

**Restructuring of Georgian Railways**

**Volume I**

**Environmental Management Plan**

# Restructuring of Georgian Railways

## Volume I Environmental Management Plan

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## EXECUTIVE SUMMARY

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This report constitutes Volume I of a two-volume report on the environmental management of Georgian Railways. It sets out a proposed Environmental Management Plan for the railway. Volume II provides a more detailed account of the current environmental legislation in Georgia relevant to the railway.

The European Bank for Reconstruction and Development (EBRD) is giving consideration to providing a loan of US\$20 million to Georgian Railways (Sakartvelos Rkinigza - SR). The project is designed to enhance the physical and economic viability of the strategically important trans-Caucasian transport corridor which links the central Asian republics of the former Soviet Union with the Black Sea ports and western Europe.

The loan to be provided to SR provides for a capital investment programme in track renewal, track maintenance, replacement of bridge sleepers, reinstatement of signalling equipment and the installation of new fibre optic communication systems. The EU Tacis TRACECA Programme (Transport Corridor Europe Caucasus Asia) is working closely with the EBRD and providing US\$6 million for the fibre optic communications and US\$1.2 million in technical co-operation. The technical co-operation programme includes the preparation of a 5-year business plan, restructuring proposals for the railway and an Environmental Management Plan.

This report sets out the current environmental status of the railway and identifies several priorities that will need to be addressed these include:

- major oil spills resulting from damaged track or poor rolling stock.
- pollution along the track at train stopping points and river crossings;
- widespread pollution and contamination issues at loading and unloading terminals; and
- waste management.

The proposed investment programme will largely generate environmental benefits but by far the largest environmental challenges that will face the railway will arise through the restructuring of SR and its proposed division into separate business and service units. The railway is faced with an enormous stockpile of redundant equipment, wagons and locomotives, and by huge problems of land contamination and emissions, non-compliant with current legislation and best practice.

This report sets out a framework EMP for the railway and proposes:

- the creation of the post of Corporate Environmental and Health and Safety Manager reporting directly to the Director General of the railway;
- the creation of the post of an Assistant Corporate Environmental and Health and Safety Manager for each of the proposed operating units of the restructured SR;
- the establishment of a corporate environmental policy;
- a complete and thorough due-diligence audit of all SR facilities and operations;
- a legislative review and the establishment of a register or database of environmental legislation;
- the establishment of a priority action list for those areas where SR is non-compliant with current legislation;
- separate EMP's for specific facilities;
- the preparation of corporate directives on *inter alia* waste management, emergency oil spill plans, materials storage, energy efficiency and recycling; and
- an early on-going training and 'train-the-trainers' programme for SR.

# 1 MISSION AND OBJECTIVES

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## 1.1 Introduction

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The European Bank for Reconstruction and Development (EBRD) is giving consideration to providing a loan of US\$20 million to Georgian Railways (Sakartvelos Rkinigza - SR). The project is designed to enhance the physical and economic viability of the strategically important trans-Caucasian transport corridor which links the central Asian republics of the former Soviet Union with the Black Sea ports and western Europe.

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This report constitutes the Environmental Management Plan for the restructured railway.

The EBRD is directed by its founding agreement to 'promote in the full range of its activities environmentally sound and sustainable development'. In order to implement this directive the Bank ensures that all of its investment and technical co-operation activities undergo environmental appraisal as part of the overall financial, economic, legal and technical due diligence process.

The Bank categorise projects in three ways:

1. **A Level** projects are 'greenfield' or major extension projects. Projects listed in this category will normally require a full Environmental Impact Analysis (EIA) as part of the loan procedure.
2. **B Level** projects are those greenfield or major extension projects not included in the EBRD listing for category A. By virtue of their size and nature they will have a lesser impact on the environment and will require an Environmental Analysis (EA). The EA is similar in scope, but more limited than, a full EIA.
3. **C Level** projects are those considered not to have any potential impact on the environment and do not require either an EIA or EA.

Regardless of the above categorisation if, in the opinion of the Bank, a project requires an environmental audit it is screened in category 1. If no audit is required, it is screened in category 0.

**This project has been screened as Category B/0** and the Bank requires the preparation of an Environmental Management Plan.

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## 1.2 Environmental Management Planning

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### 1.2.1 Environmental Management and Monitoring Plans

The integration of environmental issues with all aspects of a business operation has become an accepted component of modern commercial good practice. Companies in all sectors now recognise that both for public relations risk management and financial prudence it makes sense to ensure that environment is a core business function.

Corporate Environmental Managers often form part of the senior management team of a business. They may well have overall responsibilities that extend through issues such as stack emissions, effluent discharge and waste management all the way to procurement and recycling in the office environment and the training of staff. In larger, more complex operations their functions will be delegated through the management structure to individual plant managers and administrators depending on the nature of the business. Very often, operational health and safety will be integrated into the environmental management function.

A key tool in the environmental management system of a business will be an Environmental Management Plan (EMP). The EMP will set out the environmental position of the business, review this against relevant national and international standards and practices, and examine those issues necessary to either achieve compliance and/or meet future expected regulatory requirements. In addition the EMP may address housekeeping issues which will impact on the overall profitability of the business such as waste management, recycling and procurement.

It is extremely important that the EMP is seen as working document and which provides the basis for operating an environmental management system (EMS) on a day to day basis: one that regularly sets targets, monitors progress and re-evaluates performance. The EMP should be integrated as part of the overall planning strategy of an operation and should track the development of the corporate business plan.

### 1.2.2 Environmental Management Plan for SR

An EMP plan for SR will not only be a requirement of the EBRD loan but will make good business sense for the restructured railway and form part of the 5-year business plan.

Current responsibility for environmental matters within SR rests with the Head of Scientific Technical and Information Services within the Chief Engineer's Directorate. Although SR recognise the need for environmentally sustainable procedures and operations no environmental policy or EMP for the railway has been prepared.

The objective of this report has been to prepare a draft EMP plan for SR which will provide a framework for the environmental management of the railway and a priority action plan.

The report will:

- set out the current environmental problems on the railway which are based on a series of interviews with key staff, site visits and background information;
- review the present environmental standards and guidance in Georgia which SR will need to meet;
- describe the likely impacts of both the capital investment programme to be funded by EBRD and the restructuring proposals for the railway;
- propose an Environmental Management Plan for SR together with priority actions; and
- set out roles and responsibilities and training needs within a new SR structure.

## **2 PROJECT DESCRIPTION**

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### **2.1 Current Operations**

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#### **2.1.1 Operations, Infrastructure, Rolling Stock, Traffic**

The Georgian Railway system is a link of key strategic importance in the Caucasus. It connects the central Asian republics of Turkmenistan, Uzbekistan, Tadjikistan, Kyrgyzstan and Kazakhstan via the Caspian Sea and Baku in Azerbaijan to the Black Sea ports and western Europe. The trans-Caucasian section of the rail link consists of 924km of electrified double track connecting Baku to the Georgian ports of Poti and Batumi.

Georgian Railways has a route length of 1569km of which approximately 270km is double tracked. The main section consists of the trans-Caucasian link to Baku but there are also important connections to Armenia and Moscow (although the Moscow link is closed at the time of writing due to the conflict in Abkhazia).

The railway is laid to Russian standard gauge with a mix of concrete and wooden sleepers which support 65kg heavy section flat bottomed rail suitable for a maximum loading of 25 tonnes. The main lines are electrified at 3.3kv. The line and related structures are in very poor condition in many parts, forcing speed restrictions on several sections.

Rolling stock consists of 1176 passenger vehicles of which 534 are operational and 20,000 freight vehicles of which 5000 are in service. The locomotive fleet is 300 of which 59 units are operational.

Traffic on the railway collapsed with the break-up of the Soviet Union. Freight traffic was 36 million tonnes in 1988 and declined to 4 million tonnes in 1995, similarly passenger traffic fell from 17 million to 3 million over the same period. Since 1995 freight traffic has begun to recover based primarily on oil from Kazakhstan via the Caspian Sea.

Freight is the dominant source of traffic for SR accounting for greater than half of the total tonnage carried. Of the total freight traffic of 7.2 million tonnes in 1997 over half was oil in transit, the main growth coming from the Tengiz crude oil field operated by Chevron in Kazakhstan. Other oil products come from SOCAR (the State Oil Company of Azerbaijan) and from Turkmenistan. Most oil traffic is westward through Georgia and, although a number of pipelines are currently being planned, oil traffic will dominate the freight rail market for the foreseeable future with substantial reserves in Azerbaijan, Kazakhstan and Turkmenistan yet to be developed.

Freight traffic eastbound from the Black Sea is the second most important source of traffic for SR (1.23 million tonnes in 1997). The traffic consists of grain, flour, sugar, foodstuffs and consumer durables.

#### **2.1.2 Organisational Structure**

Responsibility for environmental issues in SR currently rests with Mr Tornike Kupatadze, Head of the Scientific and Technical Progress and Information Division. He has two further specialists working for him the principal one of whom is Prof. Marat Tsitskishvili the founder and first vice-president of the Georgian Academy of Sciences who is employed on a part-time basis.

The Scientific and Technical Progress and Information Division reports to the Chief Engineer who is a First Deputy of SR. The Chief Engineer in turn reports directly to the Head of the Railway Department.

There is no Environmental Management Plan in place for the railway and the work of the Division is principally to:

- receive, co-ordinate and act upon all environmental data related to railway operations that is issued by the Georgian Ministry of Environment;
- approve and issue a railway 'ecological passport' for all railway facilities. A site audit is carried out by the Division as part of the process and a comparison made with national regulatory standards. A facility may either be stopped from operating if it is non-compliant or asked to prepare an Environmental Action Plan. Fines may be applied in appropriate circumstances.

An 'ecological passport' for a facility should be renewed every five years. In practice, however, the railway authority have neither the money nor the resources to carry out this work and no railway facilities have valid ecological passports.

The Division have no dedicated laboratories or mobile laboratories and there is no emergency response team to deal with major environmental incidents.

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## **2.2 Investment Components**

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The investment financed by the EBRD and the EU-Tacis programme can be broadly grouped into two elements:

- capital investment programme;
- technical assistance and restructuring.

The programmes are described in more detail below and the potential environmental impacts outlined in section 6.

### **2.2.1 Capital Investment Programme**

This element of the programme includes the following components:

- track renewal over 35km of life-expired sections of the track between Samtredia and Agara (10km east of Khashuri on the main line - see Figure 1). The programme will involve complete track replacement, including supply and installation of new ballast and the re-profiling of track formation to eliminate problems with track drainage;
- track replacement equipment to complement the track renewal programme;
- replacement of bridge sleepers and the repainting of selected bridges;
- reinstatement of the signalling system; and
- the extension of the fibre optic communications line east from Samtredia.

### **2.2.2 Technical Assistance and Restructuring**

The principal components of this portion of the programme are:

- the separation of policy and operating responsibilities in the railway sector with SR being established as a government owned joint stock company;
- the need for SR to be managed according to commercial principles and the division of the freight and passenger businesses into separate profit centres;
- the drafting of a 5-year Business Plan.



### 3 LEGISLATIVE FRAMEWORK

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This section provides a brief overview of the environmental administrative structures and requirements for Georgia which relate to the operations of SR. Volume II of this report contains further details on all aspects of the requirements for environmental protection in Georgia.

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#### 3.1 Environmental Administration and Agencies

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The Ministry of Environment is the main state regulatory body in the field of environment. It consists of several departments responsible for a variety of activities including environmental policy, economics and education.

The principal responsibilities of the Ministry of the Environment are to implement Georgian legislation on environmental issues and to set standards and provide guidance. The principal statutory instruments involved are:

- the Environmental Protection Act (1997);
- the Protected Areas Act (1997);
- State Ecological Examination Act (1997); and
- the Law on State Ecological Examination (1997).

Of these the Environmental Protection Act (EPA) forms the legal basis for the other statutory instruments as well as the provisions on Environmental Impact Assessment.

The environmental standards used in Georgia under the Soviet Union were based on Maximum Allowable Concentrations (MACs). MAC's set by various departments of the Ministry of Environment exist in relation to the discharge of wastewater and emissions to air. However, implementation of these standards has not been successful as they were often unrealistic. Currently new standards are under development-based EPA provisions although the principal progress in this area will depend on new water and air laws replacing the 1974 and 1981 Soviet Union laws.

Environmental legislation, standards and guidance apply equally to private and public sector enterprises. In practice, however, little attention has been given by SR to environmental issues and their current environmental team do not possess the resources to ensure the implementation of environmental legislation and guidance. An early requirement of the a restructured SR would be to instigate the establishment of an inventory/database of all relevant legislation and guidance applicable to their operations.

Currently the Ministry of Environment have no information on railway activities and do not know whether railway operations comply with existing standards or to what extent they differ.

##### 3.1.1 Interface with Georgian Railways

As mentioned above the principal responsibility of the Ministry of Environment is to set the regulatory standards and guidelines for Georgia and to monitor their implementation and compliance through the issue of environmental permits.

The Ministry of Environment believe the environmental group within SR to be under-funded and under-staffed and the only interaction between both organisations tends to be in response to a major pollution incident.

Emergency response planning is discussed in more detail in Chapter 6, but in essence liaison between the various parties when a major pollution incident occurs is poor. As mentioned above SR have neither an emergency response team nor established procedures for post-emergency clean-up. As a result the Ministry of Environment harbour serious concerns that pollution problems are not adequately cleaned-up.

## 4 CURRENT ENVIRONMENTAL PROBLEMS

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Discussions took place during the project with a number of individuals both in SR and the Ministry of Environment regarding the current environmental problems of the railway and how they might be addressed. These individuals were:

- Solomon Tsabadze, Head, Department of Environmental Permits and State Ecological Examination (Ministry of Environment).
- Otar Turmanidze, Deputy Head, Department of Environmental Permits and State Ecological Examination (Ministry of Environment).
- Ekaterina Khmaladze, Head, Division of State Ecological Examination (Ministry of Environment).
- Tornike Kupatadze, Head, Scientific and Technical Progress and Information Division (SR)
- Prof. Marat Tsitskishivili, Environmental Specialist (SR)

Site visits were also undertaken to the sidings and oil terminal at Gachiani, east of Tbilisi. As mentioned previously, there has been an enormous decline in traffic on SR since the break-up of the Soviet Union. This has led to a corresponding fall in revenue and this lack of financial stability combined with hostilities in some parts of the country have meant that there is a huge backlog of investment and maintenance on the railway. Virtually every aspect of SR has suffered, resulting in large scale environmental problems principally related to the carriage of oil and other hydrocarbons on the network.

These problems can be summarised under four headings:

- major oil spills resulting from damaged track causing derailments or poor rolling stock;
- pollution along the track at train stopping points and river crossings;
- widespread pollution and contamination issues at loading and unloading terminals; and
- waste management.

### 4.1.1 Major Oil Spills

Major oil spills are the largest cause of environmental concern both for the railway and the Ministry of Environment. During 1998, up to the time of writing, there had been four major incidents.

#### **Supsa**

At Supsa - on the line from Samtredia to Batumi near the Black Sea coast - the derailment of an oil shipment caused widespread pollution: four dwellings were affected along with local roads and fields. The railway paid for the clean-up operation and excavated the affected soil to 1m depth. The Ministry of Environment are still not satisfied that the clean-up has been conducted thoroughly.

#### **Vale**

At Vale, which is off the mainline east of Khashuri, another derailment of an oil shipment caused pollution of a local watercourse.

#### **Gachiani**

Gachiani is a mainline station and wagon marshalling yard east of Tbilisi. During the summer a major fire and oil spill occurred when a number of oil tankers caught fire in the high temperatures.

The Ministry of Environment is most concerned to reduce the likelihood of a major oil spill within a national park. The mainline passes through the Borjomi National Park (see Figure 2) for some 20km and the secondary line through the Park between Khashuri and Vale for some 50km. The Borjomi National Park is considered as a most sensitive area and several minor rail incidents have occurred within the Park

In addition there is a particularly difficult section of track between Zestaponi and Khashuri where the mainline traverses the valleys of the River Kvirila and Dzirula. Some of the track radii in this section are only up to 200m and derailments have occurred.

#### **4.1.2 Track Pollution**

The Ministry of Environment believe pollution along the track to be a potentially major, yet still unquantified problem. The most serious concerns are where trains stop near rivers and important water abstraction points - so called 'hot spots' by the Ministry of Environment - and oil and other contamination from the stationary train leaks onto the track.

The Ministry of Environment would wish to see a thorough audit of the railway track in order to identify where these hot spots are and to propose measures such as adequate drainage and oil interceptors to counter the potential problem.

The Ministry of Environment also point to concerns of more widespread track bed pollution resulting from the use and maintenance of wooden sleepers. Wooden sleepers tend to cause track bed pollution resulting from their treatment with creosote designed to prolong their use. Creosote is distilled from coal and contains naphthalene, thenol and anthracene all of which will be washed into the track ballast. The proposed track replacement programme should go some way to alleviate this problem but in the longer term all wooden sleepers will clearly need to be replaced.

#### **4.1.3 Pollution at Loading/Unloading Terminals**

Pollution at loading and unloading terminals is a further cause of concern for the Ministry of Environment. Again, the Ministry would wish to see these facilities properly managed on environmental grounds with the provision of appropriate wastewater treatment systems, drainage and oil interceptors.

#### **4.1.4 Waste Management**

The Ministry of Environment would like to see a thorough review by SR of the quantity, type and disposal mechanisms of the waste produced by the railway - both solid and liquid. They would also like to see a review of the projected increases in waste arisings given the anticipated increases in traffic with the future development of the central Asian oilfields.

There is currently no legislation in place in Georgia on solid waste management but the Ministry of Environment would like to see SR introduce their own code of practice pending state legislation.

Other issues of concern in this area include the storage of chemicals and hazardous substances.

Other issues, not specifically mentioned by either SR or the Ministry of Environment are likelt to include fuel storage, train washing and contamination at maintenance depots and marshalling yards.

## **5 PROJECT ENVIRONMENTAL IMPACTS**

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### **5.1 Capital Investment Programme**

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#### **5.1.1 Introduction**

The immediate impacts of the overall investment programme are likely to be those which will result from the capital elements and will relate principally to the track replacement programme. Environmental impacts will include potential problems arising from the removal of contaminated ballast and the disposal of waste.

#### **5.1.2 Track renewal**

Track renewal will take place over 35km of life expired sections of the track between Samtredia and Agara (10km east of Khashuri on the main line - see Figure 1). The programme will involve complete track replacement, including supply and installation of new ballast and the re-profiling of track formation to eliminate problems with track drainage. The proposed renewal will be with concrete sleepers fastened with elastic fasteners.

Overall the impact of track replacement is likely to have a beneficial effect on the environment by reducing the potential incidence of derailments and hence major oil spills. If a major incident does occur, improved signalling and telecommunications should greatly enhance the response time of the emergency services and decrease the potential contamination effects.

The principal environmental problems which are likely to be encountered include:

- the disturbance of contaminated land and contaminated clinker during the track replacement programme and the necessity of ensuring the safe disposal of such material;
- the requirement to ensure that such contamination does not enter the groundwater system;
- noise and vibration impacts associated with track laying and tamping of ballast;

#### **5.1.3 Bridge sleeper replacement**

Again, the replacement of bridge sleepers is likely to have an overall beneficial effect on the environment by significantly reducing the potential for derailments. There will be the potential for contamination of watercourses during sleeper replacement brought about by the disturbance of contaminated ballast and the need to either clean or replace it.

#### **5.1.4 Signalling and telecommunications**

Similarly new signalling and telecommunication systems will significantly improve the environmental performance of the railway by increasing response times for polluting incidents on the track.

Other impacts that may occur include:

- noise arising from new signalling equipment during construction and operation; and
- possible electromagnetic effects of new signalling equipment.

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## 5.2 Restructuring

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The 5-year Business Plan for the railway, developed as part of this project, recommends the division of SR into a number of strategic business and service units. It is proposed that SR has two main business units:

- a passenger business unit; and
- a freight business unit.

These will be served by two new service units, namely:

- rolling stock; and
- infrastructure

Two further units will provide the overall corporate functions for the restructured railway. These will be:

- corporate services (including, *inter alia*, finance, procurement, IT and legal services); and
- ancillary services.

The reorganisation of SR into these units will create a number of new environmental challenges which will cover the entire operations of SR from the disposal of waste, through the procurement of new rolling stock to good office working practices.

### 5.2.1 Passenger Business

The following key areas are considered to have a potential impact on the environment during the period of the first 5-year Business Plan.

#### **Passenger stations improvements**

- construction impact of new buildings or changes to existing buildings;
- noise and vibration arising from construction;
- chemical or fuel pollution of water courses arising from demolition and construction;
- alterations to services; and
- Increased road feeder traffic.

#### **Closure of passenger stations**

- disposal of waste materials;
- disconnection of services; and
- clean-up of site area

#### **New Passenger Coaches**

- Environmental benefits include:
  - controlled emission toilets and the non disposal of effluent to track;
  - reduction in noise and vibration due to better suspension although there will be a potential corresponding increase in noise and vibration due to the increased speed of trains.

### 5.2.2 Freight Business

Freight Business developments and key activities included in the 5- year Business Plan that may have an environmental effect include:

- reduction of sidings at two marshalling yards at Samtredia and Tbilisi Sort;
- closure and removal of equipment at several current freight stations - locations undefined at present;
- removal of tracks and cranes;
- removal of redundant buildings; and
- changes to services at various locations.
- concentration of freight activity at main centres - locations undefined at present;
- new handling equipment;
- increased road vehicle effect;
- possible new buildings and services including the creation of improved and new container terminals; and
- increased risk of incidents due to more trains although mitigated through better track and signalling control

### 5.2.3 Rolling Stock Service Unit

The Rolling Stock Service Unit will be responsible for the purchase and maintenance of all rolling stock including all locomotives, wagons and carriages. It will also be responsible for the disposal of old rolling stock.

Large volumes of industrial waste will be generated by the restructuring of the railway and the need to scrap redundant track and rolling stock. Well in excess of 0.5 million tonnes of industrial waste will need to be disposed of. Particular problems are likely to include:

- scrap metal;
- asbestos in coach linings;
- PCB's in diesel locomotive transformers;
- plastic seating;
- de-greasing agents;
- oils and heavy metals including lead, chromium, magnesium and zinc in coach wagon and locomotive components; and
- CFC's in refrigerated wagons.

A waste disposal strategy will need to be developed which will form part of the SR's Environmental Management Plan (see section 6). The Environmental Management Plan will need to include procedures for the safe stripping of contaminants and the occupational health and safety issues that will also arise. Most of the waste will need to go to dedicated industrial waste landfill sites. Although there may be scope for recycling/reusing some components.

### 5.2.4 Infrastructure Service Unit

The Infrastructure Service Unit will be responsible for train control, signalling, communications, electrical and permanent way infrastructure.

Environmental issues will include:

- the safe disposal of surplus line side scrap after track work;
- disposal of old ballast;
- operation of stone quarries;
- visual impact of electrification masts;
- ballast dust whilst track renewal works are in progress; and
- noise whilst work is in progress.

## 5.2.5 Corporate Services and Health and Safety

The key issues related to the Corporate Services provided for the Georgian Railways reflect the movement towards commercialisation over a 5 year period. The Business Plan has specific targets to be achieved year on year during the period of the plan and these include:

- provision of high quality support services to meet business sector needs;
- co-ordination of policy planning activities to present integrated plans;
- provide centralised accounting and administration for strategic purposes; and
- provide a centralised legal function on a company-wide basis.

Items which will need addressing in respect to environmental impact include:

- recycling;
- office environment;
- IT;
- health and safety; and
- accommodation

The main requirements of each activity during the 5 years are as follows:

### *Corporate planning*

This unit will provide policy support to the business units and DG. The environmental issues relate to:

### *IT and Computer systems*

The section will employ around 120 people providing installation and support to the businesses throughout Georgia. The main objectives will be to implement comprehensive modern computer systems and networks to assist business productivity and performance. This should include connections with neighbouring railways. The Information Computing Centre is well equipped with modern computers and there are also computers at other enterprises, stations and depots.

### *Finance and Control*

This section provides accounting and audit support to the businesses through application of networked financial packages. The section will employ 80 personnel mostly HQ based but travelling to offices throughout the network. The plan envisages implementation of robust financial procedures and systems, linked to an IT strategy for development step by step over the 5 year period of the business plan. The key tasks of the function are to prepare and co-ordinate the corporate budget and forecasts and will be responsible for Treasury and Cash control, accounting procedures and debt management.

### *Procurement*

This section will be responsible for the tendering and central purchasing of services and equipment for supply to the businesses. Where appropriate outsourcing procedures will be developed and implemented. Comprehensive capability will be achieved in the first year of the plan and enhanced during the next 4 years of the plan.

### *Real Estate*

The management of property disposal, rent and development will be handled by this division. These will include valuation and presentation to the market working as a support to the businesses to identify and categorise land as operational and non-operational. An action plan will be developed for implementation during the 5 year period of the plan to dispose of redundant land and exploit commercial opportunities.



### *Organisation*

The organisation section will be responsible for the support to the businesses in implementing the new structures . This division will operate for 2 years then be absorbed within the Human Resources section The key responsibilities will be to establish organisation principles in the development of the corporate plan.

## 6 CORPORATE ENVIRONMENTAL MANAGEMENT PLAN

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### 6.1 Introduction

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As mentioned previously, the adoption of an overall environmental management system (EMS) for SR, incorporating an Environmental Management Plan (EMP) will be both a fundamental requirement for the loan disbursement to the railway and make good business sense.

The fundamentals of the EMP are:

- the establishment of the correct corporate structure;
  - an audit of existing facilities and operations in order to fully understand the current environmental problems which SR are facing;
  - a thorough legislative review and a comparison with the current compliance status of SR;
  - development of priority action plan;
  - setting of targets and timescales for meeting the priority action plan.
- 

### 6.2 Corporate Structure

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The 5-year Business Plan envisages the formation of two business units (freight and passengers), two service units (infrastructure and rolling stock) and two corporate units. Each of these units will have a Director who will report to the Director General. It is proposed that a new role of Corporate Environmental and Health and Safety Manager is also created reporting directly to the Director General and with Board level responsibility for environmental issues company wide.

It will be the function of the Corporate Environmental and Health and Safety Manager to set the overall corporate objectives for environmental management in SR, prepare the detailed EMP, and to agree overall company-wide directives or policies on issues such as waste management, recycling and energy conservation.

The Corporate Environmental and Health and Safety Manager will have an Assistant Manager located within each of the service, business and corporate units forming a team of seven senior individuals. The Assistant Managers will be responsible for the implementation at unit level of the Environmental Management Plan including setting targets for their business sector, monitoring progress and providing training to key individuals within the various sections of their unit.

#### 6.2.1 Corporate Environmental Commitment

The first priority of the new EMP for the railway will be to develop a corporate environmental commitment which may be embodied in an overall Mission Statement and to set clear goals for environmental improvement over the life of the first 5-year Business Plan. An appropriate Mission Statement may be:

*"To transport freight and passengers, quickly, efficiently and safely by offering a high-quality cost-effective service that has due regard for the environment of Georgia. To meet its commitments to environmental protection, as embodied in the Environmental Protection Act and International treaties, SR will implement an Environmental Management Plan that will progressively reduce its consumption of resources, emissions of pollutants and seek to provide for the improvement of environmental management practices in its operations and facilities"*

Such a statement should be agreed and signed by the Board of SR and disseminated to all employees.

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## 6.3 Environmental Management Plan

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It will be the principal responsibility of the Corporate Environmental and Health and Safety Manager to prepare and implement an Environmental Management Plan (EMP) for the railway. This section will outline the framework for the plan, the actions required, priorities that have been identified and potential monitoring requirements. Section 8 will identify implementation requirements including responsibilities, training and support. The framework for the EMP has been discussed with:

- Tornike Kupatadze, Head, Scientific and Technical Progress and Information Division (SR);
- Prof. Marat Tsitskishvili, Environmental Specialist (SR); and
- Solomon Tsabadze, Head, Department of Environmental Permits and State Ecological Examination (Ministry of Environment).

### 6.3.1 Framework

The framework for an EMP for SR will need to be structured around the following elements:

1. a thorough environmental audit of all SR operations and facilities;
2. the compilation of a legislative database that clearly defines the legal responsibilities of SR towards the environment and contains procedures for updating it regularly;
3. a comparison between the audit findings and the legal responsibilities of SR;
4. a definition of the areas for improvement;
5. a prioritisation of these areas;
6. a set of clear, measurable and auditable targets for improvement; and
7. a timescale for measuring progress towards these targets.

### 6.3.2 Audit

SR will need to conduct as a first priority a complete audit of all its operations and facilities. These will include, *inter alia*, all freight depots, passenger stations and maintenance depots as well as office practices, heating, lighting and recycling.

Particular attention will need to be paid to those areas likely to give rise to the greatest environmental problems and these will include:

- emissions to air;
- water and waste water - use and disposal;
- materials handling, storage and transport;
- management of hazardous materials;
- waste arisings, management and disposal;
- noise, odour and vibration; and
- land contamination.

With regard to operations attention will need to be given to the priority areas identified by the Ministry of Environment. These include:

- pollution along the track at train stopping points and river crossings and the identification of areas most at risk from contamination - so called 'hot spots'; and

- identification of the causes of derailments and oils spills and an audit and review of the success of clean-up initiatives where these have occurred.

The audit will need to be undertaken by appropriate trained personnel (see section 7) familiar with the operations of the railway and be conducted according to current best practice in environmental auditing. A checklist system is recommended for the audit, covering *at a minimum*, those areas listed above but also where possible examining other issues such as general housekeeping and identifying potential improvement areas such as waste reduction, opportunities for the use of cleaner technology and energy use and conservation.

The audit should be based on:

- discussions with facility personnel;
- an examination of past records relating to emissions and discharges and incidents; and
- on-site testing and monitoring where records do not exist or are incomplete.

An appropriate starting point for the environmental audit could be the 'ecological passport' system. Of the approximately 60 railway facilities that exist currently none have valid ecological passports. It is estimated by SR that around 12 facilities could be audited each year completing the initial round by the end of the first 5-year Business Plan. Under the present system a passport is valid for five years and it is recommended that this system is retained on a rolling five year basis coinciding with the business plan.

### 6.3.3 Regulatory Compliance

Volume II of this report provides a review of the current legislation and guidance that SR will need to comply with. At present it is unlikely that SR hold any of the necessary certificates to show that it is in compliance with regulatory requirements in relation to emissions to air, water and solid waste management.

Based on the review undertaken for this report, SR should instigate the setting up of a database of all legislation that it needs to comply with. The database should be maintained centrally but must be accessible to each facility so that individual facility managers are fully aware of their commitments and compliance status.

A comparison will need to be made by SR of the audit findings and regulatory compliance status. Given the history of the railway and the current backlog of investment and maintenance there will be a need for SR to bring many of its facilities and operations into compliance. These areas will need to be prioritised and clear and auditable targets set for achieving compliance within a timescale appropriate to the scale of the problem and the measures required to deal with it.

### 6.3.4 Priorities for improvement

A number of priority areas and issues will arise from the environmental audit and compliance status of SR and appropriate environmental action plans and remediation plans established. A full audit of the railway is a lengthy process and one which was outside the scope of this report. However, discussions between SR and the Ministry of Environment, revealed a number of immediate issues which SR will need to address. These are:

- major oil spills resulting from damaged track or poor rolling stock;
- emergency response planning
- pollution along the track at train stopping points and river crossings;
- widespread pollution and contamination issues at loading and unloading terminals; and
- waste management.

(a) Oil Spills

The avoidance of oil spills, particularly in the sensitive national parks is a major area of concern for the Ministry of Environment. This concern will increase as traffic grows with the opening of new oil fields such as the Tengiz crude oil field operated by Chevron in Kazakhstan and the passage of other oil products from SOCAR (the State Oil Company of Azerbaijan) and from Turkmenistan.

Derailments leading to oil spills will be a consequence of several factors either operating individually or in concert. These factors will include:

- the condition of the track;
- the configuration of the wagon bogies;
- speed of the train; and
- the radius of track curvature;

The track replacement programme which is underway in Georgia and the investment in new track brought about by the EBRD loan, will greatly assist in improving track conditions and hence safety and environmental concerns.

The configuration of the wagon bogies, particularly those which pass through sensitive areas will need to be examined closely. Standard bogies consist of two axles, each with four wheels and the majority of oil transport wagons in use currently seem to conform to this pattern. However, recent developments have included the introduction of four axle bogies supporting a total of sixteen wheels. It is likely that this configuration, allowing a 160 tonne laden load to be transported, is more susceptible to derailment particularly on tight radius curves.

It is not known what caused the recent derailments in Georgia as this information was not available but an urgent priority of the Environmental Management Plan should be to examine closely the statistics relating to derailments and examine any correlation between bogie configuration, speed and curvature. This analysis should result in actions items for the EMP which may:

- make recommendations not to run four axle bogies through sensitive zones and/or limit their speed through such areas;
- place speed restrictions on trains through sensitive zones; and
- recommend possible track re-configuration through sensitive zones to avoid tight radius curves.

In addition, the EMP should clearly state the importance of ensuring that wagons are securely sealed before departure.

(b) Emergency Response Planning and Clean-up

Allied to the problem of oil spills, SR will need to enhance its emergency response planning and clean-up procedures both of which the Ministry of Environment have expressed concerns about.

New signalling and telecommunications will greatly assist in the response time of emergency services but, nonetheless, the EMP will need to address emergency response planning. It should be recommended that an Emergency Response Directive is drafted which will include the formation of an *ad hoc* Emergency Response Group (ERG) chaired by the Corporate Environmental Health and Safety Manager and formed from key members of SR in the other directorates *and* appropriate officials from the Ministry of Environment.

The responsibility of the ERG would be to receive information on an emergency situation, assess the response required and mobilise the necessary resources to limit the potential.

Acting alongside the ERG, SR will need to recommend, as part of the EMP, the formation of an Emergency Response Unit, formed from railway personnel and trained in containment and clean-up procedures.

Clean-up procedures should be sanctioned by the ERG, which as it will also contain Ministry of Environment officials, will be able to co-ordinate and agree actions.

(c) Stopping points and river crossings

The environmental audit should identify stopping points for trains in potential 'hot spots', that is those areas near to water abstraction zones, in national parks or in other ecologically sensitive areas.

The scale of any potential contamination problem will need to be assessed in these areas through ground investigations and potential remediation measures sought. Remediation measures which may be recommended in the EMP include:

- the avoidance of stopping locomotives in potential 'hot spots';
- oil trap mats in sensitive areas and on bridges to absorb spillage from tanks and locomotives.

(d) Loading/unloading terminals

Again the scale of the problem will need to be addressed through the environmental audit and potential remediation problems identified as part of the environmental action plan.

As part of this project the Gachiani oil loading terminal near Tbilisi was visited. The facility is a modern one where oil from Georgian oilfields is transferred direct by pipeline to the terminal for loading onto tanker wagons. A limited site inspection showed it to be a relatively clean facility with good drainage systems and apparently oil interceptors.

The Gachiani terminal is a clear illustration of what can be achieved by good design and investment and the EMP will, similarly need to recommend appropriate drainage, water treatment and oil interceptor systems for loading/unloading terminals.

For existing facilities clean-up operations appropriate to the scale of the problem will need to be recommended in conjunction with the longer term measures noted above.

(e) Waste management

Waste management will be a major issue for the restructured railway given the enormous surplus of rails, sleepers, locomotives and wagons that will need to be disposed of.

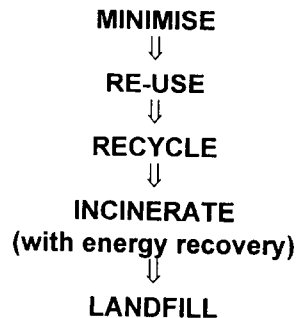
Much of this will contain toxic substances including:

- asbestos in coach linings;
- PCB's in diesel locomotive transformers;
- plastic seating;
- de-greasing agents;
- oils and heavy metals including lead, chromium, magnesium and zinc in coach wagon and locomotive components; and
- CFC's in refrigerated wagons.

A waste disposal strategy will need to be developed which will form part of the SR's Environmental Management Plan. The EMP will need to include procedures for the safe stripping of contaminants and the occupational health and safety issues that will also arise.

Procedures will need to be put in place to ensure that the waste goes to dedicated industrial and special waste landfill and/or incinerator sites and to ensure its safe transport to such sites. These sites will need to be identified as part of the EMP.

For the future the EMP will need to recommend current best practice in waste management based on the waste hierarchy of:



As far as legal compliance with waste management regulations is concerned Georgia does not currently have any legislation in place although it is understood that this is currently being drafted. The EMP should ensure that it contains both a commitment to comply with this new legislation when it is on the statute books and to work towards compliance from now on.

### 6.3.5 Targets and timescale

It is essential that SR sets a series of clear targets with respect to regulatory compliance and good environmental management practice and provides these targets with an appropriate timescale. Ambitious targets are unlikely to be met, no targets at all will mean that compliance will not be achieved and the timescale must similarly being realistic to the goal that has been set.

Specific targets for operational performance in relation to issues such as wastewater discharges and air emissions can only be set by reference to current performance which itself can only be measured through the environmental audit. A thorough detailed audit is, therefore a first priority.

A reasonable timescale in which to audit all facilities would be five years, coinciding with both the ecological passport system of SR and the rolling business planning round. For the emission and discharge of specific pollutants timescales are less easy to define as they will depend on the scale of the problem and the financial resources required to address it. Priority should be given to addressing the concerns voiced by the Ministry of Environment and indeed some of these could be rapid and low cost. Critically examining the accident record, for example, and recommending lower speeds and/or bogie configurations does not require a significant investment.

## 7 RESOURCES, IMPLEMENTATION AND SCHEDULING

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### 7.1 Institutional Issues

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The principal roles of the Corporate Environmental and Health and Safety Manager and the Assistant Managers within the Directorates of the restructured SR have been described above. For the environmental performance of the railway to improve it will be critically important that:

- the new Board of SR take the environmental commitments of the railway to be a central part their overall corporate strategy;
- the roles and responsibilities of the Corporate Environmental and Health and Safety Manager and the Assistant Managers within the directorates are similarly recognised to be of central importance within the company;
- these individuals are given appropriate authority through the reporting structure of the organisation;
- where necessary the required funding, resources and/or support is made available to bring about environmental improvements to the operation of SR;
- environmental training is provided where necessary; and
- the Board of SR have a transparent reporting structure so that both employees and the general public are made aware of their environmental performance.

As well as the key environmental managers within the company it will be equally important for all facility managers and indeed all employees to have an increased awareness of their role within the overall environmental performance of the company. In particular there should be:

- an individual and collective duty of care towards the environment;
  - a roll-down of company environmental commitments to the site specific level; and
  - a requirement amongst all employees to review environmental performance specific to their activity within the company.
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### 7.2 Training

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#### 7.2.1 Corporate Environmental Manager and Assistant Managers

Professional training will be required for those individuals who will fulfil the key environmental roles within SR. This will need to be undertaken as part of the implementation schedule for the EMP and involve formal courses in environmental management and auditing, probably through an overseas institution (for example, the UK Environmental Auditors Registration Association - EARA) as well as short periods of secondment in Europe to rail companies that have developed EMP's, for example Railtrack in the UK or any of the European railway companies.

It will also be important for these individuals to be given guidance and training in the further training of those individuals at specific facilities and operations in SR who will be instrumental in implementing the EMP. This 'train-the-trainers' approach will ensure that corporate environmental goals are linked to site-specific practices



## 7.2.2 Facility and operations managers

Operational level individuals with responsibility for site specific environmental performance will be trained by Assistant Corporate Environmental Managers attached to each of the six directorates.

Training needs will be governed by the needs of the specific facility but will need to include technical issues such as the:

- guidance in the preparation of environmental management plans and action plans for their specific facility;
- guidance on follow-up site audits; and
- guidance on specific monitoring requirements.

---

## 7.3 Communications

The success of the EMP will be dependent on effective communication between the corporate environmental managers and the facility and operations managers who will have day to day responsibility for its implementation.

At the corporate level information will need to be rolled down to operations and facilities: This information will include:

- changes in environmental legislation or guidance affecting the facility or operation; and
- corporate policy or directives on issues such as energy efficiency, waste management, waste minimisation and recycling.

Similarly upward channels of communication will need to be open from facility managers to directorate level. This will enable early problems in meeting targets to be recognised and addressed as well as potential opportunities for further improvement incorporated into the corporate strategy.

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## 7.4 Implementation and scheduling

Implementation of the EMP will not be simple or rapid and this should be recognised at the outset in order to avoid unrealistic expectations. A suggested implementation schedule over the course of the first 5-year Business Plan may be as follows and in Table 1 overleaf.

<b>ACTION ITEM</b>	<b>SCHEDULE (within 5 year plan)</b>
Agree corporate policy	Month 1
Dissemination to staff	Month 1
Training of environmental managers	First 6 months and on-going
Training of operational managers	Months 6 - 9 and on-going
Begin audit of facilities	Begin month 9 - end of year 5
Register/database of legislation	Complete by end of year 1
Establish priority actions	Complete end of month 18 and on-going revision
Begin priority actions	Begin month 18 and on-going
Monitoring	On-going

**Table 1. Georgia Railways(SR): Example Framework for Environmental Management Plan**

**Subject: Institutional/Organisation Issues**

EMP Issue	Action	Individual(s) Responsible for Action	Target Date	Budget/ Resource implications / Other comments
1. Setting up the EMP	Define job descriptions for and appoint staff to positions of: a) Corporate EHS manager b) Assistant EHS managers	DG/personnel		Salaries and overheads and support staff
	Draft and agree environmental policy	cEHS manager		as above
	Modify and expand draft framework management plan	a EHS managers		as above
	Develop reporting structure for EMP - which links EHS team into operational and administrative activities	cEHS manager and assistants		as above
	Undertake an environmental training needs assessment to identify key staff in terms of roles/influence and training needs	cEHS manager and assistants		as above
	Produce draft environment risk maps centrally with information available - these can form a basis for more detailed information generated by audits of specific areas/facilities.	EHS assistants		The Environmental Risk Maps should indicate the location of sensitive areas, receptors, rivers, aquifers protected areas, wetlands etc, the location of past spillages/incidents, locations of activities which could present a risk such as oil storage, handling facilities stopping places maintenance yards etc. This will need to be built up and added to over time as information is obtained from the audits. These maps will assist in determining priority areas for action and help plan responses to future incidents.
	Set up an audit programme covering all property and facilities and track	cEHS manager and assistants		An approximate budget can be assigned - likely to be most efficient to go to competitive tender, but require as part of Terms of Reference that railway staff are involved and trained as part of the audit process
	Set up database for legislation together with procedures for updating periodically - make this available to regions/facilities	cEHS manager and computer/IT department		Time to set up database and periodically to collect and input updates and make it available electronically or paper copy to all EHS managers Use legislative review in Volume II as a starting point
	Develop environmental objectives and targets which can be used to assess performance - referring to the corporate environmental policy, the audit results and analysis of compliance status	cEHS manager and assistants		These could include <ul style="list-style-type: none"> <li>obtaining 'ecological passports' for a specified number of facilities by a certain date</li> <li>reducing the number of incidents each year</li> <li>cleaning up specified areas of contaminated ground</li> </ul>
	Compile environmental action plan and prioritise actions based on work needed to meet objectives and targets	DG/cEHS manager		Refer to Environmental risk plan, consultations with authorities, compliance analysis and business plan in drawing up priorities

**Table 1. Georgia Railways(SR): Example Framework for Environmental Management Plan**

**Subject: Institutional/Organisation Issues**

EMP Issue	Action	Individual(s) Responsible for Action	Target Date	Budget/ Resource implications / Other comments
<p><b>2. Developing an EMS to implement the EMP on a day to day basis throughout the organisation</b></p>	<p>Develop corporate directives on key environmental management issues;                      oil spill prevention                      emergency response                      waste management                      energy efficiency</p>	<p>cEHS manager supported by consultants</p>		<p>Many of these issues are closely related to reducing costs and improving efficiency of the railway operation as a whole. They could provide significant savings in the long term. If consultants are commissioned to write these directives ensure that the EHS is closely involved and directs the output so that they address the particular management structure and operational activities of the railway.</p>
	<p>Develop simple operational procedures/guidance for staff undertaking or responsible for key tasks related to implementation of EMP. For instance these might be aimed at :</p> <ul style="list-style-type: none"> <li>• staff supervising loading and unloading activities</li> <li>• maintenance staff</li> <li>• construction staff</li> </ul>	<p>EHS assistants/ technical staff</p>		<p>All staff should be aware of their specific responsibilities with respect to environmental protection and should be reminded of these responsibilities through signs and brief guidance documents.</p>
	<p>Develop an overall programme for audit , review and modification of EMP and the environmental management system as a whole for the business plan period - 5 years</p> <p>Set up liaison meetings with authorities</p> <ul style="list-style-type: none"> <li>• on emergency response -preparedness and coordination/communication</li> <li>• operational management issues relating to environment</li> </ul>	<p>c EHS manager  c EHS manager</p>		
	<p>Develop a training programme for operational and administrative staff to implement EMS</p>	<p>c EHS manager supported by outside consultants</p>		<p>Train key staff to train others and training material to be customised to particular needs of staff</p>

**Table 1. Georgia Railways (SR): Example Framework for Environmental Management Plan**

**Subject: Environmental Issues (examples)**

Issue	Site Location	Action	Individual(s) Responsible for Action	Target Date	Budget/resource implications/ Other comments
<p><b>Contaminated Material</b></p>	<p>Entire track Alignment Especially also Areas near spillage incidents Stopping points Maintenance and sidings facilities Chemical/oil and waste storage areas Asbestos or PCB containing material/equipment</p>	<p><b>Identifying Potential Contaminated Material</b> Identify locations likely to be contaminated and types of contaminants likely to be present. This should be undertaken before sites works are undertaken. If an audit has been carried out for the area -this should provide the relevant information</p> <p><b>Handling Material</b> Ensure that all on-site contractors handling contaminated material:</p> <ul style="list-style-type: none"> <li>• receive appropriate health and safety training;</li> <li>• aware of potential hazards associated with the exposure to contaminated land;</li> <li>• maintain appropriate personal hygiene practices following handling (e.g. no eating, smoking or drinking on site; washing prior to leaving site);</li> <li>• employ appropriate Personal Protective Equipment (e.g. disposable nitrile gloves, safety boots and overalls); and</li> <li>• aware of first aid procedures.</li> </ul> <p>Ensure that guidelines in the relevant method statement(s) are observed and that required risk assessments have been duly completed in accordance with statutory requirements. Documentation from these assessments should be available on site at all times.</p> <p><b>Disposal of material</b> Material identified as contaminated should be stored and disposed of in such a way that it does not cause pollution to soil, surface or groundwaters. It should be disposed of in accordance with the regulations</p>	<p>Construction/track works - Safety Manager EHS manager responsible for the area/ facility</p>		<p>Refer to guidance on dealing with contaminated material. Additional resources may need to be made available to investigate extent and type of contamination present.</p>

**Table 1. Georgia Railways (SR): Example Framework for Environmental Management Plan**

**Subject: Environmental Issues (examples)**

Issue	Site Location	Action	Individual(s) Responsible for Action	Target Date	Budget/resource implications/ Other comments
Storage of materials/wastes	<p>Entire Alignment for track works</p> <p>All areas used for storage of chemicals, oils and wastes</p>	<p>Store chemicals oils and wastes materials such that they do not escape and cause contamination of surrounding soil, groundwater and surface water courses via leaching or airborne transfer.</p> <p>It is recommended that excavated materials should be stockpiled on impermeable surfaces and covered to prevent spread of potential contamination prior to re-use or removal from site.</p> <p>Any wastewater discharged from spoil storage areas should be controlled to prevent contamination of groundwater and nearby surface water courses</p> <p>Any water that has come into contact with contaminated material shall not be discharged to public or private surface-water or foul sewers nor to watercourses. It shall be disposed of as directed by the local Water Authority, if necessary using temporary lagoons on site.</p> <p><b>Asbestos/Asbestos Waste</b> If significant quantities of asbestos and/or asbestos waste is encountered, work should stop immediately and an assessment made of the asbestos/asbestos containing material. Large pieces of rigid material should not be broken or cut. Asbestos and asbestos-containing material should be wrapped intact in plastic sheeting or placed in a sealed container or covered skip awaiting disposal by a licensed contractor.</p>			
Oil Spillage prevention		<p><b>Derailment</b> (example headings only)</p> <p><b>Fire hazards</b></p> <p><b>Unloading /loading</b></p> <p><b>Storage and handling of oils used in maintenance activities</b></p>			

**Table 1. Georgia Railways (SR): Example Framework for Environmental Management Plan**

**Subject: Environmental Issues (examples)**

Issue	Site Location	Action	Individual(s) Responsible for Action	Target Date	Budget/resource implications/ Other comments
Emergency response Plan		Co-ordination with Authorities Internal Emergency Response Unit			
Waste management		Waste Management Directive Waste management plan for each facility			
Energy Efficiency		Lighting Heating Resource use			
Procurement		Procurement policy to meet objectives relating to energy efficiency, waste management, safety etc			
Public Liaison		Communication links			
Liaison with authorities on operational activities		Communication links/meetings			

## 8 CONCLUSIONS - CURRENT PROBLEMS FUTURE ISSUES

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This report has examined the current environmental problems facing Georgian Railways and the likely impacts that will arise through the proposed investment programme of the EBRD/EU-Tacis and through the restructuring of the railway.

The investment programme will largely generate environmental benefits through improved track, track maintenance, signalling and telecommunications. However, it is important that the environmental impacts that could arise through these activities are also understood and addressed.

By far the largest environmental challenges that will face the railway will arise through the restructuring of SR and its division into separate business and service units. The railway is faced with a large stockpile of redundant equipment, wagons and locomotives, and by significant problems of land contamination and emissions, non-compliant with current legislation and best practice.

An Environmental Management Plan for the railway is both an essential requirement of the loan disbursement and makes good business sense for the restructured railway. The EMP which has been outlined in this report, and discussed with relevant officials in the Ministry of Environment and SR, sets out a framework for the future. It is essential that the overall corporate objectives outlined in the EMP are fully integrated into the planning of SR and that the new Board gives due consideration to the serious nature of the environmental issues it will face.

The reversal of years of neglect of environmental problems will not be without cost and it will be for the new Corporate Environmental Manager of SR to prioritise actions and seek Board approval for funding. It will be important for the future viability and profitability of the railway that these issues are dealt with as a matter of urgency.

## 9 FIGURES

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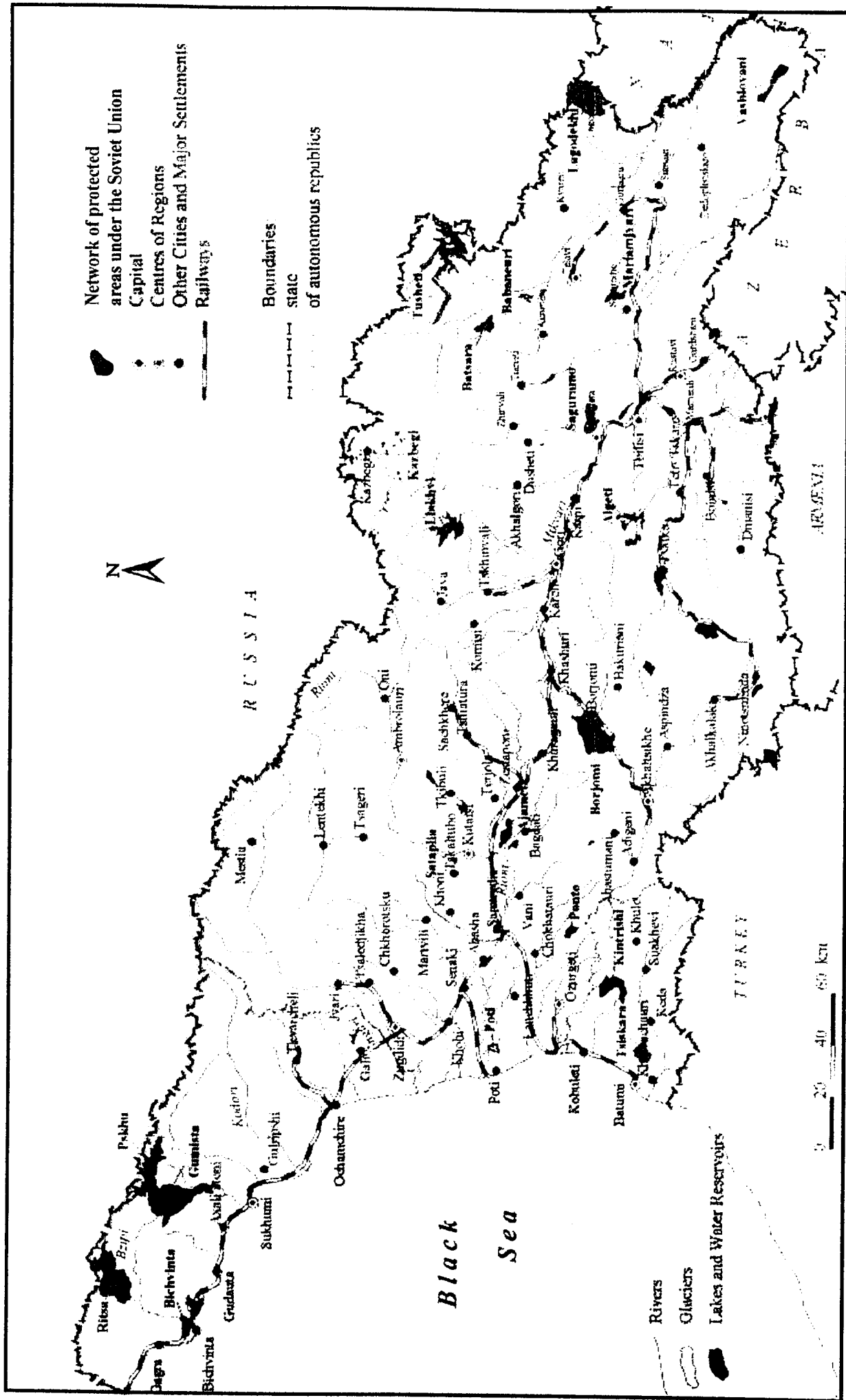


Figure 1 GEORGIA RAIL NETWORK

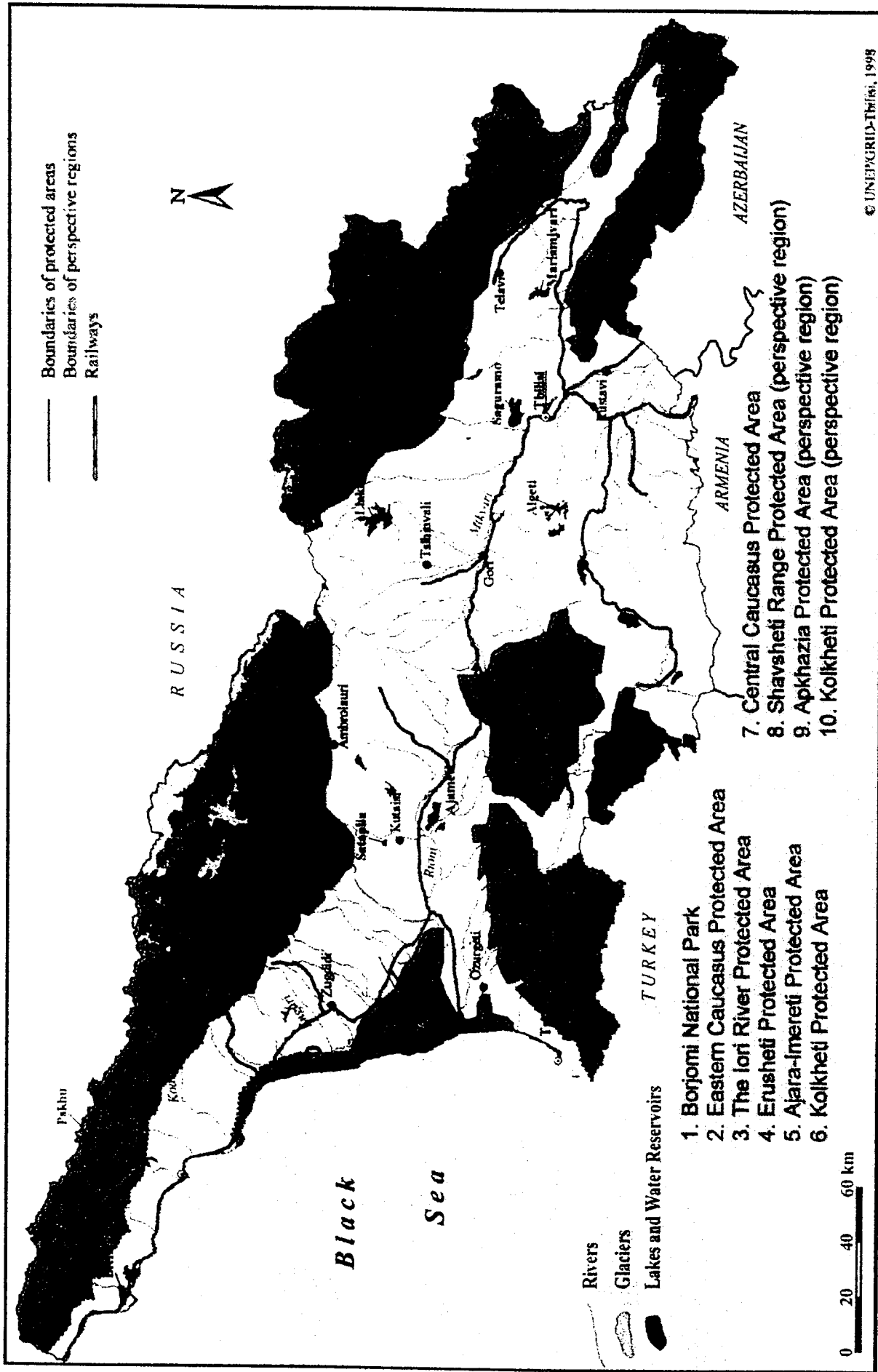


Figure 2 NATIONAL PARKS AND PROTECTED AREAS

**Restructuring of Georgian Railways**

**Environmental Management Plan**

**Volume II**

**Environmental Legislation and Structures**

# Restructuring of Georgian Railways

## Environmental Management Plan

### Volume II

## Environmental Legislation and Structures

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# 1 ENVIRONMENTAL ADMINISTRATIVE STRUCTURES

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Georgia is a democratic republic composed of 53 administrative regions and 2 autonomous republics: the Autonomous Republic of Abkhazia (Sokhumi) and the Autonomous Republic of Acharis (Bat'umi).

The foundation of Georgian Environmental legislation lies with the new Georgian Constitution, adopted on 17 October 1995, and the Land Code, 1984. The Constitution of Georgia stipulates "the right of citizens to life in a favourable environment, to have access to reliable information on its actual condition and to be compensated for any damage caused to health and to wealth by environmental infringement". The Constitution establishes a general responsibility of every citizen to protect the environment and natural resources. The Land Code establishes a right to information regarding the state of environment, stipulating that the concealment of circumstances creating a threat to the life and to the health of people shall involve legal responsibility in accordance with the Georgian Legislation.

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## 1.1 Environmental Administration and Agencies

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Legislative and executive powers in Georgia are mainly centralised. The Parliament is the major body involved in passing laws. Drafts are elaborated and debated in several Parliamentary Commissions, prior to debate in a plenary session of the Parliament. Several administrative bodies take part in the elaboration process. Key actors in the field of environment are the Commission on Environmental Protection and Natural Resources of the Parliament and the Ministry of Environment and Natural Resources Protection.

After the reorganisation of the Georgian Government in 1995, when the Cabinet of Ministers was cancelled and the position of State Minister was created, all Ministries were empowered to elaborate and implement the state policy for their relevant sector. The President, as highest executive authority, controls and supervises the general direction of such sectoral policy.

The Ministry of Environmental Protection is the main state regulatory body in the field of environment. It consists of several Departments responsible for different activities: the Department of Environmental Policy and International Relations; the Department of Environmental Economics; the Black Sea Protection Convention Department; the Department of Environmental Education, Popularisation and Public Relations and the Press Centre. The Ministry has regional (municipal) Departments of Environment in every administrative region of the Republic of Georgia.

The Ministry of Environmental Protection and its regional representatives are state bodies responsible for environmental protection on the territory of Georgia. They coordinate activities of other state committees in the field of environmental protection: for example, the Hydrometeorology Department, State Ecological Examination Department, Water Resources Protection Department and so on. The Ministry of Environmental Protection administrates directly more than 60 regional committees and inspectors. Other committees, departments and agencies also play an important role in establishing and enforcing environmental legislation and health and safety issues. Enforcement and inspection take place at the national, regional and local levels.

The main responsibilities of the Ministry of Environmental Protection include:

- comprehensive management in the area of environmental protection;
- state control and monitoring of the use and preservation of natural resources, and monitoring compliance with ecological safety standards;
- general organisation and coordination of environmental monitoring and control;

- approval of standards and regulations, participation in the development of standards regulating natural resources utilisation and protection of the environment
- conducting the state environmental reviews; and
- lawsuits demanding compensation for damages as a result of violations of environmental protection legislation.

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## 1.2 Permitting Authorities

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The set of standards used in Georgia under the Soviet regime was based on so-called Maximum Allowable Concentrations (MACs). Such MACs, set by several departments of the Ministry of Environment, still exist in relation to the discharge of waste, water quality and emissions to air. Implementation of standards has not been successful: the standards were often unrealistically strict and the economy did not allow implementation of such strict standards. At present, new types of standards are under development, based on EPA provisions. Although, the principal progress in this field depends on new water and air laws replacing the 1984 and 1981 Codes.

The procedure for permitting industrial installations is based on the law "On Environmental Protection", which includes the following aspects:

- maximum allowable (or permissible) concentrations of toxic pollutants (MAC or MPC) - these constitute the basis for developing standards of permissible environmental loading (MAC, known as "PDK" in Russian, and normally calculated in mg/m<sup>3</sup>);
- maximum allowable levels of noise, vibration, magnetic fields, and other harmful agents;
- maximum allowable levels of radiation;
- maximum allowable waste output per specific time limit and per specific agent (known as "PDV/PDS" in Russian) - set according to the specific function and conditions of the site;
- maximum allowable use of pesticides in agriculture;
- standards for environmental loading;
- maximum allowable standards for toxic substance residues in food products;
- the obligation to respect protected zones around any industrial or other type of site; and
- the requirement for final products to meet environmental standards.

PDK standards are determined for the following:

- specific air pollutants;
- specific surface water pollutants; and
- specific soil pollutants.

PDV/PDS norms are calculated for each industrial site on a time and pollutant basis as a function of the local conditions of site operations.

The "Temporary Allowed Waste Output" (known in Russian as VCV) refers to the limits imposed by the permitting authorities for industrial sites which cannot meet the PDV/PDS norms without changing its main production technology.

All permissible standards for industry environmental impacts are determined by state-empowered environmental protection agencies, state ecological examination committees and the state agencies for sanitary and epidemiological control. The Department of Sanitary and Epidemiological Control now work under the authority of the Ministry of Health.

These agencies are known as "SAS" and have a reputation for fierce resistance to whatever they consider as improperly prepared or poorly completed work in the field of industrial environmental impact assessments.

All industrial projects must be coordinated with both the Committee for Environmental Protection and with the Sanitary and Epidemiologic Control officials at the local level in cases where the project is of local importance. The project should be coordinated at both the state and local levels, however, if it is likely to effect several regions. Based on the predetermined standards, industrial sites are assigned allowances for waste output in all forms, including gaseous emissions, waste water/effluent discharges and industrial, urban, or other solid waste.

### 1.2.1 Permitting Process

#### Land

The land on which an industrial installation is to be developed must be bought or leased. The local authorities in the region must be contacted in order to initiate the construction permitting process.

#### Project Authorisation

Once local authorities of the region have issued a Decree authorising the lease or sale of the land for development as an industrial site, the project will require further agreement from the following entities:

- local architectural authorities;
- local environmental authorities;
- local sanitary authorities (Ministry of Health, Department of Sanitary and Epidemiologic Control);
- local fire inspection;
- local technical inspection (Gostekhnadzor); and
- local energy commission (for energy use limits) as there might be electricity shortages in some regions.

The control is normally accomplished in two stages:

- the preliminary stage covers the technical and economic foundation of the project; and
- the final stage covers the working project itself.

#### Documentation Required

The most important issue is obtaining permission from the State Committee for Environmental Protection, which will require:

- the carrying out of an environmental impact assessment by a Georgian company holding a proper state license for such work or by officials of State Ecological Examination Department;
- a State Ecological Expertise, ordered by the Committee for Environmental Protection at the investor's own expense; and
- an (optional) Public Environmental Expertise. This step is not obligatory but can help to influence public opinion, particularly if carried out by experts with a serious reputation and producing an independent ecological expertise of the project.

All documentation must be prepared in the Georgian language.

#### Working Project

The actual project implementation must be carried out by a specialised Georgian company properly certified for such activities, meaning it holds a special state license for designing industrial facilities. The basic western design will have to be adapted to Georgian standards in order to comply with the "Construction norms and rules" (standards, used in the Soviet system but still in force).

Normally, the contractor that prepares the Georgian version of the working project documentation is also called upon to co-ordinate the project with all local authorities.



### **Property Registration**

The purchase or lease of all lands is to be registered with the Department of Land Resources. Upon completion of construction, the project owner must register the constructed structures with the same Department of Land Resources, and obtain a certificate of property (without which no fixed property can be later sold).

This process can take from 30 to 90 days, depending on how well the basic documents have been prepared.

In the case of demolition of existing structures, agreement must be obtained from the owner of the land (if leased) and the State Architectural Committee (if buildings have any historic and/or cultural value).

All demolition must be registered with the Department of Land Resources.

### **On-Going Legal Support**

On-going legal support is strongly advised for all such projects, making use of experienced and certified Georgian legal counsel holding state licences and contacts with local authorities and local institutes.

### **Environmental Permits**

As mentioned elsewhere, environmental standards are established according to the region and the area in which the site will function.

### **Public (non-state) expertise**

The public (non-state) expertise can be executed before, during, after and separately from the State environmental expertise.

The public (non-state) expertise can be initiated by citizens, public associations, and municipal communities. The initiators wishing to proceed with the public environmental expertise of a project have to be State-registered, must follow a legally prescribed form of the expertise and must inform the public about the initiation and the results of the public expertise.

### **State environmental expertise**

The State environmental expertise is financed by the investor in the project. The investor should provide the State environmental expertise with all the documentation necessary for adequate analysis of the project and its impact on the environment. The organs of the State environmental expertise are empowered to send orders to commercial banks to halt all financial operations linked to a project that does not receive positive approval of the State environmental expertise.

The organs of the State environmental expertise are obliged to inform the Government Attorney's Office and other State authorities of all infringements to the State environmental expertise for measures to be taken to stop all projects that are not approved by the State environmental expertise.

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## **1.3 Inspection Authorities**

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Inspections ("Environmental Control") are authorised by the law "On Environmental Protection" in the following forms:

- state service for monitoring environmental conditions;
- state inspections;
- (on site) production inspections; and

- public inspections.

The main authorities for carrying out environmental inspections are as follows:

- Authorities of general competence, such as the Government of Georgia and local administrations;
- Specially empowered State agencies, including:
  - ◊ State Department for Sanitary and Epidemiological Control;
  - ◊ State Department for Land Resources Protection and Waste Management;
  - ◊ State Department of Subsoil Protection; and
  - ◊ State Committee for Construction.
- Ministry of Environmental Protection;
- State Department of Hydrometeorology and Environmental Monitoring;
- Department of Water Resources Protection;
- Department of Forests Protection;
- Department of Air Protection;
- Department of Biodiversity Protection;
- Department of Fish Resources Protection;
- Ministry of Internal Affairs.

The Ministry of Environmental Protection now coordinates all other state agencies with environmental inspection responsibilities.

On-site production inspections are executed by the industries themselves using their own or other certified laboratories. State environmental monitoring is organised by the Ministry of Environmental Protection, which mainly uses the Department of Hydrometeorology and Environmental Monitoring for actual monitoring.

Monitoring of land is executed by the Department of Land Resources Protection and Waste Management with the participation of the Ministry of Environmental Protection, the Ministry of Agriculture, and other governmental bodies. According to the law, land may only be used for the purposes for which it was assigned, regardless of the form of ownership. The authorised uses are identified in the documents confirming the right of property. Inspections are executed by the local organs of environmental control (state inspectors or a specially created commission) which, on the one hand are to send a preliminary notification to the actor to be inspected, and on the other hand can carry out unannounced inspections on the basis of information received from third-party sources.

The general responsibilities of the State environmental control officials include the following:

- to visit facilities and organisations regardless of the type of property, including military installations;
- to check the functioning of pollution control equipment, and to determine if they comply with the law;
- to issue permits for waste output, related to the disposal of solid and other waste;
- to determine the standards for waste and toxic pollution emissions in coordination with the organs of sanitary and epidemiological control;
- to determine the necessity for organising the State expertise and to control the implementation of the resolutions formulated by the expertise;
- to require the elimination of any uncovered defects in the planning and functioning of pollution control equipment;
- to arrest those guilty of infringement of environmental protection regulations and to institute administrative and criminal proceedings against persons and companies; and
- to make the decisions to limit, to suspend or to halt the functioning of any industrial activity causing damage to the environment.

These decisions are obligatory for all ministries, organisations, companies, officials and citizens. The state environment inspector is empowered to do the following.

- issue a directive following a predetermined form in which he or she can prescribe several measures to be taken by the industrial agent to ensure their activities comply with the environmental law (such directives must have a warning that in cases where the industrial agent does not take adequate measures, the materials will be sent to the administrative commission for punishment to be applied.);
- to issue a Protocol (a record of proceedings) reflecting an infringement to the environmental law or other environmental norms and to send it directly to the administrative commission for punishment to be applied;
- render a decision (make an enactment) for a punishment application on persons guilty of violating environmental regulations;
- issue a command for the industrial agent to halt all exploitation of a site until the infringements to the environmental regulations are corrected (such a command should have a warning to send notification to the bank to suspend all financial operations of the industrial agent in question.); and
- can send to the bank servicing the industrial agent a command (using a special form) to stop the financial operations on the account of the industrial agent in question.

### 1.3.1 Environmental Fees

Environmental fees can be assessed for:

- the use of natural resources;
- the use of the natural resources beyond the authorised limits or for "irrational" use of natural resources; and
- emissions of environment pollution.

Land use fees are determined by the Code for Lands, 1984.

Fees are also prescribed by the "Code for Water", 1984, in the form of:

- water resource use fees;
- fees for reconstruction and protection of water resources which include payments for:
  - ◊ water abstraction within the allowed limits.
  - ◊ water abstraction in amounts exceeding the allowed limits.
  - ◊ wastewater discharges to bodies of water within the allowed limits.
  - ◊ wastewater discharges to bodies of water in quantities exceeding the allowed limits.
  - ◊ wastewater discharges containing pollutants in quantities exceeding the allowed limits.

A charge for issuing a licence for using a body of water is collected in the amount determined by the respective state environmental control administration; the cost of the licence is based on the expenses linked to the execution of the expertise for using this body of water.

The fee levels for using natural resources should be determined in accordance with the procedure for PDV/PDS identification for each industrial/commercial agent. The fees for using natural resources are calculated on the basis of individually determined standards. Initially the fees were introduced by the Soviet Government Decree No. 32 of 1 January 1988. Based on this Decree the Ministry of Environmental Protection has developed and approved two basic forms of fees for using natural resources:

- fees for waste disposal and for other forms of harmful impacts on the environment within allowed standards (PDK). This fee is calculated by multiplying the rates (per measurement unit of pollutant) by the quantity of the pollutant. The results for each pollutant are tallied.
- fees for waste output and for other forms of harmful impact on environment within the allowed limits (PDV/PDS). This fee is calculated by multiplying the basic rates per pollutant by the difference between the standards and the limits per pollutant. The results for each pollutant are tallied. In cases where the facility exceeds the waste output limits, the fee calculation will be done by multiplying the rates foreseen for the limits by the amount of actual excess waste output. The results for each pollutant are tallied. The received sum is is

multiplied by five. In cases where a facility does not have a properly formulated permit for waste output, all the mass of the wastes is considered to exceed the limits and is to be paid in accordance with the procedure for the limit rate waste output.

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## 1.4 Health and Safety Administrations and Agencies

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The State Sanitary and Epidemiological Service is the main controlling body regarding occupational health and safety issues. The official bodies and institutions of the State Sanitary and Epidemiological Service represent the unified system, headed by the State Committee of Sanitary and Epidemiological Control. The State Sanitary and Epidemiological Service consists of the following organisations:

- State Committee for Sanitary and Epidemiological Control;
- Centres for Sanitary and Epidemiological Control in the autonomous republics, regions and cities;
- scientific Institutes for issues of sanitary and epidemiological control; and
- educational Institutes and Colleges responsible for training specialists in the field of sanitary and epidemiological control.

The State Committee for Sanitary and Epidemiological Control is the official body which issues the state sanitary norms and regulations.

Together with state technical inspection and representatives from trade unions, sanitary-epidemiological inspections are responsible for issuing permits for the construction and operation of production buildings, construction and equipment. It is required that any project design or construction works comply with requirements of the occupational health legislation which includes rational use of the territory and production premises, adequate operation of the equipment and organisation of production (technological) processes, protection of workers against harmful and dangerous production factors, compliance with sanitary and hygienic norms, regulations regarding working facilities and places and the establishment of sanitary facilities. Legislation provides economic incentives for enterprises to comply with the occupational safety standards. Tax rebates can be applied if an enterprise introduces or develops new (safer) technologies or production facilities, produce protective equipment (collective or personal) and control devices. On the contrary, if an enterprise does not comply with safety legislation fines are liable to be paid. An acceptance commission check in detail the compliance of the enterprise with occupational health and safety norms and regulations. All members of the acceptance commission (representatives of trade unions, technical inspections and sanitary-epidemic control) should sign the inspection report and acceptance certificate for new and redeveloped facilities. All working facilities should have a safety certificate.

The Standardisation, Metrologic and Certification Committee (Gosstandard) deals with the certification of production equipment and protection means.

The management of the enterprise must ensure that all working places are equipped with adequately safe facilities and protection equipment is provided. Management must ensure that all new raw materials and semi-finished products used for production purposes have passed special examinations regarding their effect on human health.

The occupational safety norms and regulations could be intersectoral, sectoral and local for each enterprise. The intersectoral norms and regulations state the health and safety rules common for several sectors of economy. They are developed by the Ministry of Labour. The sectoral norms and standards are established by appropriate ministries, departments and state control bodies. They are specific for particular types of production activity. In accordance with, and on the basis of, intersectoral and sectoral norms and standards ministries, departments

and state control bodies can approve occupational safety instructions. The management of an enterprise, in cooperation with trade unions, can develop local safety rules, based on such instructions.

The occupational health and safety standards in Georgia consist of the following:

- the system of occupational safety standards (SSBT). The state standards (GOSTs) are approved by the Gosstandard and the State Architectural Committee; the sectoral standards are approved by an appropriate central federal executive body; the enterprise standards are approved by enterprises;
- the sanitary norms, standards and hygienic regulations which are approved by the State Sanitary and Epidemiologic Control Committee and the Ministry of Health; and
- the safety rules (fire safety, radioactive safety, biological safety, technical safety).

An enterprises must assign annually funds for occupational safety measures in accordance with collective agreements. These funds must be spent exclusively on improvement of employees health and working conditions.

## 2 ENVIRONMENTAL REQUIREMENTS

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### 2.1 Environmental Management Programme

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Georgian legislation does not require companies to develop any special form of environmental management system, nor that any special personnel be hired for managing the environmental protection and pollution control equipment at enterprises. However, compliance with all applicable standards, limits, and quotas prescribed by the environmental authorities is considered extremely important. It is common practice among larger companies to hire specialised environmental personnel, to equip their own laboratories for all required environmental testing and analyses and to carry out their own laboratory certification.

Moreover, companies are required to maintain an environmental register for all aspects of inspections, maintenance and operations of their environmental protection and pollution control installations and equipment. In addition, annual reports must be prepared and presented on industrial waste, secondary waste generated by pollution control equipment, use of chemicals, actual emissions and waste generation and disposal.

#### 2.1.1 Regulatory obligations

The main principals of Georgian environmental policy and legislation are stated in the Constitution. It stipulates that "the citizens have the right to live in a favourable environment, to have access to authentic sources of information on its actual condition and to be compensated in cases of detriment caused to their health and wealth by environmental infringement."

The framework of environmental policy and regulations of Georgia is established in the following legislative documents:

- Law on Environmental Protection, adopted in 1996;
- Land Code, 1984;
- Water Code, 1984;
- Law on Air protection, 1981;
- Regulations of the Sanitary and Epidemiological Service of the Georgian Health Ministry;
- Law on State Environmental Expertise, 1996;
- Law on Environmental Permits, 1996;
- Law on the Wild Fauna Protection, 1996;
- Law on Protected Areas System, 1996;
- Law on Transition and Import of Waste to the Territory of the Republic of Georgia, 1995;
- Law on Soil Protection, 1995;
- Law on Basic Taxation, 1994.

The following drafts have been prepared or are under preparation by the Parliamentary Commission on Natural Resources and Environmental Protection and by Ministry of Environment:

- Law on Waste Management;
- Law on Hazardous Substances; and
- Water Law.

Within the above framework, the State Committee of Standardisation (Gosstandard) issues state standards for air and water quality, noise and vibration, effluent quality and many others. The Ministry of Environmental Protection develops guidance and procedures for application and utilisation of standards in particular areas of environmental protection.

## 2.1.2 Planning/Implementation of Environmental Programmes

In accordance to the Law on *State Ecological Examination*, adopted in 1996, enterprises are required to develop an environmental management plan at the very early stage of a planning activity. The Environmental management plan and mitigation measures against negative environmental impacts must be included in the planning application submitted to the local branch of Goscomecology for approval of the proposed activity.

All normative documentation should state the relations between state authorities and developer, specify the responsibilities and liabilities of both parties and determine the intended environmental protection measures as well as economic and social impact on the region. The environmental part of the documentation should include an environmental assessment of the proposed area and the following documentation:

- type and amount of natural resources to be utilised;
- type and amount of pollutants to be generated, including wastes;
- physical impacts; and
- noise, radiation, heat and other impacts.

The technical part of the documentation should include:

- information on technical and technological processes;
- information regarding materials used for production and characteristics of the final product, which include:
  - ◊ physical and chemical characteristics of the materials;
  - ◊ characteristics of bioresistivity (biodegradability) of materials in the natural environment;
  - ◊ list of environmental impacts;
  - ◊ assessment of the impact on the abiotic components of the environment (changes of chemical characteristics of air, physical-chemical characteristics of soils;
  - ◊ sanitary and hygienic assessment of the materials;
  - ◊ information on materials utilisation, storage, transportation and disposal of;
  - ◊ measurements to provide environmental safety for utilisation, storage and transportation of the materials;
  - ◊ reuse, recycling and disposal methods for materials; and
  - ◊ specific measures to provide safe disposal of the materials.

The Law on *State Ecological Examination* states that prior to any economic activity or development being undertaken it is necessary to accomplish the assessment of potential impacts of the proposed activity on the environment. It lists more than 30 activities for which a full EIA is obligatory. Among them are production of asbestos containing materials, chemical industry, paper production, highways and railways construction, construction of airports, wastewater treatment plants and large water intakes. It is also required that the following information is included in planning documentation: purpose of the development or proposed activity; alternatives; state of the environment in the proposed area; potential negative impacts; mitigation measures; monitoring and environmental management plan.

## 2.1.3 Environmental Personnel

Georgian legislation does not require companies to develop any special form of environmental management system, nor that any special personnel be hired for managing the environmental protection and pollution control equipment at enterprises. There are no specific requirements to appoint a site compliance officer. However, compliance with all applicable standards, limits, and quotas prescribed by the environmental authorities is considered extremely important. It is common practice among larger companies to hire specialised environmental personnel, to equip their own laboratories for all required environmental testing and analyses, and to carry out their own laboratory certification. The Law on Environmental Protection, 1996, states that enterprises, institutions, organisations and citizens must maintain the established

environmental quality standards by keeping to the approved technologies, by implementing ecologically safe technologies and production processes, reliable and effective operation of treatment works, facilities and means of control, treatment and utilisation of wastes, by accomplishing environmental activities and programmes to ensure the protection of lands, sub-soils, waters, forests and vegetation, animals and reproduction of natural resources.

#### **2.1.4 Environmental Record Keeping**

Companies are required to maintain an environmental register for all aspects of inspections, maintenance and operations of their environmental protection and pollution control installations and equipment. In addition, annual reports must be prepared and presented on industrial waste, secondary waste generated by pollution control equipment, use of chemicals, actual emissions and waste generation and disposal.

Other requirements regarding environmental records of air emissions, wastewater discharges, water use and waste disposal are presented in the relevant sections of this report.

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## **2.2 Air Quality**

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### **2.2.1 Air Quality Regulations and Requirements**

The Law on Air Protection, 1982, contains general provisions for air protection and the regulation of impacts on air quality in the process of economic and social development. It defines the general obligations to protect air against pollution by industries, transport, energy production and other sources, establishes a system of environmental standards and permits and contains measures to control acid rain, trans-frontier pollution, climate change and depletion of the ozone layer.

Air quality standards are introduced by federal health protection and environmental protection agencies. Air quality standards are established for each type of air pollutant and physical effects (radioactive, electromagnetic, sound and so on) separately measured in milligrams per cubic metre of air, both for total maximum concentration and daily average concentrations. These standards are established separately for work place and stack emissions.

### **2.2.2 Inventory of Air Emission Sources**

The Law defines two sources of pollution: mobile and stationary. Standards for maximum permissible levels of emissions are established for each individual type of stationary source and each mode of transport.

Maximum allowable concentrations (MAC) have been developed for 479 air pollutants. MACs play the role of a limiting factor while at the same time serving as a basis for the calculation of maximum allowable emissions. These are determined by considering the background level of pollution and the existing level of industrial impact on the environment in a given territory. There are three main levels in determining the harmful impact of a pollutant:

- maximum instant impact and the corresponding concentration;
- maximum daily impact and the corresponding concentration;
- in absence of the previous two basic parameters (certain pollutants do not have any officially prescribed parameters) there exists an "provisional level of safe concentration." Where certain official parameters of Maximum allowable concentration do not exist, the concerned company must calculate it on its own and present the data for approval to the Sanitary and Epidemiological Control administrations, which consider it in coordination with the State Committee for Environmental Protection. These two authorities then take a mutually agreed decision.



This is a rather long process, the cost of which is borne by company concerned. Thus, it is strongly recommended that the company begin the process as early as possible, particularly if the emissions are expected to contain any rare pollutant.

The ventilation, heating, and air conditioning in new buildings are to be designed and installed in accordance with the Construction Norms and Rules No.2.04.05.-86 approved by Decision No. 49 of 15 December 1986 of the USSR State Committee for Construction (still in force).

### **2.2.3 Air Emission/Stack Plan**

An emission standard is a limitation per unit of time on the maximum quantity of a pollutant that may be released into the air by a particular source. Emission standards are determined by the owner of the air emission source or its administrative entity according to the procedures described in *Limitations of Maximum Permissible Emissions and Physical Effects, 1981*. Emission standards should then be approved by the environmental or sanitary control agencies within their competence.

Maximum allowable concentrations and air emissions are to be calculated and agreed for:

- the workplace; and
- stack emissions.

Stack height plays an important role, as does the wind rose at the location of the facility, along with background air contamination of the region.

### **2.2.4 Air Emission Characteristics and Monitoring Plan**

Emissions from the facility are to comply with the maximum allowed concentrations (MAC), as noted in the table below, although it should be noted that emission limits in Georgia can be as much as one order of magnitude more restrictive than most other countries. As a result, in certain cases, the MAC may not even be measurable with current technologies and are practically never enforced. In most cases, it is necessary to work with the authorities to ensure permit conditions are reasonable for the level and type of pollutant emission anticipated.

**Table 1: Maximum Allowed Concentrations (MAC) of Selected Pollutants in Facility Emissions (mg/m<sup>3</sup>)**

Pollutant	Class of Danger	MAC (punctual)	MAC (daily) (24 hours)	Approx. Level of Safe Concentration
Dioxide of Nitrogen	2	0,085	0,04	
Oxide of Nitrogen	3	0,4	0,6	
Nitrogen three-fluoride	3	0,4	0,2	
Acrylonitrile	2		0,03	
Caprolactam	3	0,6	0,6	
Sulphur Dioxide	3	0,5	0,05	
Aniline	2	0,05	0,03	
Acetone	4	0,35	0,35	
Barium carbonate			0,004	
Barium oxide	1			0,004
Vanadium 5-oxide	1		0,002	
Particulates	3	0,5	0,15	
Vinyl acetate	3	0,15	0,15	
Bismuth oxide	3		0,05	
Hydrogen cyanide	2		0,01	
Gexan	4	60,0		
Asbestos containing dust	1		0,06	
Vinylplast dust				0,01
Natural zeolite dust				0,02
Paper dust				0,1
Wooden dust				0,1
Brass dust (by Cu)				0,003
Paraffin dust				0,6
Cement dust	3	0,3	0,3	
Dolomite dust	3	0,5	0,15	
Polypropylene dust				0,1
Phenolformaldehyde resin dust				0,05
Mercury metallic and its oxides	1		0,0003	

In addition to air emission regulations, Georgia has developed some requirements regarding air quality in buildings and at the working places. These requirements are specified in GOST 12.1.005-76 *Temperature, Moisture and Content of Pollutants in the Air of Working Zones*.

### 2.2.5 Emissions Reductions

The Law on Air Protection states that all enterprises should implement measures to reduce their emissions. Measures to protect air must not cause the pollution of soils, surface and underground waters and the general environment. According to the Law on Air Protection enterprises are required to reduce their air emission in cases of unfavourable meteorological conditions. An air emission should be limited, stopped or prohibited if it exceeds permissible level or threatens the public health.

### 2.2.6 Record keeping

According to the Law on Air Protection, 1982, enterprises are required to keep records of their emissions including type, composition and amount of pollutant.

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## 2.3 Emergency Preparedness and Response

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*There is no information available about Emergency Preparedness and Response for Georgia. For the Russian Federation the regulations are following.*

Chapter VIII of the Law on Environmental Protection concentrates on the handling of extraordinary environmental incidents and disasters, particularly in Articles 58 and 59 (see Annex 1). The Law applies primarily to large-scale environmental disasters on a regional and national levels (for emergency classification see below), and introduces the notion of a "zone of extraordinary environmental situation" which can be declared by the President of Russia in the form of a Decree which is requested and prepared by the local environmental protection authorities. All activities having a negative impact on the environment can be suspended in such zones until the required remedial measures are taken. The law also specifies that the financing of such an environmental measure is to be provided by the responsible parties (companies, ministries) as well as funds for specific Federal environmental programmes.

The Law of the Russian Federation On Protection of Population and Territory from Emergency Situations of Environmental and Technological Nature, December 21, 1994, '68-F3, which was signed by the President on 21 December 1994, also addresses the responsibility of industrial entities for environmental disasters. According to the law, companies must promptly inform the environmental protection authorities of the current (normal) and of any potential extraordinary environmental situations that could arise at their facilities. They must also make provisions for the necessary financial and material resources required to deal with the consequences of a potential environmental disaster. The Federal government issued Decree No. 1113 "On unified state system of extraordinary situations prevention and the consequences elimination" on 5 November 1995, according to which industrial operators must be prepared to inform the Ministry of Civil Protection and Extraordinary Situations of any environmental disasters that occur at their facilities.

In accordance with the above mentioned Law was issued the classification of emergency situations, approved by the Government of the Russian Federation on 13 September 1996. It classifies emergency situations as on-site, local, territorial, regional, national and transeboundary. Emergency can be qualified as an "on-site emergency" if less than 10 people were injured or living conditions of less than 100 people were effected or if damage is less than 1000 "minimum wages" (special term introduced in Russia for social security) or if impacted area does not exceed the area of enterprise. On-site emergency situation should be eliminated by enterprise and at its own expenses.

The coordination of disaster prevention is to be done in compliance with Federal Government Decree No.164 "On interministerial Commission for extraordinary situation prevention and consequences elimination" of 20 February 1995. The Minister of Civil Protection and Extraordinary Situations is appointed as head of this Commission. Industrial operators must maintain direct contact with the Ministry in the event they conduct hazardous production processes. They must also maintain direct informative contact with the Ministry of Health's Department of Sanitary and Epidemiological Control, which is empowered to enforce compliance by any industrial activity with the requirements of the Federal law "On sanitary and epidemic well-being of the population" initially dated 19 April 1991 and incorporated into Federal law No. 89 of 19 June 1995, which came into force on 22 June 1995.

Official Letter No. 01-11/29-2618 of the former Ministry of Environmental Protection, registered in the Ministry of Justice on 11 September 1995, obliges industrial operators to maintain direct informative contact with the Goscomecology. The same requirements to inform the environmental protection authorities of any environmental incident or disaster immediately (on the same day of the incident) by telephone were reconfirmed by Order No. 29 of 23 June 1996 of the same Ministry.

In addition to the above-mentioned regulations, there are fire safety regulations and flood safety regulations.

According to the *Fire Safety Regulations* PPB-01-93 for the Russian Federation, in force from 1 January 1994, every enterprise must comply with the requirements set in the standards, construction norms and regulations, norms for technological design, regional norms and requirements for specific industries; develop an evacuation plan and provide necessary equipment for emergency situations; undertake regular fire preventive measures and train staff. Enterprises are required to undertake periodical fire-alarm training (according to the requirements of the local Fire Safety Service).

Flood safety is regulated by Order No 353 of 26 March 1998 on *Flood Safety on the Territory of the Russian Federation in 1998*. This document states requirements and preventive measures for floods in 1998.

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## 2.4 Hazardous Materials

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### 2.4.1 Inventory of Hazardous Materials

*It has not been possible to obtain the requirements for Georgia. For the Russian Federation the regulations are as follows:*

According to the Decree of the Government No869 of 12 November 1992 on State Registration of Potentially Dangerous Chemicals and Biological Substances all potentially dangerous chemical and biological substances should be registered with the Russian Register in order to prevent their adverse effect on the environment and public health. All individual chemical and biological substances (compounds), manufactured and/or applied on the territory of the Russian Federation should be pertained to state registration. Substances, designed for production or use after 31 March, 1993, so called "new substances" should be registered before their production or use will start. Substances, produced or imported to the Russian Federation before 31 March, 1993, "old substances", should be registered within three years from the publication of the document (25 May 1993). There is a certain fee for State Registration and all applications should be submitted to: 18-20 Vadkovskii per., Moscow 101479, Russian Federation. Documentation should include the following:

- the cover letter, signed by paying party (enterprise);
- the fulfilled "list of information, required for state registration of potentially dangerous chemical and biological substances";
- the list of references, on basis of which "list of information" have been completed;
- payment order;
- expert conclusions about possibilities to publish in mass media the materials of state registration.

### 2.4.2 Hazardous Materials Storage Area Design

*These requirements were developed during Soviet Union so they are likely to be still applicable in Georgia.*

The open storage area for hazardous materials should be enclosed by a fence of not less than 2 meters high and embanked. The size of the embankment is regulated by the construction norms related to the specific production and type of the hazardous materials. Within the embankment, the storage area must be carefully designed and covered with gravel. The storage area should be elevated above ground for 0.2 m and surrounded by a ditch to collect storm water run off.

The storehouse for inflammable materials must not have more than one floor. Windows in storehouses for gaseous materials should be painted or covered with protection against sun and heat. The storehouse must be naturally ventilated.

Liquid hazardous materials such as oil and diesel can be stored underground in specially designed containers covered by 2 m of earth.

### **2.4.3 Transfer and Handling of Hazardous Materials**

According to the Fire Safety Regulations, the following requirements are applicable to the transportation of hazardous and flammable materials:

- all containers must be marked according to the toxicity of transported materials and accompanied with documentation specifying the type of transported materials, amount and final destination;
- hazardous materials should be packed in containers or other packaging material in accordance with the requirements of state standards and type of material. Packaging material and containers must be firm, in good order, prevent spillage and provide safe transportation of the materials;
- flammable materials must be supplied with fire-extinguishing equipment, placed in a hermetically sealed packaging or containers;
- glass containers should be placed in a firm wooden or plastic boxes with fire-resistant and absorbent filling;
- metal and plastic containers should be placed in wooden boxes;
- solid, dry substances should be transported in small lots, solid substances which are packed in sacks must be additionally packed in a hard cover (metal or plywood drums);
- loading-unloading areas should be equipped with special facilities (stretchers, ladders, etc.) to provide a safe working environment. Hand-cart or special stretchers with sockets must be provided for glass containers, or otherwise they can be carried by two people in a basket with handles. Workers should be provided with personal safety clothing. Loading and unloading should be carried out in accordance with warning signs and instructions;
- filling and draining of containers must be carried out through pipes and hoses.

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## **2.5 Environmental Due Diligence**

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Prior to undertaking any economic activity or redevelopment, it is necessary to submit specific documentation to the state environmental expertise (see section 2.1.2 above). This documentation should contain a feasibility study for the proposed activity or redevelopment and an environmental impact assessment.

### **2.5.1 Soil and Groundwater Contamination**

Protection of the land in Georgia is based on the "Code of Land", adopted in 1984. Groundwater is regulated by the "Water Code", adopted in 1984. Soil contamination levels are calculated on the basis of the "List of maximum allowable concentration of basic toxic matter in the soil.", Sanitary standards and Regulation No. 6229-91, Ministry of Health of the USSR, 1991. The following is a selection of pertinent standards:

**Table 2: Soil and Groundwater Maximum Allowable Contamination Levels**

No.	Pollutant	Maximum allowable concentrations (µg/kg)
1	Acetaldehyd	10.0
2	Bensapiren	0.02
3	Benzene	0.1
4	Benzol	0.3
5	Vanadium	150.0
6	Isopropylbensol	0.5
7	Arsenic	2.0
8	Nitrates	130.0
9	DDT (sum)	0.1
10	Mercury	2.1
11	Pb + Me	20.0
12	S (elementary)	160.0
13	H <sub>2</sub> SO <sub>4</sub>	160.0
14	Furfurol	3.0
15	Cobalt (mobile)	5.0
16	Cu (mobile)	3.0
17	Ni (mobile)	4.0
18	Pb (mobile)	6.0
19	Zn (mobile)	23.0
20	Cr (mobile)	6.0

The *Law on Environmental Protection*, 1996, states the main principles of environmental liability. Enterprises, organisations and individuals are liable to pay the injured party for all damage to the environment and/or to health and for any loss of property in accordance with existing legislation. Compensation for the damage could be made voluntarily or following a court order. The amount of compensation should be calculated in accordance with guidance and methods developed by responsible bodies or, in the absence of specific methods, should be equal to the real cost of environmental clean-up including damage to property and benefit losses. Compensation can be paid directly to the aggrieved party or to the state environmental funds if the damaged object is common property. If several persons inflict the loss the charge should be calculated according to individual contributions, this includes research and design institutions and construction companies.

The GOST 17.4.2.01-81 "*Soils. Indicators of sanitary state*" provides a matrix of various types of contamination and the zones or locations in which they would require investigation.

The enforcement of environmental regulations and requirements lies with the local administrative authorities and local state environmental committees and bodies. The existing legislation does not particularly specify particular environmental liability for the cases when environmental damage have been caused by previous owner of the site.

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## 2.6 Hazardous Waste

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### 2.6.1 Hazardous Waste Regulations and Requirements

The Law on *Environmental Protection*, 1996, establishes a number of stringent requirements concerning safe handling of industrial wastes and methods for their collection, disposal and utilisation. For example, it is prohibited to dispose of toxic wastes on sites in the vicinity of cities or other settlements or natural recreational or specially protected areas. It is envisaged that environmental protection and sanitary control agencies are double checking the dangerous waste management practices.

*There is no available information on waste management in Georgia. Here are the requirements for the Russian Federation.*

The Federal Act on *Industrial and Domestic Wastes* establishes the legal responsibilities for all enterprises and persons who generate or handle domestic and industrial wastes. The Federal Act sets out requirements regarding the handling and transportation of hazardous wastes. All hazardous wastes must be properly classified on the basis of their composition and characteristics, registered and labelled on site and then handed to the specially trained operator who possesses the state license.

### 2.6.2 Inventory of Hazardous Wastes

The Order of Goskomecology on *Federal Waste Specification* provides a classification system for all types of wastes. The catalogue has five classification levels: blocks, groups, subgroups, positions and subpositions. The highest level of classification is blocks, formed according to the origin of waste: organic (animal and green waste), mineral waste, chemical waste and domestic (including household) waste.

All hazardous wastes are classified into four categories according to the degree of toxicity: (I) extremely hazardous; (II) highly hazardous; (III) moderately hazardous and (IV) least hazardous.

The enterprise should present to the local branch of the Goscomecology an application form for recording their wastes in the Waste Catalogue and information about every particular type of waste. The application includes information on:

- origin of waste;
- aggregative state;
- chemistry of waste (percentage of all compounds) and methods of determination; and
- toxicity of waste.

It is required to update those records once in three years.

The Instruction for the Determination of the Toxicity Index for Industrial Wastes, published by the Ministry of Health in 1987, provides methods to determine the toxicity index according to the maximum permissible level of pollutants in industrial wastes.

### 2.6.3 Landfill Sites

Under Order No 3133/84 on *Handling, transportation, treatment and burying of industrial toxic waste*, approved by Head Sanitary Epidemiological Doctor of former USSR and Regulation No 2.01.28/85 on *Construction norms and regulations*, approved by Gosstroj, waste disposal facilities are classified as follows:

- facilities for household and construction waste;
- facilities for the treatment and landfilling of industrial waste; and
- radioactive waste facilities.

According to Regulation No 2.01.28/85, waste disposal facilities are intended to centralise the collection, treatment and disposal of toxic waste from enterprises and companies. Chapter 4 of the Regulation covers sanitary instructions for the disposal facilities:

- disposal facilities must be situated in the areas that are remote from residential areas
- the sanitary zone must be 3000 meters;
- the site must be bordered by a ring canal;
- the facility will be comprised of: a plant for treating the toxic waste, a landfill and a garage for waste transport equipment.

Only toxic waste of the first, second and third categories according to degree of toxicity would be accepted for disposal at such facilities. Radioactive waste and oil products are not acceptable for disposal in these facilities. The waste falling in the fourth category must be brought to household waste dumps.

#### **2.6.4 Hazardous Waste Storage Practices**

All industrial wastes produced by an enterprise should be packed according to their toxicity index: steel containers for the first category; polyethylene bags for the second category and paper bags for the third category of waste. After packing, the wastes should be weighed, recorded and delivered to the storage sites for further transportation to the landfill sites. Fourth category wastes are piled up at storage sites.

#### **2.6.5 Transportation and Disposal of Hazardous Waste**

Hazardous wastes:

- should be transported in specially equipped and properly marked vehicles;
- should have a hazardous waste passport stating the composition and properties of the waste. The passports should be signed by an authorised person from the enterprise and should always be available for inspection when wastes are transported; and
- should be accompanied by documents stating the amount of hazardous waste, reason and final destination of transportation.

Industrial waste, depending on toxicity and other properties, are disposed of either at the ordinary dumps or toxic waste landfill sites. The method of disposal is chosen depending on the aggregate state, solubility coefficient, toxicity index and other special characteristics of the substance.

Ordinary landfill sites receive category II-IV wastes. The total volume permitted varies for each region depending on its natural capacity to assimilate and neutralise pollutants without causing harmful effects to the environment and public health. In order to reduce adverse effects on the environment the limits for waste generation and waste disposal are set by the Government of Georgia in Provisional Regulations on Payment of Taxes for Polluting the Environment with Harmful Substances, adopted by the Resolution of the Cabinet of Ministers No 1010 of 22 October 1992, with amendments No 379 of 13 May 1993 and No 402 of 24 June 1994.

#### **2.6.6 Record Keeping**

All enterprises or legal persons producing or handling wastes should keep records of wastes generated, reused, treated, transferred to or received from different organisations, and disposed of. All records should be kept for a certain period of time (to be set by the local authorities) and be available upon request of the competent authorities. All waste shipments must be accompanied by a "passport" containing information outlined in section 3.6.5 above.



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## 2.7 Aboveground Storage Tanks

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Specific requirements for above-ground storage tanks (ASTs) include the following:

- the storage area should be surrounded by fence at least 2m high, embanked, elevated to at least 0.2m above ground level and surrounded by ditch for storm water run off;
  - it is strictly forbidden to use unsealed containers and locks, containers with warps and cracks, faulty equipment, control instruments, input pipes and stationary fire safety equipment; to have trees and bushes within the storage area; to place tanks on a flammable base; overload tanks; to pour products in or out during storms;
  - spillage has to be cleaned immediately; and
  - on any embanked area there must not be more than four tanks within an area of 25x15m; distance between tanks must be not less than 10m and distance to the embankment not less than 5m. The distance to the next embanked storage area must be not less than 20m.
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## 2.8 Waste Water

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### 2.8.1 Wastewater Regulations and Requirements

The Water Code states that the discharge of waste waters (industrial, municipal, drainage and other) may be conducted only when:

- a permit is issued by the Agency for Use and Protection of Water Resources upon approval from environmental protection, sanitary and other related agencies; and
- the discharges do not increase pollutant concentrations in water above the environmental quality standards.

When waste waters are discharged into water bodies classified for domestic and municipal use, the water quality standards must be observed at a distance of one kilometre upstream of the nearest point of water use. When waste waters are discharged into fishery water bodies, the standards must be respected at distance not more than 500m from the discharge point or the source of pollution.

Discharge limit values for pollutants are established individually for each enterprise or other source of pollution for the purpose of regulating the disposal of effluents into surface water bodies, ground water and onto land.

The Government of Georgia approved Provisional Regulations on Payment of Taxes for Polluting the Environment with Harmful Substances, adopted by the Resolution of the Cabinet of Ministers No 1010 of 22 October 1992, with amendments No 379 of 13 May 1993 and No 402 of 24 June 1994.

The Provisional Regulations prescribe the maximum permissible concentrations of pollutants for effluents discharged into water bodies, both on a permanent and temporary basis, with methods for establishing scientifically-based standards for effluents. Such standards are the basis for granting discharge permits. All water-using enterprises must have discharge permits related to maximum permissible discharges (MPD), maximum permissible concentrations (MPC), or for temporarily agreed discharges (TAD).

#### **Discharge Limitations**

The quality of waste water discharges to surface water (after pre-treatment) is determined by the "Regulations on Water Protection: Standard Rules" adopted by Official Letter No. 5/15-12 of 26 January 1991 by State Committee for Environmental Protection of USSR, and which

came into force from 1 March 1991. The main requirements for the quality wastewater discharged to surface water are as follows:

**Table 3: Requirements for wastewater quality**

Pollutant or Parameter	Drinking Water Sources	Water for General Household Use	Fish aquatoria	
			"extra" and "first class" fish	"second class" fish
Suspended Solids	0,25 mg/l	0,75 mg/l	0,25 mg/l	0,75 mg/l
Floating matter	no floating matter should be visible on the surface of water			
Colour	no colour should be visible in a test-glass containing:			
	20 cm	10 cm	no colour at all	
Odour	max 1 ball directly or after chlorination	max 1 ball directly	no odour should be given to the meat or to the fish	
Temperature (°C)	max + 3° C above the average of the hottest month of the year		max + 5° C above the seasonal average	
pH	should not exceed 6,5-8,5			
Dissolved Oxygen	min 4 mg/l		6 mg/l in all seasons	4-6 mg/l by season
BOD compl.	3 mg/l	6 mg/l	3 mg/l	3 mg/l
COD	15 mg/l	30 mg/l	depends	
Chemical agents	within the maximum allowable concentrations (MAC)			
Lactosa positive bacilla	max 10.000 per litre	max 5.000 per litre	not regulated	
Colifagues	100 per l	100 per l		

The standards for waste water to be accepted by the municipal wastewater treatment facilities can depend on the regions where the waste is produced, but normally must meet the following standards:

**Table 4: Standards for Wastewater Discharged to Sewerage Systems**

No.	Pollutants	Allowable Concentration Limits (mg/l)	Sample Regional Allowable Concentrations (mg/l)
1	Suspended Solids	200	400
2	BOD complete	1000	1000
3	Fatty matter	60	50
4	Nitrogen (ammonia)	18	18
5	Chloride	1000	1000
6	Sulfate	500	500
7	Oil products	0,3	0,3
8	Anionic surfactants	1.0	1.0
9	Fe	0,5	0,5
10	Phosphorus of phosphate	2,7	2,7
11	Phenols	0,04	0,0-0,05
12	Cu	0,04	0,04
13	Ni	0,03	0,04
14	Zn	0,03	0,04
15	Cr -3	0,6	0,8
16	Cr -6	0,2	0,2
17	Pb	0,5	0,5
18	Al	0,2	0,0
19	Manganese	0,03	0,0
20	Formaldehyde	0,9	0,0-1,2
21	Fluoride	1,4	0,0-1,1

Quality limits for stormwater discharges (direct output) are as follows:

**Table 5: Stormwater Discharge Limitations**

No.	Pollutant	Allowable Concentration Limits (mg/l)	Sample Regional Allowable Concentrations (mg/l)
1	Suspended Solids	3-22	7,5-110
2	BOD complete	3,0	3,0-20
	COD	30	30-80
3	Mercury	0,0001	0,0
4	Nitrogen (ammonia)	0,4	0,0-0,5
5	Chloride	300	300
6	Sulphate	100	100
7	Oil products	0,05	0,05-0,5
8	Anionic Surfactants	0,5	0,0-0,05
9	Fe	0,1	0,1
10	Phosphorus of phosphate	0,2	0,0-0,2
11	Phenols	0,01	0,0
12	Cu	0,001	0,002
13	Ni	0,01	0,0
14	Zn	0,01	0,02
15	Cr -3	0,07	0,0
16	Cr -6	0,02	0,0
17	Pb	0,1	0,35
18	Al	0,04	0,3
19	Manganese	0,01	0,01
20	Cadmium	0,005	0,002
21	Cobalt	0,2	0,0

The regional Committees for environmental protection are empowered to determine the quality of the water to be accepted into local systems or for further cleaning or for direct discharge to surface water. For example, in Saint Petersburg the system accepts water with the following characteristics:

- pH within 6,5 to 9,0;
- Max temperature = 40°C;
- Max correlation COD: BOD complete = 1,5 or Max correlation COD: BOD-5 = 2,5\* - \* except for the basins with a separate system of collection of waste water.

**Table 6: MAC Limits for Selected Substances in Surface Water**

No.	Pollutant	Maximum allowable concentrations for surface water used for fish reproduction (MAC) (mg/l)
1	Acrilamid	0,35
2	Acrylic acid	0,0025
3	Alumina bichromate	0,05
4	Ammonia salts	2,9
5	Ammonia bichromate	0,05
6	Ammonia	0,05
7	Aniline	0,0001
8	Acetone	0,05
9	Vanadium	0,001
10	Volframate	0,0011
11	Gexan	0,5
12	Titanium dioxide	1,0
13	Fe +2	0,005
14	Fe	0,05
15	Isopropyl alcohol	0,01
16	Cadmium	0,005
17	Cobalt	0,005
18	Paint components	0,1
19	Manganese ions	0,01
20	Cuprum ions	0,001
21	Cuprum	0,005
22	Carbamide	37,3
23	Arsenic	0,001-0,005
24	oils	0,05
25	Nickel	0,01
26	Mercury	0,0001
27	Pb 2+	0,1
28	Pb x	0,01
29	Sulphur	10,0
30	Sulphate ion	3,5 gr/l
31	Formalin	0,1 mg/l
32	Furan	0,01
33	Phosphorus elementary	absent
34	Zinc	0,05
35	Zn 2+	0,01
36	Cyanide	0,05
36	Chloride	300,0

## **Discharge Fees**

Discharge fees are set depending on the permit type. There are two basic fees:

- fees for the discharge of contaminants within the norms of MPD
- fees for the discharge of contaminants exceeding the MPD

The fees depend also on the environmental sensitivity of the region.

When effluents are discharged into municipal water treatment facilities, effluent limits are determined by agreement between the owner of a source of pollution and that of the treatment facility.

### **2.8.2 Inventory of Sources Generating Wastewater**

According to the *Water Code of Georgia*, any enterprise can be defined as source of pollution if it discharges wastewater or other pollutants to the surface or ground waters, decreases quality of water resources and has a negative effect on the condition of water body beds and banks.

### **2.8.3 Record Keeping**

Enterprises must keep records of wastewater discharged to the communal sewerage systems and ensure that the quality of wastewater complies with the state requirements.

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## **2.9 Water Supply**

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### **2.9.1 Water Supply Regulations and Requirements**

The main principles of use and protection of water resources in Georgia are stated in the *Water Code*, 1984. According to the *Water Code*, every organisation, enterprise or otherwise must obtain a license in order to be able to use water resources.

Enterprises consuming water resources are required to:

- undertake protection measures to ensure stable water quality;
- register all volumes of water intake, wastewater discharge and the amount of pollutants present in the effluent; and
- provide easy access to the information for state bodies regulating surface water and ground water resources.

Enterprises which use water for production and abstract water directly from wells or surface water sources should follow the requirements for drinking water quality stated in the State Standard GOST 2874-82 *Drinking Water - hygienic requirements and quality control*.

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## **2.10 Asbestos Management**

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*There is no information available on requirements regarding asbestos management.*

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## **2.11 PCB Management**

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*There is no information available on requirements regarding PCB management.*

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## 2.12 Solid Waste

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### 2.12.1 Solid Waste Regulations and Requirements

The Law on *Environmental Protection* of the Russian Federation, 1996, defines some general provisions concerning wastes. Local authorities, enterprises, institutions, organisations and individuals have to take effective measures to deactivate, process, utilise, store or dispose of industrial and domestic waste and comply with the existing ecological, sanitary and epidemiological standards and regulations. The Law establishes a permit procedure for handling waste. Environment agencies at the local level have rights to issue permits for collection, transportation, treatment and disposal of industrial, domestic and other wastes. The Law prohibits putting into operation any new or modified economic and technical project not equipped with the necessary devices for waste minimisation and re-use.

### 2.12.2 Inventory for Solid Wastes

Solid wastes could be classified as an industrial, domestic and agricultural, toxic and non-toxic. Toxic wastes are specified according to the degree of toxicity.

The enterprise should present to local branch of the Goscomecology application form for recording their wastes in the Waste Catalogue and information about every particular type of waste in two copies:

- origin of waste;
- aggregative state;
- chemistry of waste (percentage of all compounds) and methods of determination;
- toxicity of waste.

It is required to update those records once in three years. It is also required to maintain records about amount of wastes generated by enterprise and waste disposal site which received them.

### 2.12.3 Solid Waste Storage Practices

Solid wastes, which have not been utilised or transferred to landfill sites for treatment and disposal, require recording. Temporary storage of solid wastes on a company's site should be agreed with regional environmental protection committee.

### 2.12.4 Solid Waste Disposal Practices

Non-hazardous solid waste may be disposed of in ordinary landfill sites. The method of disposal is chosen depending on the aggregate state, solubility coefficient, toxicity index and other special characteristics of the substance.

### 2.12.5 Solid Waste Reduction/Reuse Efforts

As prevention and minimisation of industrial wastes during the production process are considered to be the most efficient way of solving problems, the legislation therefore concentrates on preventive measures, including introduction of resource-saving, low-waste and non-waste technologies. The preventive measures are established by respective legislative acts.

The *Law on Environmental Protection* prescribes that waste minimisation and other modern technologies to prevent pollution of the environment shall be considered and envisaged during preparation of project feasibility studies. This Law does not allow operation of economic and technical projects not equipped with modern technologies, structures and devices to ensure

the disposal, treatment and utilisation of harmful wastes, emission and discharges, complying or not with the maximum.