巻末 4　Law of Georgia on Environmental Permits

THE LAW OF GEORGIA

ON ENVIRONMENTAL PERMITS

This law establishes the legal basis for the issue of the environmental protection permits for an activity implemented on the territory of Georgia, state ecological expertise, environmental impact assessment as well as the legal basis for the public notification and participation in the decision-making process on the issue of the environmental protection permits.

Only activities planned after the enactment of the law shall be subject to the present law.

This law does not regulate the issue of other permits on the activity.

CHAPTER 1

GENERAL PROVISIONS

ARTICLE 1. THE AIM OF THE LAW

The aim of the law shall be:

1. to protect human health, natural environment, cultural and material valuables during the implementation of the activity

2. to ensure basic rights of a citizen provided for by the Constitution of Georgia - to acquire full, objective and timely information on his working and living environment as well as, with the purpose of democratic development of the country, to ensure public participation in the adoption of important decisions by the state in the area of environmental protection

3. to take into consideration ecological, social, economic interests of the society in the process of the adoption of important decisions pertaining to the activity

ARTICLE 2. THE OBJECT OF THE LAW

The object of the law shall be:

1. to elaborate and defend the rights and obligations of investors, community and the state in the area of environmental protection.

2. to facilitate protection of the environment and national resources from irreversible quantitative and qualitative changes as well as to ensure their rational utilization.

ARTICLE 3. DEFINITION OF TERMS

The term "activity" shall denote entrepreneurial, economical or any other activity, implementation of habitation and development plans and projects, infrastructure projects, the implementation of settlement, habitation and sectoral development plans, including the implementation of plans and projects for protection, utilization and use of water, forests, land, mineral ore and other natural resources *existing* on the territory of Georgia, as well as significant reconstruction and technical and technological re-equipment of existing enterprises.

The term "investor" shall denote a physical or juridical person - the initiator of an activity who shall address the body authorized in the issue of environmental permissions for the obtention of the environmental protection permission.

The term "Environmental Protection Permission" shall denote a written decision of the Ministry of Environment of Georgia, its regional and local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics. The contents and the issuance procedures of the permission are different for different kinds of activities. The environmental protection permission represents an integrated permission which consists of permissions on exhausts, waste disposals, etc.

The term "Consultation Firm" shall denote a consulting juridical person which is entitled under the charter to carry out consultation works in the area of environmental protection.

The term "Environmental Protection Standards " shall denote the establishment of such standards of the impact on the environment which shall ensure the ecological balance. In view of the foregoing, the following standards shall be established: qualitative standards on the condition of the environment - in atmospheric air, water and soil; permissible standard limits for the quantity of the concentrates and micro-organisms harmful for human health and nature, permissible standard limits for noise, vibration, electromagnetic fields and other physical impacts, permissible standard limits for radiation impact; permissible standard limits for the inputs of harmful substances into the environment and environment pollution by microorganisms; permissible standard limits for the utilization of chemical means, ecological requirements for the products; load standards on the environment.

The term "Significant reconstruction, technical and technological re-equipment" - shall mean such reconstruction, technical and technological re-equipment, the implementation of which shall require an elaborate feasibility study.

The term "Regional body of the Ministry of Environment" shall denote the organizations subject to the Ministry of Environment of Georgia, in particular, regional (urban) environmental divisions, as well as the Tbilisi Committee for environmental protection and regulation of natural resources.

The term "The local body of the Ministry of Environment" shall mean regional structural sub-divisions of: regional (urban) environmental divisions of Georgia, as well as the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics and the Tbilisi Committee for environmental protection and regulation of natural resources.

The term "Best technology" shall denote the best, usable and economically available technology in terms of environmental protection which. is most effective in avoiding, minimizing or transforming harmful impact on the environment: may not be widespread but its mastering and utilization are possible from technical standpoint; economically may not condition the reasonableness of the obtention of marginal environmental benefit at the expense of considerably high value, but which at the same time from economic standpoint is available for investor

CHAPTER II

THE PROCEDURE FOR THE ISSUE OF ENVIRONMENTAL PROTECTION PERMISSION

ARTICLE 4. CATEGORIES OF ACTIVITIES

1. In accordance with the present law the activities shall be grouped into 4 categories by their scope, importance and the quality of their impact on the environment..

2. The first category is the category which due to its scope, location and essence. can cause serious and irrevocable impact upon the environment and human health.

The first category of activity are the following

a) Mining of mineral ores

- Mining of mineral ores (except the activities listed in Point 3 of Article 4) and mineral dressing;
- Ground and underground constructions for the extraction and dressing of mineral ores;
- Deep drilling, especially activities aimed at the extraction of deep circulation thermal waters;
- Activities for the accumulation and deployment of mining output.

b) Power industry

- Processing of oil raw materials and petro-chemical production;
- Gasification and liquefying of coal;
- Carbonization of coal;
- Briquetting of coal and lignite;
- Construction of heat and power stations and other thermal enterprises;
- Construction of main facilities, for gas, steam, hot water and electric power transmission;
- Construction of hydro-electric power stations (with the capacity of more than 10 Megawatts);
- Construction of dams, artificial water reservoirs and other hydro-technical buildings;
- Construction of nuclear reactors of different purposes and capacities;
- Construction of nuclear power stations;
- Production and dressing of nuclear fuel, processing of the used nuclear fuel.

c) Agriculture

- Fisheries;
- Wood-felling (including all systems of felling) and the usage of forest fund soils for different purposes;
- Utilization of virgin soils and unbroken expanses for intensive agriculture activities;
- Carrying out soil melioration works,
- Soil re-cultivation;
- Measures taken against hazardous natural calamities,

d) Food industry

- Production of flour from fish and animal bones;
- Production of vegetable and animal oils and fats;
- Industrial production of starch;
- Production of canned goods (objects processing more that 5 000 tons of raw materials);
- Breweries, liquor, cognac, vodka distillers, wine production (objects with the production capacity of greater than 30 mln. liter bottles per year)

d) Chemical industry

Chemical industry of any type and capacity·
among them: chemical processing of semi-finished goods (interim products) and production of chemical substances; production and processing of pesticides, pharmaceutical goods, chemical colourings, varnishes, peroxide and production and processing of elastic substances (rubbers or plastic substances), production and packing of gunpowder or any other explosives; production of batteries; production of graphite electrodes, production of refrigerators.

e) Metallurgy

Metallurgy of any type and capacity;

f) Machine-building and ship-building among them.

- automobile, shipbuilding, railway and aircraft industries;
- ship-repair, railway-repair, aircraft-repair industries;
- production and testing of engines, turbines, reactors;

g) Production of building materials

- Any asbestos utilizing production;
- Production of cement;
- Production of asphalt;
- Production of glass and glass ware,

h) Wood processing, paper, leather and textile industries

- Production of fibre and sawdust boards and plywood ;
- Production of artificial mineral fiber;
- Production of cellulose, paper and cardboard;
- Leather processing industry and leather utilizing production;
- Construction of fullery-worsted spinning group of enterprises in which wool is refined, degreased, bleached.

i) Waste processing and disposal

- Disposal of municipal and industrial wastes, location of their dumping places and location and operation of the factories for their processing and burning;
- Disposal of toxic, hazardous and radioactive wastes, location and operation of their dumping places and rendering them harmless.

j) Location and operation of storages

- Location and operation of ground and underground storages for gas, oil, coal, petrochemical products;
- Location and operation of storages for radio-active substances

k) Implementation of infrastructural plans, projects and programmes

- Urbanization and city-planning programmes;
- Industry development programmes,
- Power-systems' development programmes;
- Residence area purification utilities construction projects;
- Forest use programmes (including prospective projects for forestry and hunting farms organization and follow up plans);

- Transport infrastructure development programmes, projects for motorways, railways, airfields, bridges, over-passes;
- Land use schemes for administrative-territorial units (regions);
- Projects for the main pipe-lines for any purposes;
- Projects of sea ports and terminals;
- Projects for subways, underground motor-way and railway communications;
- Projects of hotel and resort complexes,
- Projects of sport complexes and constructions;
- Projects of hospitals of oncologic, infectious and tuberculosis diseases.
- Long-term rehabilitation programmes for preserved territories;
- Plans and projects for protection and utilization of water, forests, land, mineral ore and other natural resources existing on the territory of Georgia;
- Programmes and projects of national, regional and local importance for location of all types of economical and engineering objects with the view to avoid negative effects of natural spontaneous processes anticipated on the territory of Georgia.

All the afore-mentioned activities are subject to the environmental protection permits.

Infrastructural plans, projects and programmes shall require environmental permits issued by state legislative and executive bodies in accordance with the rule specified by the law prior to their adoption, approval or confirmation.

The environmental protection permission for these categories of activities shall be issued by the Ministry of Environment of Georgia.

The obligatory integral part of the procedure for the issue of the environmental protection permits shall be the following

- environmental impact assessment (EIA); the procedure shall be carried out in accordance with Chapter III of the present law)

- state ecological expertise, the procedure shall be carried out in a manner specified by the law);

- participation of the community in the decision-making process

3. The IInd category is represented by an activity the scope, location and content of which can have a significant impact on human health and the nature of the region where the activity will be carried out.

The IInd category is comprised of·

a) Mining of mineral ore:

- ore reconnaissance and mining activities;
- operation of low capacity (below annual 100 000 tons) quarries for building, inert, decorative materials and reconnaissance activities,
- drilling activities for the reconnaissance of sweet potable and mineral water.

b) Power industry:

- construction of thermal and power-stations for industrial purposes and other thermal enterprises (with the capacity of less than 10 Megawatts);
- construction of hydro-power stations (with the capacity less than 10 Megawatts).

c) Agriculture and food industry

- utilization of virgin soils and unbroken expanses for intensive agriculture activities;
- construction and operation of potable and irrigation water supply internal systems;
- utilization of agricultural arable land (of the area from 30 to 50 hectares) for non-agricultural purposes;
- construction of complex paultry and cattle breeding farms;
- reception of carbamide from the cattle-breeding farms;
- setting up of maricultural and aquacultural farms,
- setting up of fishing and hunting farms,
- production of sugar;
- breweries, liquor, cognac, vodka distillers, wine production (objects with the production capacity from 20 to 30 mln liter bottles per year)
- production of jams, syrups and juices;
- production of dairy goods;
- production of yeast,
- setting up of smoking-drying enterprises;
- setting up of enterprises for the processing of animal remains;
- construction of grain production factory;
- setting up of a non-alcoholic, wine and spirit bottling enterprise.
- re-cultivation of land (of the area greater than 100 hectares);
- canning industry (objects annually processing from 3000 to 5000 tons of raw materials).

d) Forestry

- using of forestry fund lands (of the area greater than 100 hectares) for non-forestry and economic purposes);
- wood-felling - on the forest area greater than 500 hectares (including all felling types).

Other activities:

- publishing activities;
- construction of timber and wooden furniture factory,
- construction of mineral and insulation cotton enterprise;
- construction of lime-stone and chalk production enterprise;
- municipal facilities including sewerage;
- fibre drying industry;
- construction of a brick and ceramic tile production enterprise,

- construction of a plaster tile production enterprise;
- construction of a building-structural production enterprise;
- municipal facilities including sewerage;
- establishment of an enterprise for the production of building materials out of mineral raw materials;
- construction of chemical product containers' washing enterprise.

The environmental permits for the IInd category of activities shall be issued by the Ministry of Environment of Georgia

The obligatory integral part of the procedure for the issue of the permission shall be:

- state ecological expertise; the procedure shall be carried out in a manner established by the law;
- public participation in the decision-making process.

4. The IIIrd category comprises activity, the scope, location and content of which will not bring about serious impact on the environment.

The activities under the IIIrd category are the following:

a) Agriculture and food industry

- collection of medicinal herbs in the environment;
- setting up of slaughter-houses;
- construction of a coffee beans and sunflower roasting enterprise;
- utilization of agricultural arable land (of the area from 20 to 30 hectares) for non-agricultural purposes;
- establishment of an egg product manufacturing enterprise (with the annual capacity exceeding 40 tons);
- establishment of semi-finished food production factories (with the annual capacity exceeding 200 tons);
- construction of a grain drying, cleaning, storing and silo tower;
- production of non-alcoholic beverages,
- production of tobacco;
- construction of buildings to store agriculture goods,
- construction of hot-houses of industrial designation,
- construction of agricultural product storing and processing buildings, facilities and enterprises;
- construction of warehouses for chemical pesticides and mineral fertilizers;
- canning industry (objects annually processing from 3000 to 5000 tons of raw materials).
- breweries, liquor, cognac, vodka distillers, wine production (objects with the production capacity from 10 to 20 mln liter bottles per year)

b) Forestry

- using of forestry fund lands (of the area from 50 to 100 hectares) for non-forestry and economic purposes);
- wood-felling - on the forest area from 100 to 500 hectares (including all felling types).

Other activities:

- production of flax;
- establishment of a sawmill (with the annual capacity exceeding 1000 cubic meters);
- construction of buildings for timber storage (land-based, water spraying or on-water of more than 1000 cubic meters),
- setting up of a ceramical goods enterprise;
- construction of local motor-ways,
- construction of gasoline stations,
- construction of a harbour for sailing vessels;
- operation of sterilization equipment in the hospitals using ethylene oxide;
- setting up of municipal laundries;
- construction of hospitals.

The environmental protection permits for the IIInd category of activities shall be issued by the regional bodies of the Ministry of Environment of Georgia as well as the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics.

The obligatory integral part of the procedure for the issue of the permission shall be the following:
- state ecological expertise; the procedure shall be carried out in a manner established by the law;
- notification of the community of the planned activity

5. The IVth category is not included in points 2, 3 and 4 of Article 4. and its the impact of which on the environment is insignificant

The list of the activities under IVth category shall be elaborated and approved by the Ministry of Environment of Georgia basing on the provisions "On the list of IV th category activities specified by the procedure of the issue of environmental permits".

The environmental protection permission for the IV th category of activities shall be issued by the regional or local bodies of the Ministry of Environment of Georgia.

The obligatory integral part of the procedure for the issue of the permission shall be the state ecological expertise; the procedure shall be carried out in a manner established by the law.

ARTICLE 5. APPLICATION FOR THE ENVIRONMENTAL PROTECTION PERMISSION

1. In order to obtain the environmental protection permits, the investor shall be obligated to submit an application to the Ministry of Environment of Georgia, its regional or local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics

2. The investor shall be obligated to prepare a detailed application in a complete shape and in written form.

3. The application should include the evidential documentation on the activity, investor's application for the obtention of the environmental protection permission, feasibility study project of the activity, assessment report on the activity's impact on the environment (for the 1st category activity)

The application should include the following information:

a) name of the planned activity, name and address of the investor,
b) location of the planned activity on the map of the given region;
c) assumed date of the initiation and termination of the activity, the aims of the activity;
d) plan of the buildings necessary for the activity;
e) description of the technological process;
f) the list of substances which will be used during the activity or are received as a result of the activity;
g) detailed description of the measures which are planned in order to reduce the impact of the activity on the environment and social factors;
h) types and quantity of the natural resources to be used;
i) volume and type of the expected emission;
j) methods for the measurement of emission volume,
k) types and quantity of the industrial wastes, the probable places for their disposal, measures planned for the reduction of the waste volume and processing.
l) safety measures to be taken against accidents of technical nature

4. For the activities under I, II, III categories, along with the application the investor shall be obligated to submit a brief annotation in accordance with the form given below.

- name of the planned activity, name of the investor,
- location of the planned activity,
- assumable date of the initiation and termination of the activity;
- aims of the activity;
- category of the activity;
- place and time for the public discussion of the activity,
- address, where the public will be able to familiarize itself with the documentation connected with the activity.

The information submitted in this form shall be published in the press and shall be made available to the representatives of the public.

5. The investor shall have the right to submit additional information which he finds necessary for the specific case.

6. Having received the application presented in full, the Ministry of Environment of Georgia, its regional or local bodies and the Ministries of Ajarian and Abkhazian Autonomous Republics shall commence the procedure provided for by the law.

7. The Ministry of Environment of Georgia shall determine the content and form (the issuance rule) of environment permits as well as the form of the application to be submitted for the obtention of environment permits, on the basis of the provision "On the rule for submission of applications for the obtention of environmental permits and the issuance of environmental permits"

ARTICLE 6. STATE, INDUSTRIAL AND COMMERCIAL SECRETS

1. The investor shall be obligated to provide the Ministry of Environment of Georgia with the complete scheme of the technological process even in case the activity contains industrial, commercial or state secret.

   The part of the application which contains industrial, commercial or state secret should be submitted separately by the investor.

2. The part of the application including the secret should be labeled and kept separately. This sector should be inaccessible for public representatives.

3. The body issuing environmental permits shall be obligated to keep the secrecy. Relevant officials shall be given the right of access to the secrecy in accordance with the rule laid down by the law

4. The persons who shall be authorized by the present law to familiarize themselves with the part of the application containing secret information, in the event of its disclosure, shall bear responsibility in accordance with the legislation of Georgia in force.

ARTICLE 7. PROCEDURE FOR THE ISSUE OF ENVIRONMENTAL PERMITS FOR THE FIRST CATEGORY ACTIVITIES

1. In order to obtain an environmental protection permit for the Ist category activity, the investor shall be obligated to conduct environmental impact assessment.

2. In order to conduct a thorough environmental impact assessment and ensure the public participation in the assessment process, the investor shall be entitled to:

- announce a tender for obtaining the right to conduct the EIA. The terms and conditions of the tender should be published in the central press.

- ensure the availability of the examination materials, reviewed by the environmental impact assessment, to public representatives.

3. After the receipt of the detailed application on the Ist category activities, the Ministry of Environment of Georgia shall be obligated to carry out the procedure provided for by the present article which covers the state ecological expertise of the activity (the procedures for the expertise shall be regulated by the applicable legislation of Georgia) and to assure public participation in the decision-making process for the issue of the environmental permits.

4. Within 10 days following the receipt of the application the Ministry of Environment of Georgia shall be obligated to

a) ensure the publishing in press of the application and brief annotation to which the information on the date and venue of public discussion of the issues related to implementation of the activity should be enclosed,
b) receive and discuss the written comments of the public in 45 days following the publishing of the information on the activity

5. Within 2 months at maximum after the receipt of the application the Ministry of the Environment of Georgia shall be obligated to hold a public discussion of the activity with the participation of the Investor, the Ministry of Environment of Georgia, local administration bodies and public representatives

6. The review period of the evidential documentation on the activity at the Ministry of the Environment of Georgia shall be 3 months at maximum.

7. The copy of the application shall be kept by the body of the Ministry of Environment of Georgia where the review of the evidential documentation on the activity is planned and the public representatives shall be able to familiarize themselves with the application (with the exception of the part containing commercial, industrial and state secrets) within the entire period of application review.

8. Within this period the Ministry of Environment of Georgia shall be obligated to:

- carry out the expertise of environmental impact assessment;
- determine the compliance of the activity or its separate part with the legislation of Georgia in force;
- determine the compliance of the activity or its separate part with the standards in effect of the condition of the environment in Georgia;
- determine the measures the elaboration of which shall be necessary for the reduction of the impact on the environment in case the activity is implemented;
- adopt a decision on the issue of the environmental permission for the activity taking into account the environmental impact assessment conclusion and public opinion.

ARTICLE 8. PROCEDURE FOR THE ISSUE OF ENVIRONMENTAL PERMITS FOR THE II CATEGORY ACTIVITIES

1. After the receipt of a detailed application for the environmental protection permission on the IInd category activity the Ministry of Environment of Georgia shall be obligated to carry out procedures provided for by the law, which cover the expertise of the activity and public participation in the decision-making process on the issue of the permission.

2. In 10 days following the receipt of the application for public information, the Ministry of Environment of Georgia shall be obligated to provide the publishing of application and a brief annotation of the planned activity to which the information on the date and venue of public discussion of the issues related to implementation of the activity should be enclosed;

In view of the above, the Ministry of Environment of Georgia shall:

- ensure the publishing of the information in press;
- receive and discuss public comments in writing within 45 days following the publishing of the information .

3. The copy of the application shall be kept in the body of the Ministry of Environment of Georgia where the review of the evidential documentation on the activity is planned and the public representatives shall be able to familiarize themselves with the application (with the exception of the part containing commercial, industrial and state secrets) within the entire period of application review.

4. In order to ensure public participation in the process of the issue of the environmental protection permission for the activity, the Ministry of Environment of Georgia shall be obligated to carry out a public discussion within 2 months at maximum after the receipt of the application, with the participation of the investor, the Ministry of Environment of Georgia, local administration bodies and public representatives;

5. Maximal term for the review of the evidential documentation of the activity following the receipt of the application at the Ministry of Environment of Georgia shall be 2 months. During this period the Ministry of Environment of Georgia shall be obligated to:

   - carry out the state ecological expertise of the evidential documentation;
   - determine the compliance of the activity or its separate part with the legislation of Georgia in force;
   - determine the compliance of the activity or its separate part with the standards in effect of the condition of the environment in Georgia;
   - determine the measures the elaboration of which shall be necessary for the reduction of the impact on the environment in case the activity is implemented;
   - adopt a decision on the issue of the environmental permission for the activity taking into account the environmental impact assessment conclusion and public opinion.

ARTICLE 9. PROCEDURE FOR THE ISSUE OF ENVIRONMENTAL PERMITS FOR THE III CATEGORY ACTIVITIES

1. After the receipt of the detailed application for the obtention of environmental permits for the IIIrd category activities, the regional bodies of the Ministry of Environment of Georgia (further referred to as a "regional body") and the Ministries of Ajarian and Abkhazian Autonomous Republics shall be obligated to carry out the procedure as provided for by the present article which covers the state ecological expertise of the activities well as public notification on the planned activity.

2. Within 10 days following the receipt of the application for public notification, the regional bodies of the Ministry of Environment of Georgia and the Ministries of Ajarian and Abkhazian Autonomous Republics shall ensure the publishing of the information on the activity in the form of a brief annotation along with the application.

3. The copy of the application shall be kept by the body of the Ministry of Environment of Georgia (also in the Ministries of Ajarian and Abkhazian Autonomous Republics) where the review of the evidential documentation on the activity is planned and the public representatives shall be able to familiarize themselves with the application (with the exception of the part containing commercial, industrial and state secrets) within the entire period of application review.

4. Maximal term for the review of the evidential documentation of the activity following the receipt of the application at the regional bodies of the Ministry of Environment of Georgia and the Ministries of Ajarian and Abkhazian Autonomous Republics shall be 2 months. During this period the regional bodies of the Ministry of Environment of Georgia and the Ministries of Ajarian and Abkhazian Autonomous Republics shall be obligated to:

   - carry out the state ecological expertise of the evidential documentation;
   - determine the compliance of the activity or its separate part with the legislation of Georgia in force;
   - determine the compliance of the activity or its separate part with the standards in effect of the condition of the environment in Georgia;
   - determine the measures the elaboration of which shall be necessary for the reduction of the impact on the environment in case the activity is implemented;
   - adopt a decision on the issue of the environmental permission for the activity taking into account the environmental impact assessment conclusion and public opinion.

ARTICLE 10. PROCEDURE FOR THE ISSUE OF ENVIRONMENTAL PERMITS FOR THE IV CATEGORY ACTIVITIES

1. In order to issue a environmental protection permission the regional or local body of the Ministry of Environment of Georgia (further referred to as a "local body"), after the receipt of a detailed application shall commence the procedures provided for by this law which cover the state ecological expertise of the activity .

2. The maximum period for the discussion of the evidential documentation of the activity by a regional or local body shall be one month. Within this period the regional or local body shall be obligated to:

- carry out the state ecological expertise of the evidential documentation;
- determine the compliance of the activity or its separate part with the legislation of Georgia in force;
- determine the compliance of the activity or its separate part with the standards in effect of the condition of the environment in Georgia;
- determine the measures the elaboration of which shall be necessary for the reduction of the impact on the environment in case the activity is implemented;
- adopt a decision on the issue of the environmental permits for the activity taking into account the environmental impact assessment conclusion and public opinion.

ARTICLE 11. GROUNDS FOR THE DENIAL TO THE ISSUE OF THE ENVIRONMENTAL PERMITS

1. The Ministry of Environment of Georgia, its regional or local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics shall not issue an environmental protection permit if:

a) the legislation of Georgia is violated during the implementation of the activity;
b) the standards for the condition of the environment effective in Georgia are violated during the implementation of the activity and the deterioration of the condition of environment in the place where the activity is carried out is caused by the use of technologies which do not meet the technology standards established by the law,
c) implementation of the activity (for infrastructure projects) is not feasible for its location, content or scope;
d) the existing environmental protection standards are not violated as a result of the implementation of the activity but there is a precedent of the deterioration of the health of the population due to the implementation of the similar activity or any of its part.

2. In case the Ministry of Environment of Georgia, its regional or the local body and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics (for the IVth category activity) refuses to issue a permission on the activity, the investor shall be notified in writing on the decision with the detailed argumentation upon the expiry of the specified period (3 months for the Ist category, 2 months for the IInd category and IIIrd categories and 1 month for the IVth category).

ARTICLE 12. THE BASIS FOR THE ISSUE OF PERMITS ON THE ACTIVITY

1. The Ministry of the Environment of Georgia, its regional or local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics shall issue a permit on the activity, if:

a) in the case of implementation of the activity the legislation of Georgia is not violated;
b) in the case of implementation of the activity the standards for the condition of environment in Georgia are met;
c) the implementation of the activity is feasible for its location, nature and scope (for the infrastructure projects)

2. In the case when it is identified, that: - as a result of the implementation of the activity, the standards in effect for the condition of the environment in Georgia are violated and that the violation of the standards for the condition of the environment are caused by the increase in the total emission by different enterprises located in a place where the activity is implemented, but at the same time the activity under discussion plans to use best available technologies, then the investor will be given the right to implement the activity The emission standards for the existing enterprises shall be revised and the period shall be specified by the Ministry of Environment of Georgia, upon the expiry of which the enterprises shall adhere to the new emission standards.

3. In case of the issue of the permission, the Ministry of Environment of Georgia, its regional or local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics shall, upon the expiry of prescribed period (3 months for the Ist category, 2 months for the IInd and IIIrd categories and 1 month for the IVth category), notify the investor in a written form on the decision and provide the list of measures to be taken after the implementation of the activity. in case the decision on the issue of a permission on the activity is made

ARTICLE 13. RIGHTS AND RESPONSIBILITIES OF THE INVESTOR

1. The investor shall be obligated to provide the Ministry of Environment of Georgia, its regional or local bodies, the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics and the consultation firm (for the 1st category activities) with the objective data on the planned activity.

   The investor shall bear the responsibility in accordance with the legislation of Georgia for the provision of the biased information.

2. In case the permission on the activity is granted, the investor shall be obligated to:

a) implement the activity provided for by evidential documentation in accordance with terms and conditions of the state ecological expertise conclusion;

b) after commencing to implement the activity, to take the measures reducing the impact on the environment which the Ministry of the Environment of Georgia, its regional or local bodies, the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics shall deem necessary.

3. The investor shall have the right to select on the basis of a tender a consultation firm to carry out the environmental impact assessment.

4. In the case when the investor does not agree with the decision of the Ministry of Environment of Georgia, its regional or local bodies, the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics he shall have the right to appeal to the court.

CHAPTER III

ENVIRONMENTAL IMPACT ASSESSMENT

ARTICLE 14. THE ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURE

1. The procedure for environmental impact assessment shall be determined by the Ministry of Environment of Georgia.

   Environmental impact assessment shall denote the study and investigation procedure of the planned activity aimed at the protection of certain elements of the environment, people, landscape and cultural heritage.

2. Environmental impact assessment shall reveal and describe direct and indirect impacts on the human health and safety, vegetation, and animal world, soil, air, water, climate, landscape, eco-systems and historical monuments or the aggregate of the above-listed factors, including the impact of these factors on the cultural values (heritage) and social and economical factors (for infrastructural projects).

3. In accordance with the present law, if the activity planned by the investor falls under the Ist category, environmental impact assessment shall be the essential and significant part of the decision-making on the issue of an environmental protection permission. The issue of a permission for the Ist category of activities shall be forbidden without the environmental impact assessment except for the cases listed in paragraph 14.4. of the present law.

4. The activity may be released form environmental impact assessment if:

- The investor repeats or continues the activity undertaken before for which the procedure for environmental impact assessment has been carried out and the repeated assessment cannot not include additional information,

- Common state interests require that the activity shall commence and the decision shall be made urgently

The decision on the release of the activity from environmental impact assessment shall be made on the basis of investor's request by a special council for environmental impact assessment. The composition and functions of the council shall be defined by the Ministry of Environment of Georgia.

The decision of the council shall be approved by the Ministry of Environment of Georgia.

5. The consultation firm shall, in accordance with the legislation of Georgia. bear the responsibility for carrying out environmental impact assessment in an unbiased manner.

6. The Ministry of Environment of Georgia, its regional or local bodies and the Ministries of Environment of Ajarian and Abkhazian Autonomous Republics shall be responsible for the compliance of the results of environmental impact assessment expertise with environmental standards. The executor of the state ecological expertise shall, in accordance with the Georgian legislation, be liable to conduct the expertise in an unbiased manner.

7. The expenses required to conduct environmental impact assessment shall be borne by the investor.

8. Public participation in the environmental impact assessment procedure shall be obligatory.

ARTICLE 15. PARTICIPATION OF PUBLIC REPRESENTATIVES IN THE ENVIRONMENTAL IMPACT ASSESSMENT

1. Public representatives shall be entitled to provide the investor with their considerations and comments on the first category activity.

2. With the view to take into consideration public opinion and to ensure public participation, the investor shall be obligated to familiarize himself with public representatives' written considerations and comments on the first category activity and give heed to their arguments in the process of final issuance of evidential documentation.

3. Public representatives shall be entitled to carry out independent environmental impact assessment for the first category activity for their own account and present it to the body issuing environmental permits.

4. The results of independent environmental impact assessment should be taken into consideration during the decision-making process on the issue of environmental permits.

5. If the public representative deems that his rights have been violated, he shall be entitled to apply to Court.

ARTICLE 17. DENIAL TO PROVISION OF INFORMATION FOR FIRST CATEGORY ACTIVITY

1. The investor shall (in the course of planning first and second category activities and in the environmental impact assessment process) have the right to refuse the provision of information, based on adequate argumentation, only if:

a) the demanded information includes a state, commercial or industrial secret;
b) the specific investigation pertaining to EIA, has not yet been finalized and, accordingly, the information is not complete and does not describe the actual state of affairs.

2. In the event of a denial to provide the information, the public representative shall have the right to appeal to the Court.

ARTICLE 18. THE RULE FOR FUNDING OF ENVIRONMENTAL PERMITS.

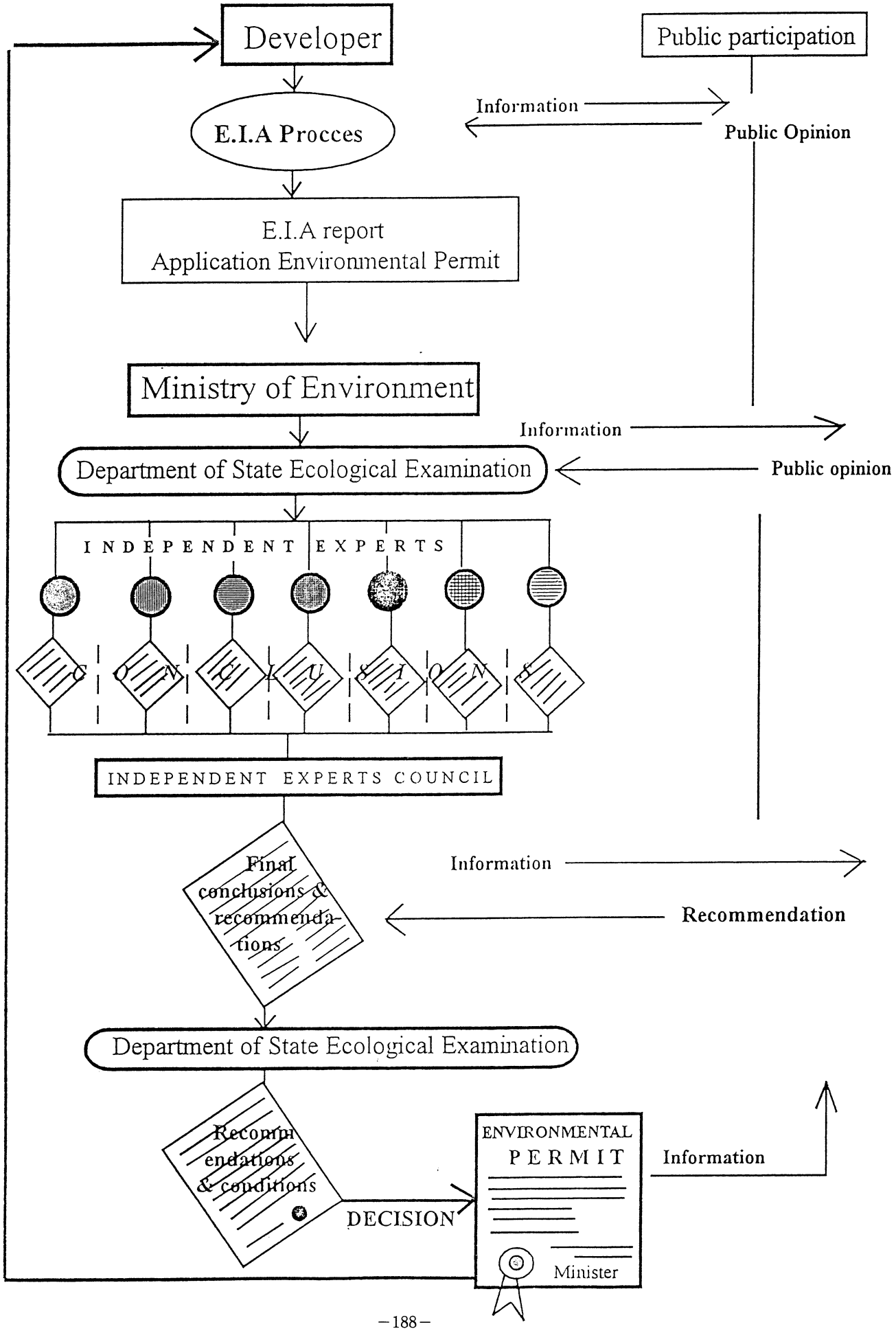
Within the limits of the process of the issue of environmental permits, the expenses required for arranging the environmental permission procedure, shall be funded in accordance with the legislation.

ARTICLE 19. RESPONSIBILITY FOR THE VIOLATION OF THE LAW "ON ENVIRONMENTAL PERMITS"

The responsibility for violation of this law shall be borne in accordance with the legislation of Georgia.

President of Georgia Edward Shevardnadze

Tbilisi
15 October 1996
No 424-IS


Developer
Public participation
Information
Public Opinion
E.I.A Procces
E.I.A report
Application Environmental Permit
Ministry of Environment
Information
Department of State Ecological Examination
Public opinion
INDEPENDENT EXPERTS
CONCLUSIONS
INDEPENDENT EXPERTS COUNCIL
Final conclusions & recommendations
Information
Recommendation
Department of State Ecological Examination
Recommendations & conditions
DECISION
ENVIRONMENTAL PERMIT
Information
Minister

RESOLUTION OF THE PARLIAMENT OF GEORGIA

On the Law of Georgia "On State Ecological Expertise"

The Parliament of Georgia resolves:

1. The Law of Georgia "On State Ecological Expertise" to be implemented from January 1, 1997.

2. To request the President of Georgia to ensure that the Ministry of Environment of Georgia elaborate and approve before January 1, 1997 the Provisions "On the rule of conducting the state ecological expertise" and "On Environmental impact assessment".

3. From January 1, 1996, the provisional Provision "On the state ecological expertise of Georgia" adopted by the Resolution of the Government of Georgia N 894 of September 5, 1992 on "Provisional provisions of the state ecological expertise of the Republic of Georgia and the approval of the provisional rule for state ecological expertise funding and compensation" to be deemed void.

Deputy Chairman
of the Parliament of Georgia — Edward Surmanidze

Tbilisi,
15 October, 1996

\No 427-IS

巻末5　Natural Resources of Georgia and Problems of their Rational Utilization

CD

NATURAL RESOURCES OF GEORGIA AND PROBLEMS OF THEIR RATIONAL UTILIZATION

PART ONE: MINERAL RESOURCES

1. THE BASIS OF GENERAL CHARACTERISTICS OF GEORGIAN MINERAL RAW MATERIALS

All main groups of Mineral Raw Materials are known in Georgia: metallic, nonmetallic and useful fossil fuels which include their various winds. The fossil fuels are represented as oil, coal and peat depots. Among metallic useful fossils are known deposits and displays of ferrous (iron, manganese) nonferrous and rare (copper, lead, zinc, tin, cobalt, arsenic, aluminium, molybdenum, wolfram, mercury, stibium) and also noble (gold, silver) metals.

Nonmetallic useful minerals are represented by deposits and displays of mining-chemical (barytes, calcite, bentonite clays, diatomite, talk, andesite, zeolite) and non-ore metallurgical (lime-stones, sand for moulding, dolomites, fireproof clays) raw materials, building materials (different stones, sand, road-metal, raw materials for cement, chalk and limestone for lime production, gypsum, plaster), stones for hand made (jewelry- agate, obsidian, chalcedony, spongolite), mineral paints and some others. The springs of different types of mineral waters are widely spread; great practical interest represent the mastering of large-scale stocks of geothermal waters. It must be noticed that some kinds of useful fossils according to the stocks scales and the quality of the raw materials occupy a prominent place in the general balance of the resources. They are- manganese, barytes, arsenic, agate, diatomite, bentonite clays, zeolites and mineral waters.

From the point of geology the surface of Georgian territory is studied in detail, but its deep structure is not yet known sufficiently and in some cases very feebly. Undoubtedly the wealth of the earth bowels are not revealed to the full extend.

In table 1.1 is given the balance stocks and the prognosis of resources for various kind of mineral raw materials for 1991 y.

Table 1.1

Mineral sources of Georgia for 1991

Useful fossils	Unit of measure	Exploiting fields			Non exploiting fields			Perspective areas		Total	
		Amount	Stocks Balances	Prognoses sources	Amount	Stocks and sources Balances	Prognoses sources	Amount	Prognosis sources	Amount	Resources
1	2	3	4	5	6	7	8	9	10	11	12
1. Fossil fuel											
Oil	mln.t	13	-	-	-	-	-	-	-	13	-
Coal-stone	"	2	410	385,0	3	6,8	-	7	360,0	12	1161,8
Brown coal	"	-	-	-	2	76,0	-	-	-	2	76,0
Plat	"	7	48,5	-	28	15,7	-	-	-	35	64,2
2. Metals											
Iron's ore	"	-	-	-	3	177	60,0	2	240	5	477
Manganese ore	"	1	212,7	32,0	2	32,0	70,0	3	80	6	426,7
Lead-zinc ore	"	1	-	-	5	-	-	-	-	6	-
Cooper ore	"	1	-	-	4	-	-	13	-	18	-
Arsenic ore	"	2	-	-	-	-	-	-	-	2	-
Mercury ore	"	-	-	-	2	-	-	-	-	2	-
Stibium ore	"	-	-	-	1	-	-	-	-	1	-
3. Mining-Chemical raw materials											
Andesite	mln. m^3	1	4,6	-	2	8,5	-	-	-	3	13,1
Barit ore	mln. t	1	2,4	0,7	3	19,7	23,0	-	-	4	45,8
Bentonite Clay	"	2	15,7	17,0	2	1,8	143	-	-	4	177,5
Diatomite	"	1	10,5	-	-	-	-	-	-	1	10,5
Calcite ore	"	1	5,6	-	2	10,1	-	-	-	3	15,7

Ores of mineral paints	"	-	-	-	2	0,6	-	1	0,6	3	1,2
Talk	"	1	2,3	-	-	-	-	-	-	1	2,3
Zeolit	"	1	30,5	-	1	2,6	2,0	1	32,0	3	67,1
4. Non ore raw materials for metallurgy											
Fireproof clay	"	-	-	-	1	2,6	-	-	-	1	2,6
Dolomite	"	2	84,9	-	-	-	-	-	-	2	84,9
Limestone for flux	"	2	61,8	-	1	1,4	-	-	-	3	63,2
Chalcedony	"	-	-	-	1	3,5	-	-	-	1	3,5
5. Stones for hand-made (jewelry)											
Agate	t.	1670	--	-	-	-	-	-	-	2	1670
Obsidian	th. t	-	-	-	1	30,1	-	-	-	1	30,1
6. Natural building materials											
Decorative-facing stones	mln. m^3	27	100,4	-	33	129,5	-	-	-	60	230,3
Wall stones	"	7	29,9	-	6	9,3	-	-	-	13	39,2
Limestone for lime production	"	8	62,7	-	18	125,1	-	-	-	26	187,8
Sand and gravel	"	38	333,4	-	36	266,7	-	-	-	74	600,1
Quartz sands	"	5	89,7	-	8	46,5	-	-	-	13	136,2
Clay for brick	"	20	33,6	-	25	74,2	-	-	-	45	107,6
Raw materials for cement	mln.t	4	74,8	-	2	183,7	-	-	-	6	258,5

Table 1.1(continuation)

1	2	3	4	5	6	7	8	9	10	11	12
inclusive:											
Clay	"	2	34,7	-	1	40,3	-	-	-	3	74,7
Limestone	"	2	40,1	-	1	143,7	-	-	-	3	183,8
Building stones	mln.m^3	9	67,6	-	57	376,1	-	-	-	66	443,7
Gyps and plaster	mln.t	4	10,2	-	2	2,6	-	-	-	6	12,8
Lite fillers	mln.m^3	5	19,1	-	12	183,2	-	-	-	17	202,3
Chalk limestone	"	-	-	-	1	4,0	-	-	-	1	4,0
Roofing slates	mln.t	-	-	-	1	4,2	-	-	-	1	4,2
7. Mineral waters	m^3	46	28473		-	-	-	86	25640	132	54113
Total		218			269			113		600	

In the republic the annual extract was about 10 mln. tons of energetically and mining-chemical raw materials, ores of ferrous and nonferrous metals and also about 45 mln. tons of different nonmetallic minerals. At this time about 30 mln. t. of disclosed rocks are removed. As a result of extracting and processing of mineral raw materials 40 mln. t. of useless waste is formed annually.

Nowadays, when easily accessible resources are already revealed and mostly mastered and when the conditions of searching, finding out arranging and exploitation of new fields are quickly complicated, the decisive role represent such factors as technical and economical expendiency for mastering and utilization of resources. At the same time is foreseen the most total and complex extraction of main and passing components of each deposit and also the utilization of opening bed-rocks and wastes of the mining production. Greatly increases the role of the ecological factors, which in some cases may be decisive when we evaluate the usefulness of mastering this or other deposit.

2. FERROUS METALS

2.1 Geological Characteristics of Deposits and Prognosis Areas

The ferrous resources in Georgia are represented by deposit of iron (magnetite's, hematite's and siderites ores and manganese (piroluzite-psylomelanines, manganite-manganocalcites and rodochrosites ores). Their economical importance is very different.

The iron ores in Georgia are find in a large stratigraphic range, from the lower Jura till Anthropogen, but the industrial deposit

among them is not yet revealed. The most considerable accumulations of the iron ore in Southern part of the republic in Small Caucasia, where the deposits are situated in Dmanisi and Poladauri. There are also ores displays of zone in Dzirula, Okriba and Gareji.

To the productive manganic geological formation first of all belong clay-sandy-siliceous deposits of Oligocene. The industrial manganese deposit belongs ledge of Dzirula and manganese displays are known in the tectonic zones of Southern Caucas and Adjaro- Trialeti. To the district of Dzirula belongs Chiatura, Chkhari- Ajameti and

Rodinauli deposits and there are also ore-bearings in Rokiti and Cholaburi. In the southern Dzirula is located the Vani-Bagdadi region manganese-bearing deposits of Oligocene. Small ore-bearings displays of manganese where discovered in Mengrelia, Rasha-Lechkhumi and cynclinals of Guria. Another formation of manganese-bearing displays are in upper-cretaceous thickness of Western and South-Eastern Georgia and there are Martvili-Senaki and Tetri Tskaro group of iron-manganese ore-bearing displays. In a balance of stocks there are three deposits of manganese of Oligocene formation: Chiatura, Chkhari-Ajameti and Rodinauli. Shkmeri deposit is out of balance because of the low quality of the ore and also of some other reasons.

2.2 Manganic Deposits

Chiatura deposit of manganic ores are disposed in the North-Eastern part of town Zestaphoni. This deposit is divided by the river Kvirila into two parts- the North-Eastern and South-Eastern part. Manganese-bearing horizon becomes weak on the North-Eastern and Southern parts. The capacity of manganese-bearing horizon changes from 0,25 to 16 meters and is located in underground from 0 till 200 m. In the vertical cut this horizon includes series of the stratums, which intermits with stratums of quartzite sands, clays and siliceous bed-rocks. The number of ore layers changes from 3 to 25. The capacity of separate ore layers changes from 1 to 50 centimeters. The thickness of the exploited horizon is from 0,6 to 8,8 m. and the useful power- from 0,35 to 5m. Tectonics of sedimentary cover of Chiatura-Sachkhere basin is relatively simple and the hydrogeological conditions of the deposit are favorable.

The ores of Chiatura deposit are represented by three main types: oxidezes, carbonizes and oxidizing. The most valuable oxidize ores are bedded mainly in the lower part of the manganese-bearing horizon, oxidizing ores are widely spread on up lands Perevisi, Shukurti, Rgani, Zeda Rgani, Tabagrebi, in the Southern part of Mgvimevi and Darkveti and in the Western part of Itkhvisi. The average maintenance of manganese in oxidizing ores in different up-lands changes from 23 to 45%, and in carbonizing ores- from 21 to 26%. Oxidized ores, which are formed by oxidation of carbonate and primary- oxidized ores have an average maintenance of manganese 26-28%.

Presently in the balance stocks the rate of the oxidizing ores includes 25,2% and the rate of the carbonizing ores- 46,9% and the oxidizing- 12,2%.

The balance stocks of the Chiatura deposit of manganese in 1990 y. is presented in table 2.1.

The depression of Kvirila is disposed in Zestaphoni and Terjola administrative districts and from the point of view of manganic stocks and has a sufficiently good perspective. Chkhari- Ajamety deposit of manganese is located in Kutaisi and Terjola districts and has a favorable perspective and is 30 klm. to the West of the town Chiatura.

Sufficient perspectives have geological searching's of manganic deposits where a group of manganese displays in Tetri Tskaro, Tskhaltubo- Martvili and Northern slope of Adjaro- Trialeti plicated system.

Stocks and prognosis resources of manganese ores in 1991 y. are presented in table 2.2.

2.3 Iron Deposits

In Georgia there are known about 60 appearances of iron ores. The all of them are evaluated as nonindustrial ones. The brief characteristic of some of them is given below. The Poladauri iron-ore deposit is disposed in Bolnisi administrative district. The ore-bearing field was found on area of 250 km ^{2}, with 8-10 km of width and 25 km of length. This deposit numbers about 30 iron-ore lots. The main ore material is hematite with pyrites, magnetite and hulkopyrites.

Table 2.1

The balance stocks of Chiatura deposit

Chiatura's deposit	Stocks according category thousand tons A B C1 A+ B+ C1 C2				
In all by deposit	32.115	17.102	150.863	200.080	12.662
including: Oxidizing	16.691	746	32.790	50.227	352
Out of them- peroxiding	-	69	5.185	5.254	96
"Mtsvari"	-	-	658	658	-
Carbonating	13.956	11.568	68.156	93.680	9.526
Oxidizing	924	2.945	25.954	29.823	1.764
Manganic sandstone's	-	-	60	60	-
Mixed	544	1.843	23.305	25.692	1.014

Table 2.2 **Resources of manganic ores of Georgia**

Name of deposits and perspective fields	Stocks, mln. t. A+B+C1+C2	Prognosis resources, mln. t.	Total stocks and prognosis resources mln. t.	Administrative district and location
1	2	3	4	5
1. Deposits Chiatura	212,7	32,0	242,8	Chiatura, Sachkhere
Kvirili depression	27,0	40,0	67,0	Zestaphoni
Chkhari- Ajameti	5,0	30,0	35,0	Terjola
Altogether by deposits	244,7	102,0	346,7	
2. Prognosis fields Tetri Tskaro district	-	25,0	25,0	Tetri Tscaro
Tskhaltubo- Martvili district	-	20,0	20,0	Tskhaltubo, Martvili
Adjaro- Trialeti zone		35,0	35,0	
In all by prognosis fields	-	80,0	80,0	
Total	244,7	182,0	426,7	

The balance resources of iron according the categories B+C1 are 4,9 million tones and the categories of C2- 732.000 tones.

Tkibuli- Shaori iron-ore deposit is located in 40-45 km. to the North-East of town Kutaisi. The prognostic siderite-ore resources are evaluated about 210 million tones. The iron-containing siderite strata with 34% 0f iron is bedded into the coal layer.

The magnetite sand deposit of Black Sea stretches as a narrow strip of 250 km. length along sea shore between rivers Chorokhi and Bzibi. These sands are sea-origin. The reserve of this deposit according the categories of C1+C2 on the fields between towns Batumi- Kobuleti- Supsa is: iron- 154 million tones, dioxide of titanum 1,25 million tones, pentoxide of vanadium- 232.000 tones. The Dzami iron-ore deposit is located in 45 km. to the South-West of village Kareli. The resources of this magnetit ores according category C1 is 16,67 million tones and average maintenance of iron is 32,14%.

The Shrosha- Urbisi deposit is supposed to be a perspective. Here are two zones more rich with iron-ores. The thickness of the first is 0,6 m. and of the second one- 5m. The maintenance of iron in both zones is more than 40%. The resources are evaluated as 20-35 million tones.

2.4 Industrial Exploitation of Deposits and Dressing of the Manganic Ores

As it is known, the exploitation of Chiatura manganic ores beginning in 1879. In 1913 the Chiatura manganese export was about 53% of the World's manganese export. In this year mining of manganic ores was 1,3 million tones. At this time the 30 dressing factories were built. Since of beginning of exploitation till 1921 in Georgia 12,3 million tones of the manganic ore was mined. During 1956-1960 the annual output was more than 3 million tones of the manganic concentrates and in 1965 the maximum mining reached up to 6 million tones. The recent years the mining of manganic ores where made by open works, its share is 40% of total mining's. The industrial power and mining of Union "Chiaturmanganese"shows the table 2.3. The dynamics of mining of manganic ores is given on the table 2.4. The same time very important is the growth level of mechanization mining of ores in underground works, that is presents on the table 2.5.

Table 2.3 **Industrial powers and mining in Chiatura**

Ore-appearances	Power on 1.01.1989 thousand tons	Power on 1.01.1988 th.t.	Mastering of power, %	Exploitation of up land
1	2	3	4	5
Shukruti	1200	1051,6	87,6	Korokhnali, Chalebi, Merevi, Itkvisi- add to Chalebi
Perevisa	300	357,5	119,1	Perevisa
Name Tsereteli	390	491,6	126,0	Zeda Rgani, Rgani, Tabagrebi, Kveda Rgani, Bunikauri

Table 2.3 (continuation)

1	2	3	4	5

Mgvimevi	445	394,3	88,6	Mgvimevi
Darkveti	1500	1451,9	96,8	Darkveti, Itkhvisi- North field
Name Pataridze	1260	1212,6	96,2	Itkhvisi
Total	5095	4959,5	97,8	

Table 2.4

Indexes of mining of manganic ores

Chiatura deposit	Mining, thousand tons			
	1975 y.	1980 y.	1985 y.	1988 y.
Ores mining- total	5172,2	5375,0	5215,4	4959,5
including: Underground way	3705,0	3614,4	3205,6	2902,6
Open way	1467,2	1760,6	2009,8	2056,9

We should note that the recultivation of areas is not properly coordinated with mining works. The table 2.6 shows relation between, these untidy areas and recultivated ones. At the same time it is significant to notice that the data of working of Dressing Factories (D.F.), Central Dressing Factory (C.D.F.), Peroxide Dressing Factory (P.D.F.), Central Cleaning Factory (C.C.F.) and Central Flotation Factory (C.F.F.) - which determines the efficiency of above- mentioned Union. The tables 2.7, 2.8 and 2,9 present the industrial powers and processing volumes of ores, technological indices of the dressing factories and dynamics of technological indices of the dressing of manganic ores of Chiatura.

The changing of the basis technical-economical indices of the work of Union "Chiaturmanganese"are presented on the table 2.10.

The table 2.11 shows evaluation of the reserves of Chiatura manganic ores until 2016. Coming from the above mentioned table 2.11, the table 2.12 shows a possible volume of mining for Chiatura manganic ores deposit until 2015.

Table 2.5

Level of mechanization mining of ores in underground works

Enterprises and indexes	1975 y.		1980 y.		1985 y.		1988 y.	
	thous. t.	%	th. t.	%	th. t.	%	th. t.	%
1	2	3	4	5	6	7	8	9
Union "Chiaturmanganite" Mining total	3604,7	100	3613,9	100	3205,6	100	2902,6	100
Including- Mechanized	2671,2	74,1	2671,1	73,9	2616,6	81,6	2469,6	84,1
of them by: - cleaning complexes	211,7	7,8	504,3	18,9	877,9	33,6	1080,3	37,2
- loading machines	1180,7	44,2	1022,1	38,2	1279,5	48,9	1130,1	38,9

Table 2.5 (continuation)

1	2	3	4	5	6	7	8	9
- Scrapers	1268,8	48	1144,1	42,8	459,2	17,5	259,1	8,9
Ore-Board (O.B.)Shukhuri Mining total	938	100	940	100	856,9	100	754,0	100
Including- Mechanized	761,6	85,8	859,8	91,4	769,0	89,7	754,0	100
of them by: - cleaning complexes	70,7	9,2	199	23,1	211,7	27,6	466,2	61,8
- loading machines	181,3	23,8	162,9	18,9	291,1	37,8	197,2	26,2
- scrapers	509,6	67	497,9	57,9	266,2	34,6	90,7	12,0
O. B. Perevisa Mining total	256	100	272,5	100	251,7	100	237,3	100

Including- Mechanized	-	-	53	19,4	164,3	65,3	156,0	65,7
of them by: - cleaning complexes	-	-	-	-	-	-	-	-
- loading machines	-	-	53	100	164,3	100	156	65,7
- scrapers	-	-	-	-	-	-	-	-
O. B. Mgvimevi Mining total	254	100	305,1	100	252,9	100	199,7	100
Including- Mechanized	-	-	-	-	25,5	10,0	30,6	15,3
of them by: - cleaning complexes	-	-	-	-	-	-	-	-
- loading machines	-	-	-	-	25,5	100	30,6	15,3
- scrapers	-	-	-	-	-	-	-	-
O. B. Tsereteli Mining total:	290	100	290,5	100	261	100	260,7	100
Including- Mechanized	-	-	5,6	1,9	74,8	28,6	78,1	30,0
of them by: - cleaning complexes	-	-	-	-	-	-	-	-
- loading machines	-	-	5,6	100	74,8	100	78,1	30
- scrapers	-	-	-	-	-	-	-	-
O. B. Darkveti Mining total	743,5	100	643,5	100	531,4	100	480,9	100
Including- Mechanized	718,5	96,6	643,5	100	531,.4	100	480,9	100
of them by: - cleaning complexes	141	12	305,9	26,4	637,4	60,6	614,2	63,3
- loading machines	280,9	23,6	210	18	221,3	21,0	251,3	25,9
- scrapers	769,2	64,4	646,2	55,6	192,9	18,4	104,4	10,8

Table 2.6

Breaking and recultivating lots on up lands of Chiatura deposit

Ore boards	Fields mastering by open works, hectare	Recultivated, hectare mining-technical including biological restoration restoration	
Shukruti	102,9	78,91	78,75
Perevisi	48,2	36,80	33,87
Tsereteli	263,2	255,61	244,44
Mgvimevi	164,0	146,69	145,32
Darkveti	306,0	217,39	160,70
Pataridze	62,2	49,00	46,57
Union "Chiaturmanganeze"	946,5	784,40	709,65

Table 2.7

Industrial powers and volumes processing of ores

Name of factory	Industrial power in 1.01.1990 y. thousand tons	Processed ores in 1.01.1989 y. th. t.	Utilization of industrial power in 1989 y. , in %

C. D. F. - 1	1100	952,1	86,6
D. F. - 25	410	392,7	95,8
D. F. - 29	300	249,8	83,3
P. D. F.	230	196,8	85,6
D. F. - 31	1400	1271,1	90,8
C. D. F. - 11	1000	927,2	92,7
C. C. F.	1360	1040,8	76,5
C. F. F.	2400	2129,0	88,7

Table 2.8

Technological indexes of dressing factories working

Name of factory	(Mn) in raw mate-rials	Results of dressing											
	(Mn) in raw mate-rials												
		Common concentrates Including highest quality			Industrial products			Non dressing ores			Wastes		
		Yield %	Maintenance of Mn, %	Ext-rac-tion, %	Yield %	Main tenance of Mn, %	Ext-rac-tion, %	Yield %	Main tenance of Mn, %	Ext-rac-tion, %	Yild, %	Main tenance of Mn, %	Ext-rac-tion, %
1	2	3	4	5	6	7	8	9	10	11	12	13	14
C.D.F.-1	18,61	18.07 16,91	45,90 47,39	46,99 45,57	30,11	12,26	31,16	45,44	6,82	16,65	6,38	15,78	5,20
.F.- 25	21,91	20,08 19,89	48,33 48,41	44,29 44,00	32,68	19,69	27,13	47,23	11,46	26,62	-	-	-
D.F.- 29	22,22	61,01 19,01	30,8 44,87	84,65 42,58	0,73	22,72	0,72	38,26	7,78	14,64	-	-	-
P.D.F.	23,23	13,61 13,57	53,21 53,24	32,93 32,91	33,0	18,66	40,6	53,39	17,97	26,44	-	-	-
D. F.- 31	16,71	51,11 2,72	23,64 48,33	73,93 8,28	0,42	16,3	0,3	39,53	9,33	21,67	8,94	8,05	4,20
C.D.F.-11	16,93	16,46 1464	44,12 46,70	45,07 42,74	32,03	18,89	3,63	44,53	4,68	12,12	7,03	15,37	6,58
C.C.F.	18,65	43,42 8,03	22,84 39,02	54,1 17,4	-	-	-	56,58	14,87	45,9	-	-	-
C.F.F.	10,85	7,46 2,07	26,05 36,19	17,91 7,62	-	-	-	-	-	-	92,5	9,6	82,1

Table 2.9

Dynamics of technological indexes dressing of manganese ores

of Chiatura deposit

Years	Ores proces-sing of carbo-nate ores	% partici-pation of carbo-nate ores	Mainte-nance of Mn %	Results of dressing

				Processing of concentrate, th. t		Yield of concentrate, %		Maintenance of Mn in concentrate, %		Extraction of Mn, %	
				Com-mon concentrate	Concentrate highest quality	Common concentrate	Concentrate highest quality	In common concentration	In concentration of highest quality	In common concentration	In concentration of highest quality
1	2	3	4	5	6	7	8	9	10	11	12
1975	5231,9	14	20,09	1834,7	1057,5	36,1	21,0	38,8	48,2	66,9	48,49
1980	5735,2	18	19,44	2779,4	950,8	48,34	16,57	30,59	47,41	78,48	42,79
1985	5733,0	40	18,45	2743,3	706,3	47,85	12,32	27,74	46,18	75,09	32,22
1987	5136,7	40	18,50	2183,3	733,1	42,52	14,26	29,85	45,73	70,46	37,23
1988	5124,2	37,5	18,57	2085,3	716,4	41,77	14,74	29,91	45,39	67,28	36,03
1989	4296,6	39	18,23	1633,7	604,5	38,03	14,07	30,72	45,27	64,06	34,93

Table 2.10

Changing of main technical-economical indexes working

of Union "Chiaturmanganese"

Indexes	Unit of dimension	1975 y.	1980y.	1985 y.	1989 y.
1. Average annual output for one worker	$ USA	6705	10.222	8.037	9.633
2. Productivity of labour in nature: a) one worker by ready production	ton/year	269,0	328,0	310,6	210,6
b) one worker of underground works	"	794,9	750,9	1025	1012
c) one worker of open works	"	4906,3	6030,0	5360	5.544
d) one worker of dressing factory by concentrate	"	1876,6	1733,2	1673	955
3. Prime cost: a) mining of raw ore:	$ USA	5,97	7,75	9,88	10,90
including underground works	"	-	8,89	11,55	13,88
on open works	"	-	5,41	7,22	6,70
b) of concentrate	"	23,23	19,73	26,08	39,84
c) 1 m^3 of disclose rocks	"	0,63	0,74	0,93	0,67
4. Expenditure to $1 of commodity output cents		80,83	89,1	102,2	90,31
5. Fund- contribution	$ USA	0,38	0,37	0,32	0,33

Table 2.11

Expectation strokes of ores of Chiatura deposit on period till 2015 year, mln. tons

1989 y. in fact	1991 y.	1995 y.	2000 y.	2005 y.	2010 y.	2015 y.
213,1	205,5	183,2	160,3	126,6	102,9	74,2

Table 2.12

Perspectives mining of manganic ores on period till 2015 year, thousand tons

Mining of manganic ores	1985 y. in fact	1990 y. in fact	1995 y.	2000 y.	2005 y.	2010 y.	2015 y.

Total	5215,4	4800	5110	5400	5400	5400	5400
including: Oxidic	2586,5	2300	2248	2112	1700	1600	1600
Carbonate	1888,1	1900	2141	2538	2950	3000	3000
Oxidized	727,0	600	721	750	750	800	800

3. Non-Ferrous and Rare Metals

3.1 Geological Characteristics of Deposits and Perspective Areas

Among non-ferrous and rare metals in Georgia widely are spread copper, lead, zinc, composites of polymetallic ores seldom molybdenum, wolfram, stibium, arsenic and mercury. Cobalt is found as a accompanied component in some copper deposits. As a raw material of aluminium was study Middle-Jurassic sandstone's which are located neer town Kutaisi.

Deposits and perspective areas of non-ferrous metals of Georgia are connected with following geological ores formations:

1) Combined copper-barytes-polymetalic deposits (Madneuli, Kvemo Bolnisi, David Gareji)- pyrites ores formation;

2) Property copper-pyrites deposits (Tsiteli Sopeli)- tipe of the same ore's formation of Bolnisi district;

3) Vein lodes of copper- lead-zinc-deposits and ores- appearances- they belong to copper- polymetallic ore formation and stratigraphical belongs to the deposits of Jura (Dambludi deposit), late Cretaceous (Pitareti group of ore-appearance) and Eocene's (deposit Merisi in Adjaria, ore-appearance of Guria, Zekari, Arjevani groups);

4) Deposits and appearance of copper ores with molybdenum and wolfram (in Khrami and Gori massifs);

5) The potential deposits and appearances of copper and polymetallic ores (in Abkhasia, Svaneti-Rasha, Kazbegi-Tusheti and Kakheti ore's districts);

6) Lead-zinc deposits in form of ore's pillar (Kvaisi and Shida Kartli);

7) lead-zinc deposits with barytes (Tekhuri, Rtskhmeluri, Skatikomi deposits the same ore in Abkhasia- Brdzishkha).

At present the Bolnisi ore area is the leading as a mineral raw materials base of the non-ferrous metallurgy. In exploitation are following deposits: one of the copper-barytes-polymetallical deposit (Madneuli), one of the lead-zincal (Kvaisi) and two of the arsenical (Tsani and Lukhumi). Some copper-polymetallics are find out and are considered as a reserves (Meri deposit group, Dambludi, KvemoBolnisi). Correlation of stocks and prognosis resources of non-ferrous and rare metals according of deposits and perspective fields are shown in table 3.1.

3.2 Industrial Exploitation of Deposits and Dressing of Non-ferrous and Rare Metals Ores

On the base of Madneuli copper-barytes-polymetallical deposit since 1975 works Madneuli Mining-Dressing Plant (M.M.-D.P.). This deposit is exploited by open way with selective mining of different tips of ores. In the table 3.2 ore given dynamic of ores mining and basic technical-economical indices of Madneuli quarry's working. In the table 3.3 is shown the geometrical parameters of quarry deposit in various time of working. The dynamics of basic indices of drill-blasting works on quarry is given in table 3.4 and dynamic of basic indices of loading works by excavators are given in table 3.5.

The copper-pyrite and baryte ores are in rich on Madneuli mining-dressing factory.

Technological and technical-economical indices of Madneuli concentration (dressing) factory work are given in the tables 3.6 and 3.7.

Kvaisi lead-zink deposit is exploit from 1949 by underground way. At present industrial power of mine is 105 thousand tones per year.

The basic technical-economical indices of the ore output are given in table 3.8 and basic indices of lead-zinc ores concentration (dressing) are given in table 3.9.

Lukhumi deposit of arsenicus is located in Rasha district and works seasonally because of its high-mountainous disposition. The ores contents 8-9% of arsenic. The dynamic of Lukhumi arsenious ores mining are given in table 3.10.

The Tsani deposit of arsenic-pyrites deposit is mining by underground way from 1937. The mine works seasonaly because of its locating in zone of glacial region of the Main-Caucasian mountain range. The ore contents 18-20% of arsenic, and this ore without preliminary concentration (dressing) undergo to crushing and firing.

Table 3.1

Correlation of stocks and prognosis resources of ferrous and rare metals

N	Name of useful raw materials, deposits and perspective areas	Stocks and prognosis resources in % of summary stocks			Administrative district
		Balance stocks	Prognosis resources	Total	

1	2	3	4	5	6
	1. Copper a) Deposits:				
1.	Madneuli	59,1	35,9	47,2	Bolnisi
2.	Dambludi	3	5,4	4,2	Dmanisi
3.	Meri's group	4,6	5,7	5,1	Keda
4.	Kvemo Bolnisi	12,8	24,6	18,9	Bolnisi
5.	Tsiteli Sopeli	25,5	28,4	24,6	Bolnisi
	Total	100	100	100	
	b) Perspective areas:				
6.	David Gareji	-	1,0	1,0	Bolnisi
7.	Tamarisi	-	3,9	3,9	Bolnisi
8.	Darbazi	-	12,1	12,1	Bolnisi
9.	Gartini	-	7,6	7,6	Kareli
10.	Abulmuli	-	18,2	18,2	Dmanisi
11.	Devdoraki	-	2,1	2,1	Kazbegi
12.	Chentisi	-	3,6	3,6	Akhmeta
13.	Mashakeri	-	3,9	3,9	Bolnisi
14.	Mamule-Grmakhevis	-	9,1	9,1	Bolnisi
15.	Vashlovana- Ugeltechila	-	4,8	4,8	Lagodekhi
16.	Mazimchais	-	7,6	7,6	Lagodekhi
17.	Adange- Marukhis	-	14,0	14,0	Gulripshi
18.	Tvibrasheni- Chkhaltini	-	12,1	12,1	Gulripshi
	Total		100	100	
	2. Lead and Zinc a) Deposits:				
19.	Ore's group of Kvaisi	49,2	49,2	40,8	Java
20.	Amtkeli	1,3	33,4	8,9	Gulripshi
21.	Rtskhmeluri	18,6	2,4	11,6	Lentekhi
22.	Madneuli	9,6	-	5,6	Bolnisi
23.	Dambludi	10,5	14,7	9,7	Dmanisi
24.	Meris	10,8	-	6,3	Kedi
	Total	100	100	100	
	3. Arsenic a) Deposits:				
25.	Tsani	66,1	-	66,1	Lentekhi
	Including lot Cherekhi	7,9	-	7,9	Lentekhi
26.	Lukhumi	26,0	-	26,0	Ambrolauri
	Total	100	-	100	
	4. Stibium a) Deposits:				
27.	Zopkhid group	100	-	100	Oni
	5. Mercury a) Deposits:				
28.	Avadkhara	36,8	-	22,8	Gudauti
29.	Akheis	63,2	100	77,2	

	Total	100	100	100

Table 3.2

Dynamics of ores mining and main technical-economical data's of Madneuli quarry's working

Index	Unit of measure	1975 y.	1980 y.	1985 y.	1987 y.	1988 y.	1989 y.
Mining of copper ore	thousand tons	641,5	608,0	1387,0	1410,0	1420,0	1452,4
Mining of barytes ore	"	-	102,3	174,0	171,5	172,2	266,4
Mining of gold-kipping quartzites	"	-	352,5	382,3	359,5	291,4	205,6
Disclosing works	th. m^3	1251,0	5937,3	5005,0	5090,0	5156,1	4129,4
Worker's productivity by:							
a) mining mass	m^3/centi-meter	28,7	29,7	29,5	30,0	31,0	31,0
b) extraction ore	ton/centi-meter	5,03	3,4	10,5	10,0	10,3	12,8
Height of projections by:							
a) disclosing	metre	10-12	12-15	12-15	12-15-18	12-15-18	12-15-18
b) ore	metre	10-12	15	15	15	15	15
Number of acting projections by:							
a) disclosing	piece	7	9	15	14	14	13
b) ore	"	5	8	6	7	7	7
Cost price mining of 1 ton of copper ore	$ USA	-	5,01	4,32	4,31	4,81	5,82
Cost price take off 1 m^3 of disclosing	"	-	1,43	1,69	1,6	1,49	1,65
Current coefficient of disclosing	m^3/ton	1,93	2,3	2,63	3,10	2,05	2,74

Table 3.3

Geometrical parameters of quarry deposit of Madneuli

Name of parameters	On 1990 y.	In future
Length: by surface, m.	1230	1300-1400
by bottom, m.	460	150
Width: by surface, m.	860	45
by bottom, m.	170	45
Height of boards, m. : South-East	240	212
West	127	159
North	240	270
Height of disclosing projections, m.	12-18	-
Height of mining projections, m.	15	-
Corner slope of working projection, degree	60-70	-
Corner slope of quarry board's, degree	-	34-36

Table 3.4

Dynamics of main indexes of drill-blasting works on quarry

	Years				
Indexes	1980	1985	1987	1988	1989

Annual volume of drilling works, m.	1205.800	164.320	176.700	161.700	138.853
Number of acting drilling machine-tools, p.	8,0	5	5	5	4
Productivity on 1 machine-tool in year, m.	25.100	32.861	32.100	32.207	34.089
Going out of mining mass off 1m. chink, m^3/m	30,1	31,0	33,6	34,2	34,2

Table 3.5 **Dynamics of main of loading works by excavators**

	Years				
Indexes	1980	1985	1987	1988	1989
Annual volume of loading works, th. m^3	6201,1	5480,0	5574,8	5642,1	4626,7
Including by disclosing, th.m^3	5437,3	5005,0	5090,0	5156,1	4129,4
Number of acting drilling machine-tools, piece	7,4	5,0	6,0	6,0	6,0
Average annual productivity for 1m^3 of scoop, th. m^3	11,3	134,7	135,9	129,4	129,9
Prime cost of 1m^3 disclosing, $	1,43	1,69	1,60	1,49	1,60

Table 3.6 **Technological indexes ores dressing of Madneuli deposit**

Indexes	Unit of measure	1975 y.	1980 y.	1985 y.	1987 y.	1988 y.	1989 y.
1	2	3	4	5	6	7	8
Processing of copper ore	thousand tons	570,4	695,8	1409,8	1396,3	1409	1448
Copper's content in ore	%	2,42	1,1	0,89	0,914	0,92	0,92
Yield of copper concentrate	"	11,0	6,24	5,09	5,04	5,18	5,18
Extraction of copper from concentrate	"	89,44	85,02	81,89	81,56	82,08	84,9
Copper content in concentrate	"	16,1	`15,43	14,36	14,78	15,1	15,0
Copper content in wastes	"	-	0,18	0,18	0,18	0,18	0,15
Processing of barytes ore	thousand tons	-	100,3	174,0	171,5	171,4	262,6
Barytes content in ore	%	-	24,84	19,1	21,01	20,7	19,84
Yield of barytes concentrate	"	-	17,93	11,87	15,67	16,9	15,87
Extraction of barytes from barytes concentrate	"	-	55,44	54,2	63,2	67,25	65,0
Barytes content in concentrate	"	-	87,49	84,81	85,83	86,0	86,1
Barytes content in wastes	"	-	11,6	9,43	9,38	8,21	8,06

Table 3.7

Technical-economical indexes of Madneuli concentration factory

Indexes	Unit of measure	1975y.	19800 y.	1985 y.	1987 y.	1988 y.	1989 y.
Production of concentrate (15%)	thousand tons	81,8	43,4	68,7	69,3	70,6	75,2
Production of barytes concentrate	"	-	18	20,7	26,9	27,7	39,7
Labor production according ore processing	tons	1930	2640	5297	5245	5204	5981
labor productivity according manufacturing of copper concentrate	"	272	145	230	232	398	422
Cost price processing of 1 ton copper ore	$ USA	-	5-55	3-66	3-71	8-80	9-33
Cost price procesing of 1t. barytes ore	"	-	4-28	5-65	5-62	9-79	5-88
Cost price of 1t. copper concentrate	"	-	226-46	199-59	196-85	204---62	209-69
Cost price 1t. barytes concentrate	"	-	92-87	108-55	79-26	82-29	54-31

Cost price of all production	$ USA	9317	13285	20359	20008	20565	20819
Expenditures on $1 of commodity production	cent USA	-	69,86	90,52	89,65	72,28	71,73

Table 3.8

The basic technical-economical indexes of ore output in Kvaisi deposit

Indexes	Unit of measure	1975	1980	1985	1988	1989
Ore mining	thousand tons	100,6	105,9	108,97	105,1	110,6
Mining cutting works for 1000 ton output	liner metre	-	12	23,3	27,2	
Number of acting cleaming faces	piece	8	9	6	6	6
Labor productivity of worker:						
a) on cleaning works	m^3 per shift	1,21	1,12	1,31	1,4	s1,33
b) on mining cutting works	"	0,92	0,68	0,68	0,92	1,00
Ore losses	%	8,0	7,1	8	8	8
Ore concentration	%	-	30,8	18	19	18
Cost price of 1 ton ore mining	$ USA	13,5	14,03	20,29	21,22	23,13

Table 3.9

Technical-economical indexes of lead-zinc ore concentration of Kvaisi deposit

Indexes	Unit of measure	1980 y.	1985 y.	1987 y.	1988y.
1	2	3	4	5	6
Processing ores	th.t.	104,2	108,2	105,3	110,6
Content in ore:					
lead	%	0,97	0,89	0,97	0,96
zinc	%	4,44	3,52	3,85	3,80
Production of lead concentrate	ton	1725,2	1283,4	1386,2	1365
Content of lead in lead concentrate	%	^49,5	60,49	59,55	62,28
Production of zinc concentrate	ton	8290,8	6697,7	7015,3	7283,8
Content of zinc in zinc concentrate	%	46,44	47,26	48,08	48,0
Extraction of lead	%	83,96	80,15	80,45	80,74
Extraction of zinc	%	83,21	83,03	83,22	83,4
Content of lead in wastes	%	0,06	0,06	0,07	0,05
Content of zinc in wastes	%	0,58	0,52	0,57	0,57
Value of processing of 1 ton raw ore	$ USA	26-91	36-78	45-33	40-13
Cost price of 1 t. lead concentrate	$	373-75	582-88	655-97	538-19
Cost price of 1 t. zinc concentrate	$	248-32	425-83	481-25	437-54
Labor productivity of 1 worker processing ore per year	ton	1430	1490	1450	1450
Expenditure on $1 wares production	$	1,55	1,64	1,62	1,64

The dynamic of the Tsani arsenic-pyrites ores mining are given in table 3.11.

Table 3.10

Dynamic of mining of arsenious ores of Lukhumi deposit

Name	1975	1980	1985	1987	1988	1989
Mining-thousand ton	1,96	2,2	1,8	-	2,0	2,0

Table 3.11

Dynamic of mining of arsenic-pyrities ores of Tsani deposit

Name	1975	1980	1985	1987	1988	1989
Mining-thousand ton	1,51	0,9	0,56	0,4	-	-

巻末6　1991年グルジア国資源量（産業省資料）

Table 1.1

Mineral sources of Georgia for 1991

Useful fossils	Unit of measure	Exploiting fields			Non exploiting fields			Perspective areas		Total	
		Amount	Stocks Balances	Prognosis sources	Amount	Stocks and sources Balances	Prognosis sources	Amount	Prognosis sources	Amount	Resources
1	2	3	4	5	6	7	8	9	10	11	12
1. Fossil fuel											
Oil	mln.t	13	-	-	-	-	-	-	-	13	-
Coal-stone	"	2	410	385,0	3	6,8	-	7	360,0	12	1161,8
Brown coal	"	-	-	-	2	76,0	-	-	-	2	76,0
Plat	"	7	48,5	-	28	15,7	-	-	-	35	64,2
2. Metals											
Iron's ore	"	-	-	-	3	177	60,0	2	240	5	477
Manganese ore	"	1	212,7	32,0	2	32,0	70,0	3	80	6	426,7
Lead-zinc ore	"	1	-	-	5	-	-	-	-	6	-
Cooper ore	"	1	-	-	4	-	-	13	-	18	-
Arsenic ore	"	2	-	-	-	-	-	-	-	2	-
Mercury ore	"	-	-	-	2	-	-	-	-	2	-
Stibium ore	"	-	-	-	1	-	-	-	-	1	-
3. Mining-Chemical raw materials											
Andesite	mln. m^3	1	4,6	-	2	8,5	-	-	-	3	13,1
Barit ore	mln. t	1	2,4	0,7	3	19,7	23,0	-	-	4	45,8
Bentonite Clay	"	2	15,7	17,0	2	1,8	143	-	-	4	177,5
Diatomite	"	1	10,5	-	-	-	-	-	-	1	10,5
Calcite ore	"	1	5,6	-	2	10,1	-	-	-	3	15,7
Ores of mineral paints	"	-	-	-	2	0,6	-	1	0,6	3	1,2
Talk	"	1	2,3	-	-	-	-	-	-	1	2,3
Zeolit	"	1	30,5	-	1	2,6	2,0	1	32,0	3	67,1
4. Non ore raw materials for metallurgy											
Fireproof clay	"	-	-	-	1	2,6	-	-	-	1	2,6
Dolomite	"	2	84,9	-	-	-	-	-	-	2	84,9
Limestone for flux	"	2	61,8	-	1	1,4	-	-	-	3	63,2
Chalcedony	"	-	-	-	1	3,5	-	-	-	1	3,5
5. Stones for hand-made (jewelry)											
Agate	t.	1670	--	-	-	-	-	-	-	2	1670
Obsidian	th. t	-	-	-	1	30,1	-	-	-	1	30,1
6. Natural building materials											
Decorative-facing stones	mln. m^3	27	100,4	-	33	129,5	-	-	-	60	230,3
Wall stones	"	7	29,9	-	6	9,3	-	-	-	13	39,2
Limestone for lime production	"	8	62,7	-	18	125,1	-	-	-	26	187,8
Sand and gravel	"	38	333,4	-	36	266,7	-	-	-	74	600,1
Quartz sands	"	5	89,7	-	8	46,5	-	-	-	13	136,2
Clay for brick	"	20	33,6	-	25	74,2	-	-	-	45	107,6
Raw materials for cement	mln.t	4	74,8	-	2	183,7	-	-	-	6	258,5

Table 3.1

Correlation of stocks and prognosis resources of ferrous and rare metals

N	Name of useful raw materials, deposits and perspective areas	Stocks and prognosis resources in % of summary stocks			Administrative district
		Balance stocks	Prognosis resources	Total	
1	2	3	4	5	6
	1. Copper a) Deposits:				
1.	Madneuli	59,1	35,9	47,2	Bolnisi
2.	Dambludi	3	5,4	4,2	Dmanisi
3.	Meri's group	4,6	5,7	5,1	Keda
4.	Kvemo Bolnisi	12,8	24,6	18,9	Bolnisi
5.	Tsiteli Sopeli	25,5	28,4	24,6	Bolnisi
	Total	100	100	100	
	b) Perspective areas:				
6.	David Gareji	-	1,0	1,0	Bolnisi
7.	Tamarisi	-	3,9	3,9	Bolnisi
8.	Darbazi	-	12,1	12,1	Bolnisi
9.	Gartini	-	7,6	7,6	Kareli
10.	Abulmuli	-	18,2	18,2	Dmanisi
11.	Devdoraki	-	2,1	2,1	Kazbegi
12.	Chentisi	-	3,6	3,6	Akhmeta
13.	Mashakeri	-	3,9	3,9	Bolnisi
14.	Mamule-Grmakhevis	-	9,1	9,1	Bolnisi
15.	Vashlovana- Ugeltechila	-	4,8	4,8	Lagodekhi
16.	Mazimchais	-	7,6	7,6	Lagodekhi
17.	Adange- Marukhis	-	14,0	14,0	Gulripshi
18.	Tvibrasheni- Chkhaltini	-	12,1	12,1	Gulripshi
	Total		100	100	
	2. Lead and Zinc a) Deposits:				
19.	Ore's group of Kvaisi	49,2	49,2	40,8	Java
20.	Amtkeli	1,3	33,4	8,9	Gulripshi
21.	Rtskhmeluri	18,6	2,4	11,6	Lentekhi
22.	Madneuli	9,6	-	5,6	Bolnisi
23.	Dambludi	10,5	14,7	9,7	Dmanisi
24.	Meris	10,8	-	6,3	Kedi
	Total	100	100	100	
	3. Arsenic a) Deposits:				
25.	Tsani	66,1	-	66,1	Lentekhi
	Including lot Cherekhi	7,9	-	7,9	Lentekhi
26.	Lukhumi	26,0	-	26,0	Ambrolauri
	Total	100	-	100	
	4. Stibium a) Deposits:				
27.	Zopkhid group	100	-	100	Oni
	5. Mercury a) Deposits:				
28.	Avadkhara	36,8	-	22,8	Gudauti
29.	Akheis	63,2	100	77,2	
	Total	100	100	100	

巻末7　1998年グルジア国資源量（産業省資料）

Mineral resources of Georgia
For 01.01.1998.

#	Title of useful minerals and its occurrence	Unit of measurement Ton	Reserves category			Forecast x) resources
			$A+B+C_1$	C_2	$A+B+C_1+C_2$	
1	2	3	4	5	6	7
	1. Energetic deposits					
1.	Oil (recoverable reserves from 15 sites)	Million Tons	11743	20694	32437	580 (potential resources)
2.	Gas (16 sites) including:	Million M^3	3691	8032	11723	161800 (potential resources)
2.1	Dissolved in oil	Million M^3	1142	2370	3512	
2.2	Free exhaust gas	Million M^3	2523	5967	8490	
3	Hard coal (Tkvarcheli and Tkibuli-Shaori sites)	Million T.	302634	50350	352984	
4.	Brown coal (Akhaltsikhe site)	Million T.	71321	4415	75736	
	2. Deposits for development of basic metallurgy (manganese), Ferro-alloy and gold extracting industry.					
5.	Manganese (Chiatura Chkhari-Adjameti and Kvirila sites)	Million. T.	222432	24202	246634	
6.	Copper (Madneuli, Tsitelisopeli, Dambludi, Merisi sites) with Madneuli bents	Thousand T.	335.5 +7.1 342.6	179.2	521.8	2120
7.	Gold (Madneuli, Sakdrisi, Dambludi, Merisi, Zopkhidi sites) with Madneuli bents	kg.	19060 +16364 35424	24283	54459	500000
8.	Silver (Madneuli, Kvaisi, Sakdrisi, Dambludi, Merisi, Zopkhidi sites) with Madneuli bents	Ton	131.6 +120.6 252.2	195.5	447.7	524
9.	Lead (Madneuli, Kvaisi, Sakdrisi, Dambludi, Merisi, Zopkhidi sites) with Madneuli bents	Thousand T.	106.9 +3.8 110. 7	128.9	239.6	800

x) - The Estimations are given on all territory of Georgia

10.	Zincum (Madneuli, Sakdrisi, Dambludi, Merisi, Zopkhidi sites) with Madneuli bents	Thousand T	263.9 +33.8 297.7	306.6	604.3	2100
11.	an arsenic (Lukhumi, Tsana and Chorokhi sites)	T.	40719	23534	64253	
12.	Antimony (Zopkhidi site)	T.	16600	24664	41264	342
13.	bismuth (Dambludi site)	T.	-	180.5	180.5	
14.	Cadmium (Madneuli, Kvaisi, Dambludi sites) with Madneuli bents	T.	554.4 +182.4 736.8	10670	1803.8	
15.	Selenium (Madneuli site)	T.	98.0	31.8	129.8	
16.	Tellurium (Madneuli site)	T.	107.6	35.8	143.4	
17.	Germanium (Tkibuli-Shaori site)	T.	168.4	5.6	174	
18.	Hydrargyrum (Akheisi and Avadkhari sites)	T	2209	1690	3899	
19.	Indium (Dambludi site)	T.		49.5	49.5	
20.	Sulfur (Madneuli and Kvaisi sites) with Madneuli bents	Thou. Ton	1146 +131 1277	590	1867	

3. Mining deposits

21.	Andezit acid-resistant (Bakuriani site)	thousand M^3	4517		4 517	
22.	Barytic ores (David-Garedji, Western Kvemo-Bolnisi, Apshrini, Madneuli, Chordi sites) with Madneuli bents Ore Sulfuric-acid barytic	Thou. Ton	22511 7606	5274 1568	27785 9174	
23.	Clay bentonitic (Gumbrini, Askana group of sites and Kumistavi, Churchuto-Chikheli and Aral sites)		40901	1651	42552	
24.	diatomite (Kisatibi site)	Thou. Ton	8015	2398	10413	
25.	Calcite (Mekvena, Gvedi, Saberia sites)	Thou. Ton	12795	2844	15639	

26.	Mineral paints (Matkhodji-Udzlouri site)	thousand $т^3$	437	-	437	
27.	Talcum (Chorchani group of sites)	thousand $т^3$	2090	245	2335	
28.	Ceolit (Dzegvi and Tedzami sites)	Thou. Ton	31664	1186	32850	

4. Deposits for metallurgy

29.	Clay refractory (Shrisha site)	Thou. Ton.	2576	-	2576	
30.	Dolomites (Tar-dolomite) and dolomitized chalkstones (Abano and Tkvarcheli sites)	Thou. Ton	45037	41822	86859	
31	Chalkstone (Abano, Dedoplistskaro, Chishura sites)	Thou. Ton	61898	-	61898	
32.	Sands for forming (Saparisgeli site)	Thou. Ton	2300	-	2300	
33.	Khaltsedon and Spongotite (Adjameti site)	thousand $т^3$	3500 16100	-	3500 16100	

5. Ceramic deposits

34.	kaolin (Djvari site)	thousand $т^3$	1298	-	1298	
35.	Clay ceramic (Zovreti and Perevi sites)	thousand $т^3$	365	-	365	
36.	Riolite (Madneuli site)	thousand $т^3$	1271	-	1271	
37.	Trakhite (Tsikhisubani site)	thousand $т^3$	945	2047	2992	
38.	Pegmatite (Shrosha site)	thousand $т^3$	2332	-	2332	

6. Artificial (color) rocks..

39.	Agate (Akhaltsikhe and Kachagani sites) Ore Agate	$т^3$/kg	5208205 792819	7030855 877929	12239060 1670748	
40.	Marble "Onix" (Khoriti) Chalkstone Mottled «Onix »	$с^3$/т.	470 975	-	470 975	
41.	Agate (Dzirovani site)	т.	-	100	100	
42.	Obsidian colored (Chikiani site)	Thou. Ton	-	30	30	
43.	lashma	т.	-	200	200	

	(Djapariongeli and Gvedi sites)					
44.	Dolerite for facing/decorative (Kurtskani site)	T.	-	872	872	
45.	Radiative Lamprofire (Atskuri site)	Thou. Ton	-	-	23	
	7. Building material.					
46.	Cement materials	-	-	-	-	
46.1	Chalkstones (Kavtiskhevi, Saskhori, Dedoplistskaro)	Thou. Ton	179726	-	179726	
46.2	Clay (Kaspi, Kavtiskhevi and Gardabani sites)	Thou. Ton	73762	-	73762	
46.3	Gypsum and Anhydrite (Tskaltubo, Kudoni, Mukhli-Tsesi, Badjisthevi and Chrebalo sites)	Thou. Ton	20100	7182	27282	
47.	crystal - for field fertilization etc. building sands (12 sites)	Thou. T.	112483	7705	120188	
48.	Cretaceous building (Gali site)	thousand T.	3962	-	3962	
49.	Send for building/stucco (Tskaltbili. Akhali-Samgori and Burdomisi sites)	thousand T.	6628	318	6946	
50.	Shales for roofing (Intsobi site)	thousand T.	2602	1612	4214	
51.	perlite (Parvani site)	thousand T.	13521	-	13521	
51.1	Including: perlite for a filter dust	thousand T.	1063	-	1063	
52.	Clay ceramsite (Nosiri site)	thousand T.	1963	-	1963	
53.	Clays bricky (56 sites)	thousand T.	112.4	1.3	113.7	
54.	Chalkstone for processing limestone (26 sites)	Thou. Ton	163.8	11.6	175.4	
55.	Facing materials (81 sites)	million T.	179.0	52.6	231.6	
56.	Sawing rockss for walls (12 sites)	thousand T	32556	5594	38714	
57.	Other send materials (85 sites)	million T.	694.2	12.4	706.6	
58.	Building rock for production of breakstone and	million T.	760	22.6	782.6	

	rubble (82 sites)					
59.	Basalt for an immovable casting (Pervisi, Samplia sites) and fiberglass	thousand m^3	9892	2090	11982	
60.	Stowing materials for mines (Tkibuli, Nakerala and Makharauli sites)	thousand m^3	83870	-	83870	
	8. Materials for glass utensils					
61.	Quartz-semi-field-fertilizer sands (Badji and Kroli sites)	Thou. Ton	12486	-	12486	
	9. Materials for production of synthetic diamonds					
62.	Lithographic rock (Algeti site)	thousand m^3	101	-	101	
	10. Fertilizer.					
63.1	Peat (33 sites)	Mln. Ton	55.6	11.6	67.2	
63.2	Send for stucco (Mziuri, Purtseltskali, Taribani, Rustavi, Samachikhani and Iagludja sites)	Mln. Ton	9.4	-	9.4	
	11. Fresh and mineral waters.					
64.	Sweet waters (40 sites)	T.				
64.1	For boundless term exploitation	Thou. m^3/day	4918.7	1878.8	6797.5	
64.2	For 25-year's computational term exploitation	Thou. m^3/day	4735.1	2149.9	6785	
65.	Mineral waters (24 sites)	Thou. m^3/day	-	-	-	
65.1	For boundless term exploitation	Thou. m^3/day	940.3	8100.8	9041.1	
65.2	For 7-flight computational term exploitation	Thou. m^3/day	105.5	-	105.5	
	12. Thermal waters for ardent water facilities.					
66.	thermal waters	Thou. m^3/day	115.5	6.3	121.8	
	13. Thermal waters for resort healing.					
67.	thermal waters	Thou. m^3/day	27	8	35	

巻末８　マンガン資源量（産業省資料）

Table 2.2 **Resources of manganic ores of Georgia**

Name of deposits and perspective fields	Stocks, mln. t. A+B+C1+C2	Prognosis resources, mln. t.	Total stocks and prognosis resources mln. t.	Administrative district and location
1	2	3	4	5
1. Deposits Chiatura	212,7	32,0	242,8	Chiatura, Sachkhere
Kvirili depression	27,0	40,0	67,0	Zestaphoni
Chkhari- Ajameti	5,0	30,0	35,0	Terjola
Altogether by deposits	244,7	102,0	346,7	
2. Prognosis fields Tetri Tskaro district	-	25,0	25,0	Tetri Tscaro
Tskhaltubo- Martvili district	-	20,0	20,0	Tskhaltubo, Martvili
Adjaro- Trialeti zone		35,0	35,0	
In all by prognosis fields	-	80,0	80,0	
Total	244,7	182,0	426,7	

巻末９　本案件要請書

MASTER PLAN STUDY ON PROMOTION OF MINING INDUSTRY IN GEORGIA

1. Background

Georgia became independent country in 1991 as a result of the Soviet Union's break-up. After declaration of its independence the unstable political situation and confusion in the country economy led to the decrease of GDP to 1/5 of the volume of Soviet period. In August 1995 a New Constitution was accepted and the reforms aimed at the economic stabilization and transition to market economy were started.

The state has been creating a foundation for the independent economic development by carrying out privatization, price liberalization, improvement of legal basis, working out necessary financial policy, reformation of administrative bodies and foreign capital attraction. However, Georgia is now facing the difficulties in the transition to the market economy due to its former dependence on economic ties with the Council of Mutual Economic Aid, especially with the USSR; collapse of the economic system within CIS has strongly affected the country economy. In 1996 GDP was USD 4,59 bln, 11,3 % rate of economic growth was observed in 1997, i. e. the first signs of economy recovery are evident.

On the other hand, the prices increased by 7,2 % in 1997, that demonstrates weak position of national economy.

Now the most important objective for Georgia is to establish the economic foundation based on the industry where key sectors should be exposed, including mining industry. It is very important to develop mineral resources (copper, zinc, rare earth metals, gold, etc) and define the mining industry as a foundation of the economy. That is a high priority goal for Georgia, and development of its mining sector will be a generator of economic growth.

Japan is an economically highly developed country with advanced mining industry. The republic wishes to request the Sun Rising Country to screen "The Master Plan Study on Promotion of Mining Industry in Georgia" by using the accumulated skills and technologies, and thus assist Georgia in laying the economic groundwork for the prosperity of the country.

2. Present state of mining industry of Georgia.

The territory of Georgia is one of the main parts of Caucasian Mountain chain which is located on the South of East European platform which was created as a result of geo-dynamic processes.

In the history of geological development Georgian earth crust is discussed in accordance with the time of formation of useful minerals (from early-Paleozoic to late Alpine era), which is bound up with sedimentary gathering processes, effusive and intrusive magnetism and metamorphism.

During the Soviet period geological investigation of the country territory was effectively carried out. A large variety of mineral resources has been discovered (copper, lead, zink, gold, silver, baryte, diatomite, zeolite, underground drinking and mineral water springs, thermal water, building and facing stones, etc). A part of them is presently exploited.

In Georgia copper mine in Madneuli, manganese in Chiatura, lead-zinc mine in Kvaisa and gold mine in Madneuli are functioning. Due to the absence of metallurgical plant for ferrous metal ores processing in the country, technological processes in mining industry are limited to the dressing and making the concentrates which are exported to different countries for further metallurgical processing. In Soviet period 1,1% of the whole output of concentrates in the USSR were produced in Georgia, but after declaration of its independence in 1991, collapse of inter-union horizontal distribution of labor has dropped their

production for a half. Recently the signs of gradual growth of production are noticed, but due to the depreciation of the equipment, weak competitive ability within market economy conditions, as well as shortage of funds, restoration of productivity is being achieved with great difficulties. Moreover, in 1991 gold mine output volume was 0,46 tons, the increase up to 3 tone was planned in 1995, and though attempts have been made to promote the gold mining industry, productivity grouth has not been registered in this subsection due to the said reasons.

Besides, the non-ore objects such as Chordi barytic, Kisatibi diatomic, Gumbrisi bentonitic and other enterprises, operating to satisfy domestic demand and supply their products to the neighboring countries, under the market economy conditions have been forced to increase their competitive abilities and productivity through modernization.

On the other hand, geological exploration activity which has formerly been carried out under the budget of the Soviet government, since 1991 has been placed in sad state. As a result, the existing deposits and promising areas, except copper and gold objects of the Bolnisi District in the South of Georgia (where foreign investments have been attracted), stopped to be geologicaly explored.

There are bases of mineral resources singled out in Georgia (located in Abkhazia, Svaneti, Zemo Racha, Samachablo, Kakheti, central Georgia, Bolnisi, Dzama-Gujareti, Guria, Achara) within which the perspectives are determined to reveal new industrial deposits of ferrous, rare and precious metals, in particular, Rammelsbergite type, Curoco type, epithermic gold ore type, etc. Consequently, there obviously is the necessity to continue geological investigation works.

That is why there is the necessity of further improvement of the Mining Law, promotion of the mining industry through attraction of foreign investments and creation of national capital to use for the promotion of the country mineral resources potential.

3. Appeal to the Government of Japan

In accordance with the above situation (circumstances) the Government of Georgia appeals to the Government of Japan with the request to co-operate in the implementation of the Master Plan Study on Promotion of Mining Industry of Georgia, with the purpose of establishment of economic basis, increase of employment of specialists, as well as social-economic development of administrative-territorial units. The co-operation must lead to the analysis of existing state of mining sector, to the assessment of economic potential of the country mineral resources, revealing the problems of development of mining industry (in particular, regulation of laws, improvement of organizational aspects related to the industry) and formation of models for their solution.

The request with which the Government of Georgia appeals to the Government of Japan, includes co-operation in implementation of investigation works within the framework of the program given below:

Program of Study

(1) Target area

– Whole territory of Georgia with the area of 70 thous.km^2.

(2) Content of the research

A. Evaluation of potential mineral resources of the country:

– Compiling and analysis of data on ore occurrences and deposits;
– Selection of projects to be studied (promising deposits);
– Investigation of infrastructure;

– Evaluation of potential of useful fossils;

B. Analysis of present state of the mines

– Study of conditions of mines operation and questions of their management;
– Study of existing exploration of layers and methods of ore dressing;
– Analysis of systems of supply and sales of raw materials.

C. Present state of environment protection

– Measures and methods used for environment protection on the mines;
– The Law on Environment Protection and control on its observance.

D. Analysis of current state policy in mining industry

– Analysis of data on the improvement of laws related to the mining industry;
– Administrative organizations (analysis of data);
– Estimation of the role of mining industry in the country economy;
– Analysis of the state of privatization and measures for attraction of foreign investments.

E. Problems and Master Plan on Promotion of Mining Industry

– Modernization of mines;
– Strategy of exploration and development of layers;

- Measures for foreign investment attraction and creation of national capital;
- State policy in mining industry.

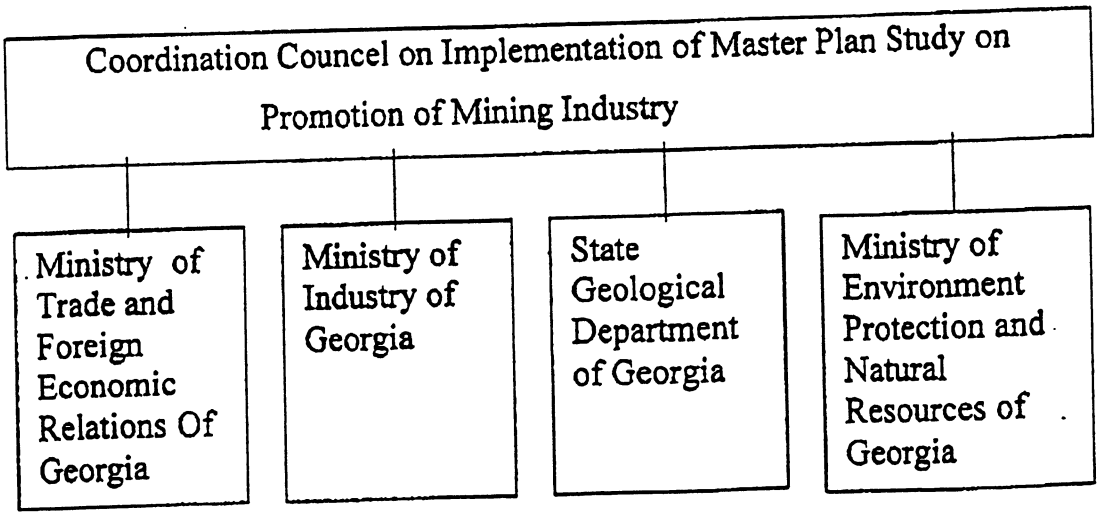
(3) Terms of the implementation of the investigation:

Terms of research – 2 years (see attachment).

The Government of Georgia will develop the mining industry in accordance with the Master Plan, which will be worked out with the assistance of Japan Government and based on realization of the mentioned program.

4. Counterpart organizations in Georgia

Implementation of the "Master Plan Study on Promotion of Mining Industry in Georgia" stipulated under the above program, requires coordination between Georgian and Japanese Ministries and organizations. For the purpose Georgian government will create Coordination Councel by the following scheme:



Chairman of the Coordination Councel - State Minister of Georgia

Responsible for:

Coordination of the Program – Ministry of Trade and Foreign Economic Relations of Georgia;

Management of the Program – Ministry of Industry of Georgia;

Realization of the Program – State Geological Department of Georgia;

Environment examination – Ministry of Environment Protection and Natural Resources of Georgia.

5. Request from the Georgian Government to the Government of Japan on implementation of the studies

a. Japanese engineers and specialists mission to Georgia for management and implementation of the studies;
b. Delivery of computers, automobiles and other technical facilities which are necessary for the implementation of the studies from Japan;
c. Invitation of Georgian engineers and specialists to Japan for training;
d. Guarantee of confidentiality of information and data submitted by the Government of Georgia to the Japanese side.

6. Obligations of the Georgian Side

a. Safety guarantee for engineers and specialists from Japan;
b. Total tax exemption for the equipment and materials supplied for the implementation of the study;

c. Permission guarantee for Japanese engineers and specialists to visit the objects necessary for the implementation of the study;

d. Guarantee of the access to the information and data necessary for the implementation of the study, and submission of such information.

e. Observance of other items which will be specified jointly with the Government of Japan.

State Minister of Georgia

Minister of Trade and Foreign Economic Relations of Georgia

Minister of Industry of Georgia

Minister of Environment Protection and Natural Resources of Georgia

Chairman of State Geological Department of Georgia

October 1998

Table 1: Schedule of the Study Works

Table 2: Summary table of operating mines

Scheme: Scheme of space location of mines and layers.

Schedule of Study Works

Description of works	First year	Second year
A. Evaluation of the potential of mineral resources: – Compiling and analysis of data; – Investigation (including infrastructure); – Evaluation of the potential; – Long-term strategy of exploration. B. Analysis of the present state of the mines: – Study of the mine operation and management; – Study of technologies; – Study of supply-sale systems; – Measures on modernization of mines.		

C. Study of environment: – Study of present state of environment protection; – Law on Environment protection and control on its observance; – Measures for environment protection. D. Mining industry policy: – Study of legislation related to the mining industry; – Study of administrative bodies; – Policy on mining sector promotion; – measures on foreign investment attraction. E. Working out Master Plan: – Putting the results of items A and D in good coordination; – Outlining of problems; – Making out a plan of actions.		

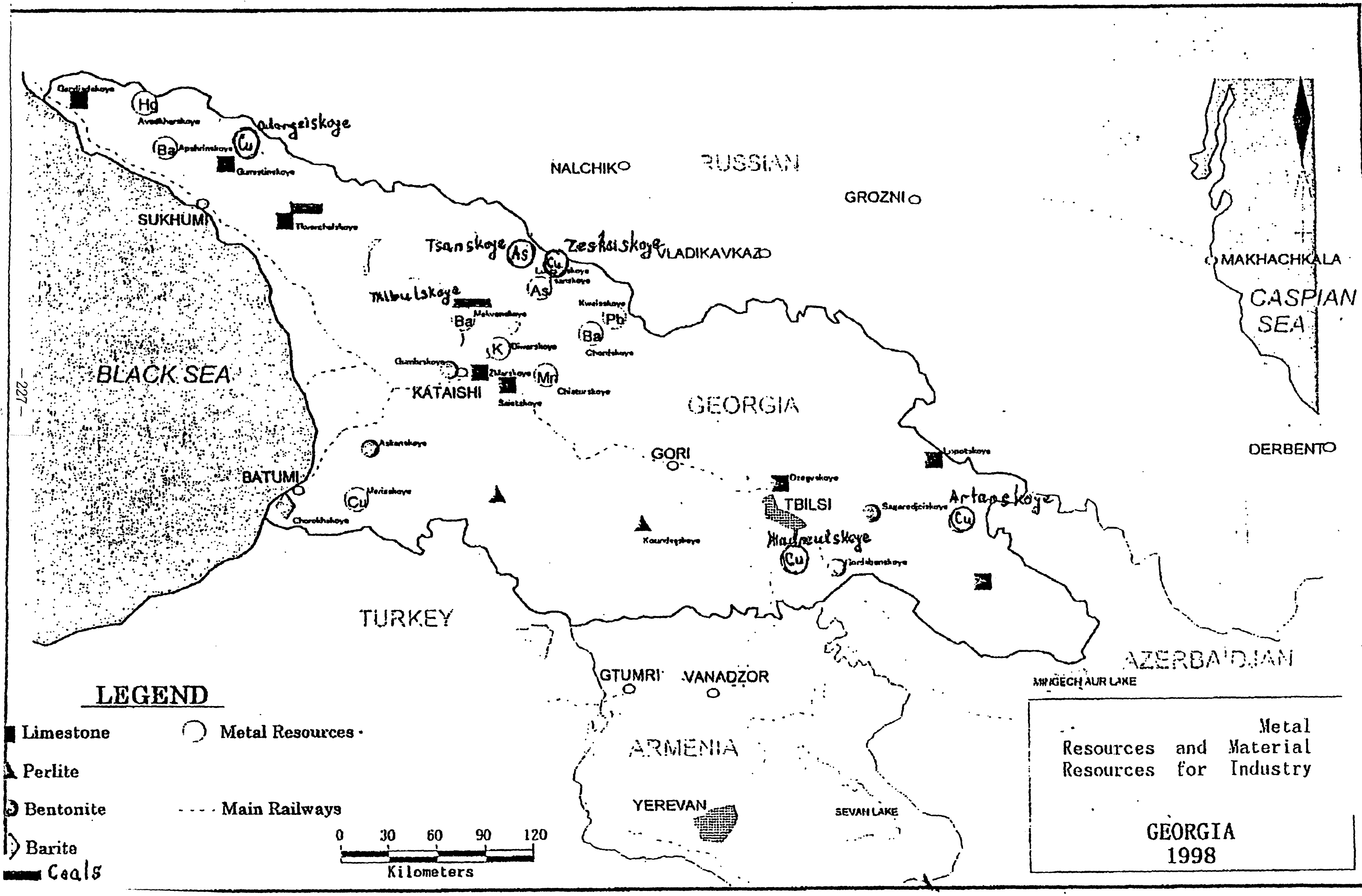
Georgia

Chart of operating mines

№	name of mine	note
1	2	3
	Mineral fuel	
1.	Tkvarcheli (coal)	Conserved
2.	Tkibuli-Saori (coal)	
3.	Akhaltsikhe (brown coal)	Conserved
	Ferrous metals	
4.	Tshiatura (manganese)	
	Non-Ferrous metals	
5.	Madneuli (cooper, zinc, lead)	
6.	Kvaisa (lead, zinc)	
7.	Lukhumi (arsenic)	Conserved
8.	Tsaka (arsenic)	Conserved
	Precious metals	
9.	Madneuli (gold, silver)	
10.	Kvaisa (silver)	
	Barytes	
11.	Madneuli (barytes)	
12.	Chordi (barytes)	
	Building Materials	
13.	Bakuriani (andesite)	
14.	Marneuli (basalt)	
15.	Kaspi (limestone)	
16.	Tsiteltskaro (limestone)	
	Dolomite	
17.	Abano	
	Dolomite clay	
18.	Askana (clay)	
19.	Gumbri (clay)	
	Facing stones	
20.	Kursebi (teshenites)	
21.	Bolnisi (tuff)	
22.	Dizi (marble)	
23.	Moliti (marble)	
24.	Lopota (marble)	
25.	Salieti (marble)	

1	2	3
	Precious stones	
26.	Akhaltsikhe (agate)	
	Building sand	
27.	Surami (sand)	
28.	Tshiatura (sand)	
	Clay for brick and tile	
29.	Gori (clay)	
30.	Metekhi (clay)	
	Diatomite	
31.	Kisatibi (diatomite)	
	Talc	Conserved
32.	Gorchana (talc)	
	Zeolite	Conserved
33.	Tedzami (zeolite)	

TRANSLATOR: G. Nijaradze


BLACK SEA
SUKHUMI
BATUMI
KATAISHI
GORI
TBILSI
GEORGIA
RUSSIAN
NALCHIK
GROZNI
VLADIKAVKAZ
MAKHACHKALA
CASPIAN SEA
DERBENT
TURKEY
GTUMRI
VANADZOR
ARMENIA
YEREVAN
SEVAN LAKE
AZERBAIDJAN
MINGECHAUR LAKE
Hg
Ba
Cu
As
Pb
K
Mn
Tsanskoye
Zeskaiskoye
Tkibulskoye
Artanskoye
LEGEND
Limestone
Perlite
Bentonite
Barite
Coals
Metal Resources
Main Railways
0 30 60 90 120
Kilometers
Metal Resources and Material Resources for Industry
GEORGIA
1998