
Sual Komi B.V.
Komi Aluminium Project

FINAL REPORT

*Due Diligence Audit
Environmental and Social Action Plan*

MIDDLE TIMAN BAUXITE MINE
KOMI REPUBLIC, RUSSIAN FEDERATION

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DATE:
8 December 2003



PURPOSE OF THIS DOCUMENT

An Environmental and Social Due Diligence audit was conducted by an independent, CSIR-led team of environmental and social specialists on the SUAL Holding owned Middle Timan Bauxite Mine, located in the Komi Republic of the Russian Federation. The audit was undertaken as a requirement of the International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD) prior to these organisations extending a loan for the expansion of the mine. This document outlines the process that was undertaken in completing the audit, the audit findings and various actions that should be undertaken to improve the current environmental and social performance of the mine.



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¹ The structure of the interview is based on an environmental due diligence questionnaire compiled by the South African environmental law firm *Winstanley, Smith and Cullinan* – who are acknowledged in this respect.

1 INTRODUCTION

1.1 Background and overview

CSIR was appointed by the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) to undertake an Environmental and Social Due Diligence audit of the Middle Timan Bauxite Mine (MTBM), a subsidiary of SUAL Holding in Komi Republic, Russian Federation. The aim of the audit is to establish the current level of environmental and social performance of the mine, in advance of and in preparation for a proposed expansion of bauxite production up to 6.0 million tonnes per annum.

The mine is currently designed for an annual production level of 1.5 million tonnes, and holds the necessary permits and authorizations to increase this to 2.5 million tonnes. Associated with an increase in bauxite production is the possible construction of an alumina refinery (two sites are being considered for this facility – one near Ukhta, the other near Sosnogorsk) and an aluminium smelter at Pechora. The audit is regarded as a Phase 1 assessment, based only on interviews and site inspections. As such no quantitative sampling, analyses, or modeling was required and/or carried out.

In considering an application for project financing by SUAL, the IFC/EBRD requires insight into the current level of environmental and social liabilities associated with the mine. A gap analysis is also required by the IFC/EBRD and along with an action plan for closing the gaps. The gap analysis is intended to look at the variance between the current performance of the mine and the standards of international best practice with regard to environmental management and social responsibility. Informing the general environmental and social appraisal of SUAL's subsidiary MTBM, is the requirement for a first-level performance appraisal of the company's UAZ aluminium smelter.

This introductory section of the report provides a brief review of the history of operations of MTBM and the development plans that are proposed by SUAL. This sets the context for the terms of reference for the environmental and social due diligence audit. A summary of the objectives and terms of reference of the audit follows.

1.2 Introduction to Middle Timan Bauxite Mine

The Middle Timan Bauxite Mine (MTBM) was established in 1996 in the northern part of the Knyazhpogost District in the Komi Republic and now forms an important part of the district and regional economy. The company Timan Bauxite, which owns the mine, is located in Ukhta. In the initial years of the mine's operations bauxite was transported by truck using a haul road that extends for some 160 km from the mine, to the village of Chin'avoryk. In 1998 a railway line was completed and the bauxite is now transported by rail directly from the mine to Chin'avoryk (157 km) and from there on to the Ural Alumina Refinery (UAL) (1755 km) and the Bogoslovsky Alumina Refinery (BAR) (1815 km).

There are no communities in close proximity to the mine and the nearest formal settlement at Chin'avoryk. Along the access road, there is a prison where convicts are held, as well as a lower security prison 'settlement' (Makaov's Halt). People are free to move around within the settlement, but may not leave the settlement. They are generally employed within the timber industry. It is important to emphasize that no forced or convict labor is allowed and Timan Bauxite expressly prohibits forced labor in all of its activities.

At the end of July 2003, MTBM employed 212 people. Of these 175 were direct employees with the other 37 employees being maintenance contractors in the workshops (23) and the building site (14). Operations work on a four panel, two-shift roster basis with a 1 month on - 1 month off schedule, and two shifts of 11 hours per day. All MTBM employees live in double rooms at the camp located on an industrial platform close to opencast pit 2. The camp is equipped with long-distance communication and a full time qualified medical worker is available at the camp.

1.3 Geology

The Soviet Geological Survey and, in recent times, the Komi Aluminium company geologists have put significant effort into exploring and interpreting the geology of the area. The area around the MTBM has been explored since 1969. The Vorykvinskoya group of bauxites is developed along the axis of the northwest-southeast trending Timan topographic ridge. They have formed on the northeastern flank of an anticline - an arching of the rock layers. Other bauxites, the Svetlinskoye, Valodinskoye and Zaoostrovskoye groups are situated to the north west of the Vorykvinskoya group, also located on the northeast flank of the anticline.

The bauxites have formed by very intensive weathering of Pre-Cambrian basement rocks aged between 1300 and 1600 million years old. At the time of weathering, these rocks had already been eroded into a platform with a typical Karstic topography. This is because they consist of dolomites with around thirty percent of clay. Dolomites are carbonates and therefore soluble and their erosion results in a topography with sharply defined platforms, ridges and hollows which, in the Vorykvinskoya region, result in sharp topographic cliffs and a variation in elevation of the buried basement surface of up to three hundred meters.

Following the formation of the bauxite layer, further sediments were deposited on top of it at the end of the Devonian Period. These are basically shallow sea sediments deposited on a rhythmically sinking land surface. Following this event, basic volcanic rocks were also deposited on the bauxite. These consist of basalts as well as basaltic tuffs or ash deposits. Some of the basalt has formed sills within the sedimentary deposits above, but not within or below, the bauxite. These are layers of basalt that have pushed their way in-between the sedimentary beds.

Much later, in the Quaternary, few million years ago, continental (essentially river) sediments only a few meters thick formed over the top of all the rocks so far described which, by this time, had been slightly folded and faulted.

1.3.1 Morphology

The bauxite is not a continuous layer but a series of lenses up to ten, but generally around one to three, kilometers long and from a few hundred meters to a kilometer wide. The long axis tends to have formed parallel with the anticlinal axis, (i.e., trending northwest). Ridges in the topography in the Devonian times seem to be responsible for the gaps between the lenses. This is not because they actually protrude above the bauxite layer, but is probably because they produced ridges in the water table at the time and bauxite will only form above the water table.

The thickness of the bauxite layer varies up to fifty meters but averages from four to eleven meters for individual lenses. The very thick formations have formed over depressions in the basement dolomite and are up to three hundred meters long and two hundred wide. Elsewhere the thickness tends to vary considerably with the thicker parts also formed over valleys in the basement surface. In cross sections the bauxite appears as an undulating layer of widely varying thickness.

Several prominent faults trending at right angles to the axis of the anticline cut the pre quaternary sequence. Interpretation of these, however, is difficult due to dramatic changes in the elevation of the bauxite from one borehole to the next may result from the original karstic topography.

1.3.2 Composition

Within the Vorykvinskoye deposit, the aluminous phase is mainly Boehmite ($\text{AlO}(\text{OH})$) with minor Diaspore (also $\text{AlO}(\text{OH})$) and some Corundum (pure alumina with the composition Al_2O_3). The bauxite contains no Gibbsite, ($\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$) possibly because of alteration and dehydration in tectonic folding events after its formation. Iron minerals in the form of Hematite (Fe_2O_3) and to a much lesser extent Goethite (FeO, OH) comprise up to twenty and five percent of the bauxite respectively. The Goethite can cause problems in the Bayer process as it tends not to precipitate into the red mud, but the refineries that currently process the Vorykvinskoye bauxite have adapted their systems to cope with this potential problem.

The bauxite also contains significant quantities of Kaolinite ($\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$) and, particularly at the top of the layer, Chamosite ($(\text{Fe}_2^+, \text{Fe}_3^+)^3 [(\text{OH})_2 \text{Al Si}_3 \text{O}_{10}] [(\text{Fe}, \text{Mg})^3 (\text{O}, \text{OH})^6]$). Both of these minerals dissolve in the Bayer Process and combine with the sodium hydroxide to form a Desilication Product - ($\text{Al}_2\text{O}_3, \text{Na}_2\text{O}, 2\text{SiO}_2, \text{H}_2\text{O}$). Besides Kaolin and Chamosite, Chlorite, Sericite and Calcite are common in quantities of around one percent.

1.3.3 Hydrogeology

The hydrogeology of the region is very complex. The geological cross-section can be divided into five water-bearing zones all having different amounts of water and with different characteristics of connectivity between each other and the surface water. Most of the hydrogeological work that has been completed to date centers on the ore bodies. Information outside of these areas is considered weak. This is due to the fact that during Phase I, (during the next 20 years), most of the areas that will be accessed will not be water-bearing and will require pit-dewatering primarily due to rainwater. The only places that groundwater is expected is in Pit #2 (eastern side of the pit) and Pit #3 (northeastern and southern parts of the pit). The expected volumes of groundwater are provided in Table x.

Table 1: Expected in-pit groundwater

Pit number	Groundwater (m^3/hr)	
	Layers above the bauxite	Foundation layers
1	53	-
1 MZhb ²	29	234
2	-	823
3 North	34	-
3 South	-	2583

² MZhb – *MaloZhelezistii Bauxit* - translated as bauxite pit with minimal iron and used as a proper name to demarcate that pit.

1.4 Environmental and social setting

1.4.1 Political and demographic situation

Komi Republic is situated in northeastern Russia on the eastern side of European Russia. It is bordered on the east by the Polar Ural Mountains, on the north and west by the Arkhangelsk oblast (province), and on the south by the Kirov and Perm provinces. Komi has an area of 415,900 km² with the geographical center of the republic at 54°16' E and 63°53' N. The capital of the republic is Syktyvkar, which has a population of 230,000 people. Komi has a population of 1,228,100 (1994 estimate), some 75 per cent of whom live in the main urban areas including Vorkuta, Ukhta, Inta, Pechora, Sosnogorsk, and Mikun. The harsh climate and sparse rural population, made Komi an ideal location for the Soviet government to establish labor camps for criminals and political prisoners. This practice was stopped in the early 1980s.

Russians make up almost 60 per cent of the population, with indigenous Komi people (about 23 per cent) and Ukrainians (8 per cent) being the other major population groups. The Komi, who call themselves Komi Mort (Komi person) or Komi Voityr (Komi people), speak Komi or Zyrian, a language with several dialects that belongs to the Permian group of the Finnic division of the Ural-Altaic languages. In 1991 the Komi Republic became part of the newly independent Russian Federation and is currently governed by the Head of Komi Republic, Vladimir Torlopov and the Government of Komi Republic (and the Ministries under the Komi Government, including the Ministry of Natural Resources and Environmental Protection). There are 20 districts in Komi including Knyazhpogost district within which MTBM is situated (Fig. 1).

1.4.2 Bio-physical

Komi is largely flat but has highlands in the Timan mountain range and the mountains of the Northern Polar Region and the Polar Urals. The highest point of the Timan range is Chetlaskii Kaman (456 m); the highest peak in the republic (and indeed the Urals as a whole) is Mount Narodnaya (1,894 m) of the Polar Urals. Major rivers are the Pechora and its tributaries the Usa and Izhma; the Vychegda with the Sysola and the Vym; and the Mezen with the Vaska. The Pechora is the largest river in northern European Russia and is navigable for more than 1,500 km.

Forests cover some 45 per cent of Russia, the greater part lying in Siberia. Taken altogether, the country's forests account for nearly 25 per cent of the world's forest area. The forest zone is divisible into a large northern part, the coniferous boreal forest, or taiga, and a much smaller southern area of mixed coniferous-deciduous forest. The taiga lies south of the tundra; it occupies the northern 40 per cent of European Russia and extends to cover much of Siberia and Far Eastern Russia.

Forest dominates the vegetation of the Komi Republic with 69% of its area consisting of taiga (spruce and pine forest). North of latitude 66°N the taiga is replaced by forest tundra consisting of spruce-birch light forest. The MTBM lies in a belt of forest-tundra between the tundra in the north and the taiga to the south. It contains peat bogs, spruce forests and, in some places, fir forests.



Figure 1: Map of Komi Republic, showing the districts (Knyazhpogodski highlighted) and other key locations for the purpose of this report namely Ukhta, Chin'avoryk, Emva and Syktyvkar as well as the position of MTBM.

Pine (*Pinus sylvestris*) forests are confined to dry, flat or convex parts of the landscape whereas spruce (*Picea albes*) forest occurs in riparian corridors in concave parts of the landscape. Along the watercourses the dominant species are spruce and various hardwood species such as alder (*Alnus* sp.), birch (*Betula* sp.) and willows (*Salix* sp.). Despite the remoteness of the region, considerable areas of the original spruce dominated or spruce-fir mixed forests have been logged and are now dominated by birch *Betula* sp.

The climate is severe with winter temperatures that average as low as -20.4°C at Vorkuta (in the northeast of the republic) and -17.1°C at Syktyvkar (in the southwest). Summer temperatures range from 11.7°C at Vorkuta to 16.6°C at Syktyvkar. Permafrost covers 13 per cent of the territory but there is no permafrost in the vicinity of the mine.

1.4.3 Knyazhpogost district

The Knyazhpogost district occupies an area of 24,600 km² and has a population of 33,100 spread throughout 53 settlements. The district capital is the city of Emva (see Fig. 1). Knyazhpogost District is principally rural with no cities – the main settlements are the villages of Sindor, Tract, Meschura, Vet'yu, Chin'avoryk, Seregovo, Shoshka and Knyazhpogost.

Key industries in the district are forestry and timber production, which make up some 85% of total production. Other industries include food production (4,5%), light industry (6,5%), machinery and metal-working (3,1%). There are 75 businesses registered with the Knyazhpogost Administration including MTBM and five departments of M-222 enterprise (a state enterprise within the Ministry of Internal Affairs that manages labor in the prison labor settlement), with 20 SMEs and 634 individual businessmen registered. The official level of unemployment is 3,5% (630 persons) which is higher than the average level in Komi Republic (2,1%)³.

1.5 Purpose of the audit and terms of reference⁴

The overarching objectives of the audit are to determine whether:

- The various aspects of the mine expansion programme meet Russian Federation and existing European Union (EC) environmental standards or, where EC standards do not exist, national and World Bank Group (WBG) environmental and social policies and guidelines and other pertinent international standards; and
- To ensure that the project does not result in significant adverse environmental and social impacts; and that all necessary management, mitigation and monitoring measures to address any adverse impacts that cannot be avoided, are included in the project.

The immediate objectives that must be fulfilled to meet the overarching objective are listed below:

- Environmental threats and liabilities for the existing mine as well as (as far as practicable) the proposed mine expansion have been listed, characterized and assessed;
- The perception of authorities and key stakeholders of SUAL Komi and its environmental performance has been characterized and assessed;
- Environmental management capacity within the SUAL Group, with special emphasis on the capacity to manage the items identified in a. and b. have been characterized and assessed;
- To design an action plan for MTBM, which will serve as a foundation for improving the mine's environmental and social performance in order to bring operations in line with international best practice;
- Key gaps and deficiencies have been identified as the basis of the Environmental and Social Action Plan and the scope of the ESIA.

³ Sourced from Stage Centre of Employment. The real level of unemployment is likely to be much higher.

⁴ The original Terms of Reference are given in Appendix D.

1.6 Structure of the report

Following this introduction to the report, *Chapter 2* presents a description of the environmental and social due diligence audit process. This includes both a general description of the auditing process and the approach adopted for specialist aspects of the investigation. This is followed in *Chapter 3* by a discussion of the environmental statutory framework that is in place, which is pertinent to the MTBM mining operation and its proposed expansion. *Chapter 4* outlines the mining process that is followed at MTBM. *Chapter 5* contains the results of the environmental and social audit, and is structured to provide separate discussion of various environmental and social activities and aspects. This is followed by a summary assessment of the associated environmental impacts and legal controls that apply to the individual environmental and social issues. *Chapter 6* deals with the current situation with regard to SUAL Holding environmental management.

The variance between the current level of environmental and social performance of the MTBM mine and the level that defines international best practice (gap analysis) is summarized in *Chapter 7*. This chapter also contains an action plan for closing the identified gaps. In essence, this final chapter of the report documents the main conclusions arising from the environmental and social due diligence audit and the recommendations of the audit team.

Appendices accompanying this report include: a record of the consultation process involving the MTBM management, which serves as an important platform for the audit (Appendix A), the record of the stakeholder consultation process (Appendix B in Russian), the Public Consultation and Disclosure Plan (PCDP) (Appendix C) for the proposed MTBM expansion, the Terms of Reference for the Due Diligence audit (Appendix D) and a summary of the monitoring results from the mine (Appendix E).

2 DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL AUDIT PROCESS

2.1 Introduction

The general approach adopted for the environmental and social due diligence audit is summarized in Figure 2.

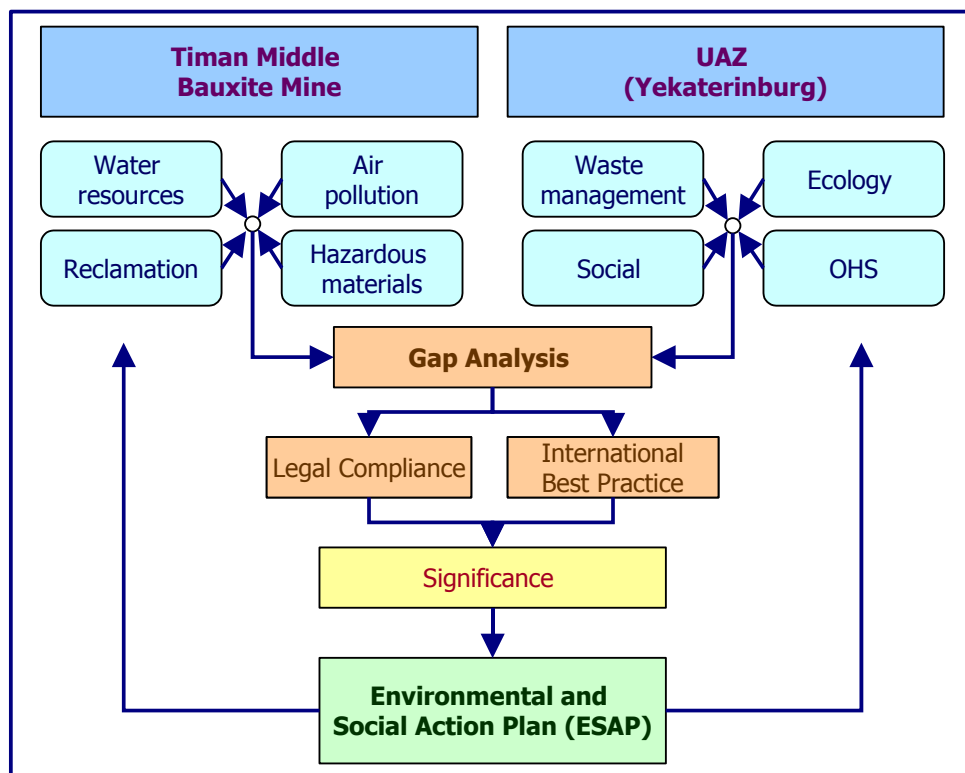


Figure 2: Approach to the Phase 1 environmental and social due diligence audit of the MTBM mine

The audit included supporting infrastructural activities related to the mine operations. Specialists were brought in to consider particular environmental and social issues, in particular those aspects of the activities, which interact with the environment such as hazardous material. The audit included a site visit, review of documentation and meetings with key stakeholders (both internal and external to the mine operations). As a result of this process, a number of issues were identified for further investigation.

The issues and their impacts were benchmarked against legal compliance requirements from the relevant government authority as well as against international minimum standards and best practice. Using this comparative approach, the project team was able to determine the significance of impacts in terms of extent; duration; intensity; and legal requirements. The result of the audit process is an understanding of the areas requiring environmental and social improvement for the operations and a prioritization of these areas. In order to assist MTBM improve its activities and work towards international best practice, an environmental and social action plan (ESAP) has been developed to mitigate negative impacts and enhance positive impacts of the operations.

In addition to the detailed audit of MTBM, a qualitative audit of the Uralsky Aluminium (UAZ) integrated refinery and smelting facility in Kamensk-Uralsky was undertaken. The UAZ evaluation was undertaken to gain a wider understanding of how SUAL Holding undertakes environmental management at its other facilities. The UAZ evaluation process was undertaken during a one-day site visit, which included discussions with UAZ management and key personnel. Following the site visit, additional environmental performance information and data was collected and reviewed.

2.2 Audit team and participants

The overall co-ordination of the environmental and social due diligence audit was undertaken by Messrs Sean O' Beirne and Rob Hounsomes of CSIR's Environmentek Division. The design of the process used to conduct the audit, and leadership of its implementation, was undertaken by CSIR's Dr Mike Burns.

Specialist contributions to the audit were provided by the following organizations and affiliated persons:

Organization	Specialists	Specialization
CSIR	Pat Morant Mike Burns Marius Claassen	Ecology, hydrology and geohydrology
	Sean O'Beirne Rob Hounsomes	Mining, refinery and smelter process
ICF/EKO	Vladimir Poltaurus	Occupational health and safety
	Alexander Kapuchkin	Atmospheric Emissions
	Marina Khotulova	Environmental statutory review, stakeholder engagement and appraisal of social issues
Independent Consultant	Bill Lytle	Review and legal context
Snowdon	Phil Morriss	Mining operations process

The following MTBM personnel participated in the structured audit interview process conducted at the organization's Ukhta offices and at the mine:

Name	Designation
Mr Karapetyan	General Director
Mr Blkokhin	Chief Engineer
Mr Vaydner	Head of Energy Department
Mr Nikitin	Head of Quality Department
Mr Pararin	Chief Mining Engineer
Mr Sirotin	Chief Geologist
Mrs Kotova	Environmental Manager
Mr Stadnikov	Chief
Mr Kotov	Deputy chief
Mr Dobrov	Foreman of repair-mechanical shop
Mr Astafjev	Power engineering specialist
Mr Semenov	Representative of JSC "KOMIexplosiveservice"

The following MTBM personnel coordinated the programme for the audit inspection at the mine:

Name	Designation
Mr Kyptychanko	Mine Manager
Mr Sirotin	Chief Geologist
Mrs Kotova	MTBM Environmental Manager
Mr Vaidner	Chief power engineering specialist

The contribution of each of these MTBM staff members in ensuring the success of the audit is gratefully appreciated. The inspection of the UAZ smelter facility was undertaken by Mr Rob Hounscome (CSIR).

2.3 Interviews and consultation

Scoping was undertaken through a structured process of interview involving MTBM's management and technical staff and consultation with key stakeholders, including various authorities and affected community representatives (outlined in Appendices A and B). As part of the scoping exercise to identify key sources of environmental risk, reference was also made to the background documents outlining the typical aspects of bauxite mining operations.

The interview and stakeholder consultation process, conducted by the Due Diligence audit team from 10 – 16 September 2003, serves as an important platform for the audit. In this respect, the process can be differentiated on the basis of meetings (interviews) held, on the one hand, with the MTBM and UAZ management and technical staff and meetings with authorities and community representatives, on the other.

A questionnaire compiled and distributed to the MTBM management at the time of the MTBM interview (10 September 2003) directed, to a large extent, the focus of the audit. The results of the interview are contained in Appendix A, while Appendix B provides a record of the stakeholder consultation process.

Since environmental liability is primarily defined by key statutory instruments affecting MTBM's operations, the interview theme centered on the testing for compliance of the organization's operational aspects with applicable environmental legal controls, including those pertaining to occupational health and safety. The interviews and consultations were conducted by the CSIR's project team, which included experienced environmental assessment practitioners and consultants within the discipline of environmental law.

2.4 Site situation assessment

Visits to the UAZ and MTBM were conducted during the course of the audit. During the visits, there was consultation with key management and technical staff of the facilities and, particularly in the case of the mine this was supplemented with a comprehensive site situation assessment.

Site visits were conducted with the aim of identifying sources of environmental risk (in the case of the mine) and securing a general impression of environmental performance of the facilities (particularly in the case of the UAZ smelter – which was the subject of only a rapid visual inspection). The site visit to the mine was designed, in particular, to secure a first level of understanding of the existence and severity of negative environmental impacts from mining activities and infrastructure, including historical risks from past activities and on-going risks relating to current operational procedures at the mine.

For this Phase I audit, the identification and evaluation of risks was primarily achieved by visual inspection of the mining operations and support infrastructure, as well as through meetings and interviews with management and key technical staff currently responsible for environmental management aspects of the mine. Environmental sampling (e.g. of soils, water, air pollution) was not included in the terms of reference for the audit and no quantitative measurements (e.g. chemical analyses) were undertaken.

The tour of the mine included inspection of the following:

- The opencast mining operation (where drilling in advance of blasting, loading and transport of the bauxite ore were observed);
- The overburden stockpile;
- The Central Blending Yard (CBY) and rail loading facility;
- The settlement water supply borehole and surrounding sanitary zone;
- The little black stream environmental monitoring site;
- A groundwater water quality monitoring borehole situated down slope of the temporary fuel storage facility at the mine settlement; and
- The various facilities and activities conducted within the mine settlement.

In addition to the above, inspection was conducted of sections of the main mine access road and the SUAL subsidiary-owned railway line used for the haulage of bauxite between the mine and the main rail link at Chin'avoryk.

2.5 Identification of environmental and social issues and impacts

The site inspections focused on the identification of environmental and social issues. These can be described in terms of activities, aspects and impacts.

2.5.1 Impact sources

Impact sources include all activities that can have a detrimental effect on human or ecosystem health. These may be activities associated for example, with the mining and transport of bauxite, supporting infrastructure (road and rail systems, power supply, etc.), storage, handling and disposal of wastes etc. Impact sources were identified through systematic inspection of a sample of all key mining activities and mine infrastructure, including the main road and rail transport links between the mine and the settlement of Chin'avoryk.

During the inspections attention was directed at the following categories of impact sources:

- Opencast mining and associated transport infrastructure, in the context of associated ecological (bio-physical) effects;
- Domestic effluent and waste water discharge at the mine;
- Areas exposed to the risk of soil and ground/surface water pollution due to mining activities;
- Waste management;
- The storage and use of fuels, lubricants and other hydrocarbon products;
- Operations potentially not in compliance with permits, licenses, etc.; and
- Activities affecting occupational health and safety.

2.5.2 Evaluation of impacts

Impacts describe the potential effect that a risk source may have on one or more environmental receptors. Receptors can include affected humans (mine personnel, local communities) as well as natural ecosystems. Potential environmental impacts have been assessed by characterizing the natural receiving environment, mine employees and local communities affected by the mine (largely, road and rail infrastructure) and combining this with theoretical knowledge of typical effects of exposure to the identified risk sources.

Important in the assessment of impacts is the assigned significance rating, which for the purposes of the audit is expressed at three levels: HIGH, INTERMEDIATE and LOW. In assigning levels of impact significance, cognizance is taken of the intensity and both the spatial and temporal scales at which the impacts potentially manifest. Box 1 provides an example of how the approach is applied for ecological impacts while Box 2 reflects significance in a social context.

Box 1: Example of ecological impact significance rating

Ecological impact significance: An impact of HIGH ecological significance is one that could, for example, result in the extinction of rare/threatened species. It could also result in the permanent deterioration of ecosystem structure and functioning, measurable on an extensive spatial scale and in the long-term. The ability of affected ecosystems to revert to their pre-impacted state would be severely compromised. An impact of LOW ecological significance implies that there would be no measurable deterioration in ecosystem structure and functioning beyond, perhaps, some transient (short term) perturbation; i.e. there would be no diminished delivery of important ecosystem services beyond the short term. An impact of INTERMEDIATE significance would be judged to be intermediate between high and low significance.

Box 2: Example of social impact significance rating

Socio-economic impact significance: An impact of HIGH socio-economic significance would manifest in the form of long term changed (undesirable and unsolicited) cultural traditions and livelihood strategies, probably resulting in the breakdown in established social and economic structures. Quality of life of affected communities would deteriorate in the long-term as a result of the permanent diminishment in the delivery of important ecosystem services upon which affected communities are dependent; i.e. the impact would be of high intensity, could be spatially extensive and would persist in the long-term. An impact of LOW socio-economic significance implies that affected communities would experience no measurable change in cultural traditions and established socio-economic structures and patterns following perhaps some minor, transient (short term) perturbation; i.e. in the absence of any serious diminishment in important ecosystem services, socio-economic impacts would be barely measurable. An impact of INTERMEDIATE significance would be judged to be intermediate between high and low significance.

2.6 Review of environmental statutory framework

In preparing the environmental statutory framework (see Chapter 3), the most important domestic environmental, health and safety legal controls have been considered, and an overview is provided of the laws from which such controls emanate. Appropriate detail regarding the consequences of non-compliance have also been provided.

3 REGULATORY SETTING

The mine operates under Russian Federation and Republic of Komi environmental, social, health, and safety requirements⁵. The following sections identify the major permitting requirements that the project must follow.

3.1 Russian legal framework

The Russian and Komi legal and institutional frameworks are based on a system that requires the local branches of the different environmental divisions to first review a project and then report their opinions to the Federal level (Moscow) regulators. These regulators review the environmental impact assessment, along with the submitted opinions, and provide a conclusion on whether the project has been adequately assessed and can be constructed. After the project has received approvals from Moscow, the local branch of environmental protection provides all regulatory decisions, unless the local regulators request the assistance of Moscow regulators. Projects that are in operation are required to submit permit applications, receive discharge limits, and report discharges and emissions on a regular basis.

3.2 Regulatory agencies

Regulatory agencies within the Russian Federation and Komi Republic include environmental, labor, mining, and other agencies that are responsible for compliance issues at the mine. This audit focuses only on the major mining, environmental, health, and safety offices that oversee the mine. The following sections break the primary environmental regulatory agencies down into local, regional, and federal agencies.

3.2.1 District of Knyazhpogostoye

The project is located in Knyazhpogostoye, therefore, the following agencies have direct regulatory control of the project:

- Knyazhpogostoye Sanitary and Epidemiological Committee (Emva);
- Vymskaya Fisheries Inspectors (Emva);
- Department of Hunting (Emva);
- Government Mining Technology Supervision (Vorkyta); and
- Knyazhpogostoye Environmental Protection Committee (Emva).

3.2.2 Republic of Komi

- Federal Natural Resource Committee (Syktyvkar);
- Komi Department of Water Resources (Syktyvkar);
- Komi Fisheries Inspectors (Syktyvkar);
- Komi Department of Hunting (Syktyvkar);
- Government Mining Technology Inspectors (Syktyvkar); and
- Federal Emergency Management Agency (Syktyvkar).

⁵ With IFC/EBRD participation in the project, the mine will need to follow all applicable IFC, World Bank Group (WBG) and EBRD policies and guidelines.

3.2.3 Russian Federation

Federal level agencies include:

- Russian Federation Ministry of Natural Resources (Moscow);
- Russian Federal Sanitary and Epidemiological Committee (Moscow); and
- Government Mine Technology Inspectors (Moscow).

3.3 Permitting requirements in the Russian Federation

3.3.1 Environmental Assessment

Originally, the Environmental Assessment process in Russia was splintered with several different guidelines in force at the federal and local level. For historic reasons Environmental Assessments in the Russian Federation consisted of two independent but related elements – *(state and public) environmental expert review and assessment of environmental impacts* (known in Russian as an 'OVOS'). The environmental review was a mechanism of reviewing environmental acceptability of proposed activities by competent experts and interested/affected non-governmental organizations (NGOs). The OVOS was a procedure, to be followed by developers, for analysing and documenting environmental issues associated with proposed activities.

The primary guidance for developing an Environmental Assessment at all phases of project construction⁶ was originally detailed in Order No. 539 (12/29/95) "On Approval for Instructions for Environmental Assessment of Economic and Other Activities". Order No. 539 was updated with Order No. 372 (5/16/00) "On Approval of Content for an Environmental Impact Assessment of a Proposed Economic or Other Activity within the Russian Federation". This order is supplemented the additional regulatory guidelines provided in Table 2.

Table 2: Regulatory Guidelines for Environmental Assessment in the Russian Federation.

Legislation	Issuing authority	Promulgated	Status
Environmental Protection Law	Federal Government	2002	Required
Land codex	Federal Government	2001	Required
The Law 'On investment activities'	Federal Government	2000	Required
Environmental Impact Assessment Regulations	Ministry of Nat. Resources (MNR)	2000	Required
State Environmental Assessment Regulations	Federal Government	1996	Required by MNR

⁶ The definition of project construction includes "new construction, expansion, reconstruction, and technical reconfiguration" based on the definition provided in СНиП 11-01-95, "Instructions on Development, Approval, Confirmation, and Composition of Project Documentation for Construction of a Facility, Building, or Equipment" (Moscow, 1995).

Legislation	Issuing authority	Promulgated	Status
The Decree for Conducting State Environmental Assessment	Goskomekologia, endorsed by the Ministry of Justice	1997	Required by MNR
Construction norms and rules 11-01-95 Instruction on the order of developing, co-ordination, authorization and the content of project documentation for the construction of enterprises, buildings and facilities.	Ministry of Construction (Gosstroj)	1995	Voluntary ⁷
Construction rules 11-101-95 The order of "developing, co-ordination, authorization and the content of the substantiation of investments for the construction of enterprises, buildings and facilities"	Ministry of Construction	1995	Voluntary ²
Construction norms and rules 11-02-96 "Engineering and environmental investigations for construction. Main principles"	Ministry of Construction	1996	Required

Based on the current guidelines, the assessment must complete the following phases:

- Preliminary assessment;
- Environmental Assessment; and
- Detailed engineering/permitting.

Each of these phases is detailed in the following sections.

3.3.1.1 Preliminary Assessment

During development of a project, the preliminary assessment must include an Act of Site Selection and a Declaration of Intent. These documents are provided to the regulatory agency to provide the regulators with an idea on the direction that the project is going and helps avoid costly delays in project design. The information should include enough detail to allow a reviewer to determine the environmental risks associated with the proposed design and should evaluate the various alternatives associated with the design. The Declaration of Intent is used for the local and/or federal regulators to give preliminary approval of the project design based on analogous sites and literature. The Act of Site Selection is provided to the local and/or federal regulatory authorities. This is a drawing with all of the facilities sited at proposed locations and should include potential alternatives for siting.

Based on these documents, the company will prepare a Scope of Work (Technicheskaya Zadaniya - TZ) for an Environmental Assessment. The TZ should incorporate all the requirements of development of an EA and include instructions to address any potential issues identified in the Act of Site Selection and Declaration of Intent.

The most recent EA guidelines (Order #372, Section 4) require that the approved Declaration of Intent and Act of Site Selection be disclosed, along with the TZ, during a public consultation to local interested and affected parties. The public consultation should generate a protocol that should be incorporated into the TZ to address any concerns or requests that arose during the public consultation.

⁷ These guidelines were cancelled in 2002 but were reinstated as "recommendations" by Gosstroj in May 2003.

3.3.1.2 Environmental Impact Assessment

In Russia, the Feasibility Study process is divided into two separate categories: Investment and Construction. In the event of a foreign investor or joint-venture project, both documents are required and must be submitted to the federal government for review and differ only in their level of detail. The following sections outline the environmental requirements for each level.

Investment-level Feasibility (TEO-I)

An Investment-level Feasibility (TEO-I) is required to be completed in accordance with СП 11-101-95, "Order of Development, Approval, Confirmation, and Composition for the Basis of Investment in Construction of a Facility, Building, or Equipment" (1995). This feasibility study requires a preliminary design highlighting the basic engineering and safety designs that are proposed for construction and operation of the project. A separate volume is required for the TEO-I called an OVOS. The OVOS is a preliminary environmental impact assessment that is more detailed than the initial Declaration of Intent and Act of Site Selection. It can be based on government background material, analogous sites, and field studies.

The document must undergo review at the local level and is then provided for Expertiza at the federal level. Local regulatory agencies that review the OVOS are the same groups that approved the Act of Site Selection and Declaration of Intent. Additionally, public consultation must be completed at the local level and a meeting protocol attached to the document prior to submittal at the federal-level. The conclusions from the local review are provided with the OVOS to the Federal Ministry of the Environment and the Federal Mine Supervision Department. Positive Conclusions from the Federal-level Expertiza indicate that the basic design is acceptable and the project can continue to develop.

Construction-level Feasibility

A Construction-level Feasibility must be completed in accordance with СНиП 11-01-95, "Instructions on Development, Approval, Confirmation, and Composition of Project Documentation for Construction of a Facility, Building, or Equipment" (Moscow, 1995). This document is much more detailed than a TEO-I. The information is based on equipment and design parameters that will be installed during construction. The TEO-C requires a section (volume) on Environmental Protection. The Environmental Protection Section will be very detailed and contain information regarding the effective use of resources and reclamation/closure. The document is reviewed at the local (including public consultation) and federal level. A positive conclusion allows the company to begin construction.

Detailed engineering

During detailed engineering, all drawings are finalized and equipment parameters are provided to the regulatory agencies. As part of detailed engineering, the company is required to develop the following documents:

- Maximum Allowable Emission Limits;
- Water Use and Discharge Limits;
- Solid Waste Disposal Limits; and
- Reclamation and Closure Feasibility.

A positive conclusion allows the operator to commence operations and the following permits are provided:

- Air Pollution Emission Permit;
- Water Use Permit; and
- Waste Disposal Permit.

3.3.2 Specific permit requirements

3.3.2.1 Air Pollution Emissions Permit

The air pollution discharge permit limit is developed in accordance with the Federal legislation “Ambient Air Protection” (N96-F3, 5/4/99). It requires limits on a tonnes per year basis and grams per second. Air pollution discharges are reported on an annual basis (Form 2-TP, Air). The reported amounts are based on parametric monitoring and stack sampling. Pollution payments are paid on a quarterly basis based on discharge amounts calculated in the permit application.

3.3.2.2 Water Use and Discharge Permit

Surface water use permits must be received in accordance with the Russian Water Code (No. 167-F3, 11/16/95). The Russian Water Code requires that a user identify sources, discharges, uses, recycling, and requires limits on tonnes per year usage. Water discharge limits are developed in accordance with surface water protection laws (1991). Water pollution discharges are reported on an annual basis (Form 2-TP, Water).

3.3.2.3 Solid Waste Disposal

The solid waste disposal plan is developed in accordance with federal law “On industrial consumption and generation of wastes” (No. 89-FZ, 6/24/89) and governmental decree “Guidelines for development and approval for waste generation and disposal” (No. 461, 6/16/00). These guidelines require that a user identify wastes, classify them in accordance with their toxicity and volumes, and develop a disposal strategy. Solid waste placement is reported on an annual basis (Form 2-TP, Wastes).

3.4 EBRD/IFC/WBG permitting requirements

In the event that IFC/EBRD continues to participate in this project, IFC/EBRD has a range of environmental and social policies that are applicable to the Timan Bauxite Mine. The applicable policies are described in the following sections.

3.4.1 International Finance Corporation (IFC) requirements

3.4.1.1 Mandate

The IFC is a World Bank Group entity with a mandate to invest in private sector projects in developing member countries. It lends directly to and makes equity investments in private companies without guarantees from government and attracts other sources of funds for these projects.

The IFC requires an environmental assessment (EA) of projects to improve decision-making by ensuring environmentally sound and sustainable development. It evaluates a projects potential environmental risks and impact in its area of influence by examining project alternatives, and mitigating and managing adverse environmental impacts. The IFC, wherever feasible, favours preventative measures over mitigatory or compensatory measures. The IFC will not finance project activities that contravene country obligations as identified during the EA process.

3.4.1.2 Environmental screening

The IFC undertakes environmental screening for a proposed project to determine the appropriate extent and type of EA. This is dependant on the extent, sensitivity and scale of the project as well as the nature and magnitude of the potential environmental impacts. The IFC reviews findings and recommendations of an EA to determine the adequacy of the information prior to financing. The Pollution Prevention and Abatement emission levels are adhered to, however, the findings of an EA, country legislation and local conditions may recommend alternative emission levels and pollution prevention measures. The screening process results in the grouping of a project into either Category A, B or C. A project is classed as Category A if it is likely to have significant adverse environmental impacts, in which case an EIA is required. The IFC in this regard requires independent EA experts not affiliated with the project to undertake the necessary studies. If the project is highly contentious an advisory panel is suggested, consisting of independent, internationally recognised environmental specialists.

Category B includes projects with environmental impacts that are less adverse than those in Category A. The scope of the EA project may vary and in general are not as detailed as a Category A projects. Projects grouped as Category C are likely to have minimal or no adverse environmental impacts. In this case, no further EA is required. The proposed MTBM expansion is a Category A project.

3.4.1.3 Environmental Impact Assessment

The IFC ensures that for all Category A, and where necessary Category B, projects the project sponsor consults interested and affected parties (I&APs) and non-governmental organisations about the projects environmental issues. For Category A, it is stipulated that consultation take place at least twice: 1) shortly before screening and before the terms of reference for the EA are finalised; and 2) once a draft EA report is prepared.

In addition, public consultation shall take place throughout project implementation, as deemed necessary. It is also required that for meaningful consultation, all relevant material be provided in a timely manner and prior to consultation in a form that is accessible and understandable to all groups. For initial consultation a summary of the project objectives, description and potential impacts is required. A summary of the EA conclusions is also compulsory for consultation after the preparation of a draft EA report. Furthermore, the draft EA report must be made available at a public place to all project affected groups. During the implementation phase the project sponsor has to report on compliance with measures agreed on by the IFC and including the execution of an EAP. The environmental assessment report should include:

- Executive Summary;
- Policy and legal framework;
- Project description;
- Baseline data;
- Environmental impacts; and
- Analysis of alternatives.

A Public Consultation and Disclosure Plan (PCDP) has been prepared for the MTBM. This is presented in Appendix C.

3.4.2 European Bank for Reconstruction and Development (EBRD) requirements

3.4.2.1 Mandate and objectives

The EBRD is directed by its funding agreement to adhere to sound banking principles and to promote in the full range of its activities, development that is environmentally sound and sustainable. To achieve this end, environmental procedures have been developed which has two basic objectives:

- To ensure that the environmental implications of potential Bank-financed investment and technical co-operation projects are identified and assessed early in the Bank's planning and decision-making process i.e. that environmental considerations are incorporated into the preparation, approval and implementation of projects at an appropriate level; and
- To identify ways in which the Bank funded projects can be enhanced by incorporating environmental benefits or improvements.

3.4.2.2 Environmental appraisal process

The EBRD therefore seeks to ensure through an environmental appraisal process that financing for projects is environmentally sound, designed to operate in compliance with applicable regulatory requirements, and that environmental performance is monitored. The first step in the appraisal process is screening, which is undertaken to identify potential negative and positive aspects of a proposed project. It ultimately results in the grouping of projects into A, B, or C categories to ensure the appropriate detail of investigation. The categorisation process is dependant on the type, location, sensitivity and scale of the project, and the nature and magnitude of its potential environmental impacts.

Projects are classified as Category A when the EBRD funding involves Greenfield developments, or major expansion/transformation, that are expected to result in potentially significant adverse future environmental impacts. In this case, an Environmental Impact Assessment (EIA) is required. Category B projects involves new construction, rehabilitation, or process/technology changes that result in future environmental impacts that are less adverse than Category A. An environmental analysis would then be required to assess these impacts. Category C are those projects that would not require an EIA or an environmental analysis and are expected to result in minimal or no adverse environmental impacts. An environmental audit may also be identified as requirement through screening, to assess past or current operations of existing projects. The proposed MTBM expansion is a Category A project.

3.4.2.3 Environmental Impact Assessment

The detail and scope of the EIA depends on the likely type and extent of environmental effects of a project, as well as the sensitivity of the locations affected. The detail and scope is assessed through a scoping process, which identifies important issues, and alternatives that should be examined. If however, an EIA is completed, or proceeding, at the point of potential funding, the ERBD evaluates relevant documentation to ensure adherence with Bank requirements. The Bank specifies public participation requirements and ensures that national requirements for meaningful participation are met. In some cases an Environmental Action Plan (EAP) might be a condition of investment and is based on recommendations from the environmental investigations. The EAP documents the actions to be taken for key environmental issues, the implementation schedule and an estimate of the costs. Environmental monitoring is an important aspect of the Banks project implementation process and continues until the loan is repaid.

3.4.2.4 Environmental requirements

The Bank ensures compliance with environmental requirements and specifies the environmental standards applicable to a project. The ERBD also identifies on a project-by-project basis, the applicable international agreements and treaties to ensure that proposed projects do not contravene country obligations.

3.4.2.5 Policies, guidelines and directives

The following policies, guidelines and directives are applicable:

EBRD

- Directive (European Union) 85/337/EEC as amended by Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment;
- The EBRD has developed a set of sub-sectoral environmental guidelines to assist credit/investment officers in local financial institutions and other non-environmental experts. They are designed to help in identifying major environmental activity risks, important management actions, and essential aspects of environmental due diligence. The guidelines are not part of the Bank's Environmental Procedures and are used as guidance only. Guidelines relevant to this project include:
 - Metal mining – open cast
- The European IPPC Bureau exists to catalyse an exchange of technical information on best available techniques under the IPPC Directive 96/61/EC and to create reference documents (BREFs) which must be taken into account when the competent authorities of Member States determine conditions for IPPC permits. IPPC will apply to a wide range of industrial activities and the objective of the information exchange exercise is to assist the efficient implementation of the directive across the European Union. The BREFs will inform the relevant decision makers about what may be technically and economically available to industry in order to improve their environmental performance and consequently improve the whole environment. BREFs relevant to this project include:
 - Non-ferrous metal processes

IFC

- IFC Safeguard Policy OP 4.01 dated October 1998 on Environmental Assessment;
- IFC Safeguard Policy OP 4.36 on Forestry dated November 1998 to be complemented by the World Bank Operational Policies OP 4.36 dated November 2002;
- IFC Safeguard Policy OP 4.04 dated November 1998 on Natural Habitats -;
- IFC Safeguard Policy OP 4.20 Indigenous Peoples (1991);
- IFC Policy Statement on Child and Forced Labor;
- World Bank Operational Policy OP 4.30 dated June 1990 on Involuntary Resettlement; and
- World Bank Operational Policy OP4.37 on Tailings Dams;
- World Bank Pollution Prevention and Abatement Handbook (PPAH)
 - Aluminium manufacturing
 - Base metal and iron ore mining
- General Environmental Guidelines (July 1998);
- WB PPAH Coal Mining and Production (July 1998),
- IFC, Environmental and Social Guidelines for Occupational Health and Safety (June 2003).
- IFC, Draft Hazardous Materials Management Guidelines (May 2001).

Additional IFC policies that do not specifically apply to the Middle Timan Bauxite Mine include:

- OP 7.50 Projects on International Waterways;
- OP 4.09 Pest Management; and
- OP 4.37 Safety of dams

Documents must be completed 60 days prior to loan approval and be disclosed in the World Bank Info Shop. The EBRD policy (April 2003) is similar to the IFC policy in scope and content. Typically, one document can be created that satisfies requirements for both EBRD and IFC.

3.4.2.6 Public Consultation and Disclosure

In accordance with IFC/EBRD requirements, MTBM has developed a Public Consultation and Disclosure Plan (PCDP) based on technically sound and culturally appropriate measures that can be implemented during the proposed project to ensure timely and effective communications with affected stakeholders. The PCDP includes local, EBRD and WBG requirements for public consultation, the identification of key stakeholders, consultation schedules and describes implementation and documentation and reporting. The PCDP is included in Appendix C.

4 THE MINING PROCESS

4.1 Overview

The bauxite mining process consists of the following key activities, each of which forms a component of a single continuous process:

- Development drilling;
- Overburden stripping;
- Bauxite mining;
- Transportation of bauxite;
- Additional operations; and
- Preparation and shipment of bauxite to refineries.

4.2 Development drilling

Development drilling plays a key role in the mining process, (Plate 1) as the quality of the extracted bauxite is a direct function of the area delineated for extraction. In other words there is no segregation of mined material other than the crushing of oversized ore, which is defined later in this process. Development drilling on a regular grid spacing is used to delineate the ore body contours, derive the mineral resource, and provide estimates of tonnage and grade of the mineral reserve. The drilling equipment used by MTBM consists of:

- Drilling rigs for development drilling (2 units);
- Caterpillar multi-purpose tractor (1 unit);
- Bulldozer (1 unit); and
- Tractor (1 unit).



Plate 1: Drilling operations to characterize the areas to be mined

A drill site mechanic and his assistant operate the drill rig. During the operations a geologist is present to categorize the core and complete the necessary documentation. The chief of the drilling area manages the entire operation.

4.3 Overburden stripping

The process of overburden stripping consists of:

- Preparation of stripping faces (breakage of frozen peel¹), leveling of a line, clearing of the top of the ore body by bulldozers;
- Drilling-and-blasting operations with the purpose of loosening harder overburden;
- Excavation and loading of the overburden into trucks using electric and diesel-powered shovels; and
- Transportation of rock mass to the overburden dumps.

Bulldozers are used to break the frozen peel and to provide access to the overburden faces. The breakage of dense overburden is achieved through drilling and blasting operations, using the same equipment used in the drilling areas. The main activity is simply excavating and loading the rock mass, which is carried out using excavators. The overburden material is transported using 30 and 42 tonne trucks, which transport the material on temporary external pit roads up to overburden dumps. The topsoil and seed base is not separated from the overburden during current operations at MTBM.

4.4 Bauxite mining operations

Bauxite mining operations include:

- Drilling-and-blasting operations to break-up the ore mass; and
- Excavation and loading of bauxite ore onto trucks.

After overburden stripping operations (clearing of the top of ore body) the surface is prepared for further drilling and blasting operations. Personnel from mine carry out drilling while a dedicated contractor conducts blasting. Blasting takes place about three times a month. The material loosened by the blasting is then loaded onto 30 tonne trucks by excavators for transport to the Central Blending Yard (Plate 2).

4.5 Transportation

Ore is transported from the pit to the Central Blending Yard (CBY) by 30 tonne trucks using temporary and permanent roads. A grader is used to maintain the roads used by the trucks and this is a key safety consideration. The trucks dump the bauxite onto blending beds in the CBY, where it is then blended to meet the quality requirements of the respective clients. Bauxite is excavated and transported to the CBY on a 24-hour basis.

Dumping of the bauxite at the CBY takes place at pre-defined sections on the unloading dolly way (there are a 100 such sections each 15m in length). The control master of the Quality Department specifies the sections where the ore is to be dumped and it takes approximately three minutes for a truck to dump its ore load.



Plate 2: An excavator loading bauxite on to a 30 tonne truck for transport to the Central Blending Yard. Note also the layer of basalt above the bauxite and the overburden and top soil layers above that.

4.6 Additional operations

Additional operations consist of:

- Supplying electricity to the opencast and dumping areas for the purpose of illuminating the working faces at night and when visibility is poor – the pit and dump electrical equipment consists of two diesel generators, illumination masts, cabling and starting equipment;
- Supplying electricity to the electrical excavator – this is supplied by a single diesel generator that provides the electrical power for the electric overburden excavator; and
- Maintenance of external and main roadways – as described above this is a key safety requirement. A grader, two bulldozers and a front-end loader are used to maintain the roadways.

4.7 Operations at the Central Blending Yard (CBY)

Preparation of bauxite in the CBY is carried out using a five-step procedure as follows:

- Spreading and sampling of bauxite stockpiles on the unloading dolly way with the purpose of blending to average the quality;
- Section clearing and formation of bauxite stockpiles while separating oversize bauxite;
- Mixing of bauxite stockpiles to obtain the required quality, allowing re-freezing of the bauxite during winter time and drying during the summer period;

- Forming a stockpile of bauxite ready for shipment; and
- Loading of bauxite into railway carriages.

4.7.1 Sampling the bauxite

As sections are filled the bauxite is sampled according to a defined operational procedure (GOST 25465-95). The section is divided into 6m x 6m squares and 2 kg (dot) samples taken from the center of each square. Between 7 and 10 samples taken per 1000 tons of bauxite. The samples are taken to Ukhta where they are analyzed and the assays recorded in a 'passport'.

4.7.2 Categorizing a section

Once a section has been filled, sampled and analysed and the 'passport' completed, a bulldozer is used to push the bauxite stockpile towards the loading area of the CBY.

4.7.3 Section cleaning

After the sections have been filled, oversized ore is moved to one side and the remaining ore moved to establish a new stockpile. This is done using a diesel shovel.

4.7.4 Oversized bauxite crushing

Crushing of oversized bauxite (+300 mm) is carried out by draglines with crushing being achieved using an oblique wedge-hammer of 0.8m (Plate 3). A bulldozer is used to spread the oversize bauxite into a platform, before moving to safe distance from the crushing platform (no less than 17m). The draglines then 'crush' the oversize bauxite by hoisting and dropping the wedge hammer onto the oversized pieces, breaking them into smaller pieces that meet the maximum size requirements.

4.7.5 Bauxite loading in rail cars

Before loading the bauxite, the remains of previously transported loads are manually cleaned from the rail cars. The bauxite is then loaded into the rail cars using a front-end loader that has a bucket capacity of 6.4 cubic meters (Plate 4). To ensure that rail cars are not overfilled (and overloaded) the loader operator keeps a count of the number of buckets. It typically takes 12 minutes or less to fill a rail car. After the car has been filled the loader mechanic instructs the locomotive driver by radio, to move an empty car to the loading area. Once the loading has been completed a team of workers clean the rail cars of surplus bauxite as well as the railway areas where bauxite may have been spilled.

4.7.6 Stockpile formation by an excavator or a loader

The newly formed stockpile undergoes multiple blending using excavators and a loader before being allowed to re-freeze during winter, or dry during the summer. During the blending process there is also further oversize bauxite separation for crushing.



Plate 3: Crushing the oversize bauxite using a dragline with a wedge which is hoisted and dropped on the oversize bauxite. Note the crushed material around the drag line, with the oversize material ahead of the dragline.



Plate 4: Loading the bauxite into the rail cars for transport to the refineries.

4.7.7 Dosing rail cars

Dosing is the 'topping up' of rail cars to ensure that all cars are fully loaded. This is carried out using an excavator working from the dosing dolly way, using the same ore as used in the original loading. Delivery of ore up to the dosing dolly way is carried out by a front-end loader. The loaded cars are then weighed and dispatched.

4.7.8 Mine products

The basic product of MTBM is aluminous and fire resistant (refractory) bauxite. Refractory bauxite cannot be digested using the Bauer process, and traditionally is used for making refractory material or as a cement additive. The relationship between the quantity of reserves and quantity of overburden for ore bodies of the Stage 1 MTBM development is shown in Table 2.

4.8 Off-site infrastructure

The key off-site infrastructure is the access road and railway line that connect the mine to Chen'avoryk. The railway line is privately owned and extends for some 157 km and includes a bridge crossing over the Vym' River in close proximity to the mine. The railway line is built on a raised embankment that is between 2 and 3 m above ground level. The road is some 160 km between the mine and China'voryk but is not used solely by the mine other than the very last section which is limited simply to mine personnel. The road is also built on a raised embankment that is between 2 and 3m above ground level. Both the road and rail embankments have drains that allow the free flow of surface water under the embankments.

Finally Timan Bauxite has their head office in Ukhta. All senior management including the mine ecologist is accommodated at the head office and travel to the mine only on as needed basis. Transport is between Ukhta and the mine occurs by motor vehicle, special rail car and/or helicopter.

4.9 Mine facilities

4.9.1 Living quarters

The mine facilities include a man camp that is used to accommodate the shift workers. The man camp is made up of a number of dormitories containing bedrooms with communal ablution facilities and a kitchen and dining room where meals are served.

4.9.2 Service areas

Included within the settlement area is a large enclosed workshop where vehicle maintenance can take place together with an elementary engineering workshop. The vehicle maintenance area contains an inspection pit and lifting equipment. There is also an outdoor service area where vehicle and plant are repaired/maintained.

4.9.3 Water supply

Water is supplied to the mine from an artesian well within the mine boundary. Security fencing protects the artesian well and access to the well area is forbidden.

4.9.4 Electricity supply

All electricity used on the mine is generated at the mine using diesel-powered generators. There are at least three of these generators supplying electricity to the man camp itself, the central blending yard and to the electrical powered equipment used in Pit No 2.

4.9.5 Effluent treatment

Effluent treatment is currently limited at the mine to a small-scale facility that achieves no more than solids removal and chlorine dosing of the sewage before it is discharged to the environment.

Table 3: Summary of ore reserves for the current mining operation.

Pit Name	Ore Type	Units	Quantity	Ore Ratio (m ³ /tonne)	Notes
1 LIB	Overburden	m ³	5,900,000	2.19	Ore reserves for pit 2 are given with the subtraction of tonnes mined in the second half of 2003
	Aluminium ore	tonnes	952,000		
	Refractory ore	tonnes	1,745,020		
	Total bauxite	tonnes	2,697,020		
Ore body 2	Overburden	m ³	10,200,000	0.47	
	Aluminium ore	tonnes	21,931,400		
Ore body 1	Overburden	m ³	28,854,000	2.5	
	Aluminium ore	tonnes	11,528,400		
Ore body 3	Overburden	m ³	16,430,000		
	Aluminium ore	tonnes	10,405,700		
Total	Overburden	m ³	61,384,000	1.32	
	Aluminium ore	tonnes	44,817,500		
	Refractory ore	tonnes	1,745,020		
	Total bauxite	tonnes	46,562,500		

Table 4: Production cost per tonne of bauxite

Item	Rubles / tonne
Material inputs	52.5
B.T.4. FCM	33.5
Oils	6.7
Spare parts	9.3
Others	1.9
Inventory	1.2
Industrial services	21.0
Payments	52.4
Deduction on payment	20.1
Amortization	22.5
Taxes for production costs	11.8
Charges	16.5
Total Production cost	196.8

4.10 Mining equipment

The list of the basic mining equipment at MTBM is summarized in Table 4.

Table 5: Basic Mining Equipment at MTBM

No	Model	Type of work
1	Excavator CAT 5080	Excavation
2	BelAz 7548A	Transportation
3	Loader CAT 988G	Loading
4	Tractor TT4 (URB-4T) drilling rig	Drilling
5	Bulldozer MK 21B	Drilling
6	Bulldozer B 170 ME	Excavation
7	BelAz 75404	Transportation
8	Loader L 34 B	Additional work
9	Bulldozer T 330 GR	Overburden
10	BelAz 75404	Transportation
11	Bulldozer T 330 P101	Blending
12	Bulldozer T 170	Additional work
13	Bulldozer D 355A3	Excavation
14	Bulldozer T 330 P101	Overburden
15	BelAz 7548A	Transportation
16	Tractor TT4 (URB-4T) drilling rig	Drilling
17	Excavator EO 10011E	Crushing
18	Caterpillar tractor MT LB	Drilling
19	BelAz 75404	Transportation
20	K 701	Additional work
21	Bulldozer T 330 GR	Overburden
22	Excavator EK 270	Dosage
23	Excavator EO 5124A	Blending
24	Excavator EO 5124A	Blending
25	Excavator EO 5116-1	Crushing
26	Pipe layer TO 1224 G	Construction work
27	Excavator EK 270	Blending
28	Excavator EK 400	Blending
29	Excavator EO 6123A	Blending
30	Excavator EO 6123A	Reserve for loading
31	KS 55713-4(Kamaz 53228C)	Auto crane
32	ATZ 4310 (KAMAZ 43101A)	Auto refueller
33	ATZ 56554 (KAMAZ 53229C)	Auto refueller
34	KS 55713-1 (KAMAZ 55111C)	Auto crane
35	ATZ 7433362 (ZIL)	Auto refueller
36	PRM 4909 (KAMAZ 431140)	Moving repair machine

4.11 Rehabilitation measures

Currently, no rehabilitation is undertaken as the mine areas have been kept active for the purpose of blending bauxite to achieve consistent product quality from the mine.

4.12 Emergency facilities

All modules of the inhabited mancamp are equipped with automatic fire-prevention systems made up of a combination of powder and carbon dioxide fire extinguishers. Mobile equipment is also equipped with fire extinguishers. The mechanical-repair workshops are equipped with fire-prevention pumps and on each piece of fixed equipment there are emergency fire tanks filled with water. In the administrative complex there is a medical room equipped to render first aid.

4.13 Product delivery to the refineries

The basic consumers of MTBM bauxite are the Ural Aluminium Refinery (UAL), and the Bogoslovsky Aluminium Refinery (BAR). Transportation is carried out by railway. Bauxite from the mine is hauled a distance of 157 km to Chin'avoryk and thus to UAR (1755 km) and BAR (1815 km).

4.14 Current and projected future mining capacity

In defining the mine's activities and capacity it is necessary to recognize three phases. These are:

- Current operations – this is as the mine operates at present with a capacity of 1.5 mtpa
- Intermediate expansion - the mine is currently being expanded to a capacity of 2.5 mtpa for which full authorization exists from the Russian authorities
- Full expansion – this is a further possible expansion of the mine to a capacity of 6.0 mtpa, which will require a full assessment in its own right.

It is important to note that this report focuses primarily on current operations but references are made to the intermediate expansion where appropriate.

4.15 Komi Aluminium Project

As described earlier the mine expansion forms part of a broader integrated aluminum development project known as the Komi Aluminium Project. The Komi Aluminum Project consists of the following phases:

- Phase 1
 - 1a – continued expansion of the Middle Timan Bauxite Mine to 1.5 million tonnes per year. It is anticipated that this will be achieved in mid-2004.
 - 1b – additional expansion to 6.0 million tonnes per year. It is anticipated that this expansion will commence in 2005 and be completed by 2007.
- Phase 2 – Reviewing the potential for construction of an Alumina Refinery at Ukhta or Sosnogorsk with proposed capacity of 1,400,000 tonnes per year. If a decision is made to proceed with the refinery construction will commence in 2004. (Ilok at exec summary for statement on first production of alumina)
- Phase 3 - Reviewing the potential for construction of an Aluminum Smelter at Pechora with a proposed capacity of 300-500 ktpa. The potential construction timeframe has not yet been decided.

Include comment on regulatory compliance – give some more details

5 ENVIRONMENTAL AND SOCIAL ASPECTS OF THE MINING OPERATION

5.1 Energy source and consumption

All electricity used by the mine is generated on the mine using diesel generators and there are no overland lines. Principal users of electricity are:

- The living quarters
- The kitchen
- Mine ancillaries including the workshop
- Lighting for especially the CBY
- Electrical excavators

In addition to the above, heat is generated for the working areas (only at the central facility) using a diesel-fired boiler. Heat within the living quarters is generated using electrical heaters in the individual rooms.

5.2 Greenhouse gas contributions

The mine is not a significant source of greenhouse gas emissions either in terms of emissions from the mine or as a result of the generation of power to support mine activities. It is worth noting though that the potential cumulative effects of greenhouse gas emissions as part of the integrated aluminum development, will need to be considered in future.

5.3 Intermediate products arising

There are no intermediate products arising from the mining operation, other than the top-soil and overburden that is stockpiled for reclamation/rehabilitation at a later stage.

5.4 Water resource protection

5.4.1 Water source and consumption

Water is sourced for the mine from an artesian well (see Figure 3). There are no direct process water requirements and water is used for drinking, domestic use, to supply the boiler and for dust suppression in and around the mine. When operating at 2.5 mtpa (the intermediate expansion) the mine will require some 531 600m³ of water per annum. No consumption figures were available for the current operation at the time of the audit.

5.4.2 Waste water

When operating at 2.5 mtpa, the mine will discharge some 4 643 000 m³ per annum (this includes rainwater runoff). No figures on the current wastewater discharge were available at the time of the audit.

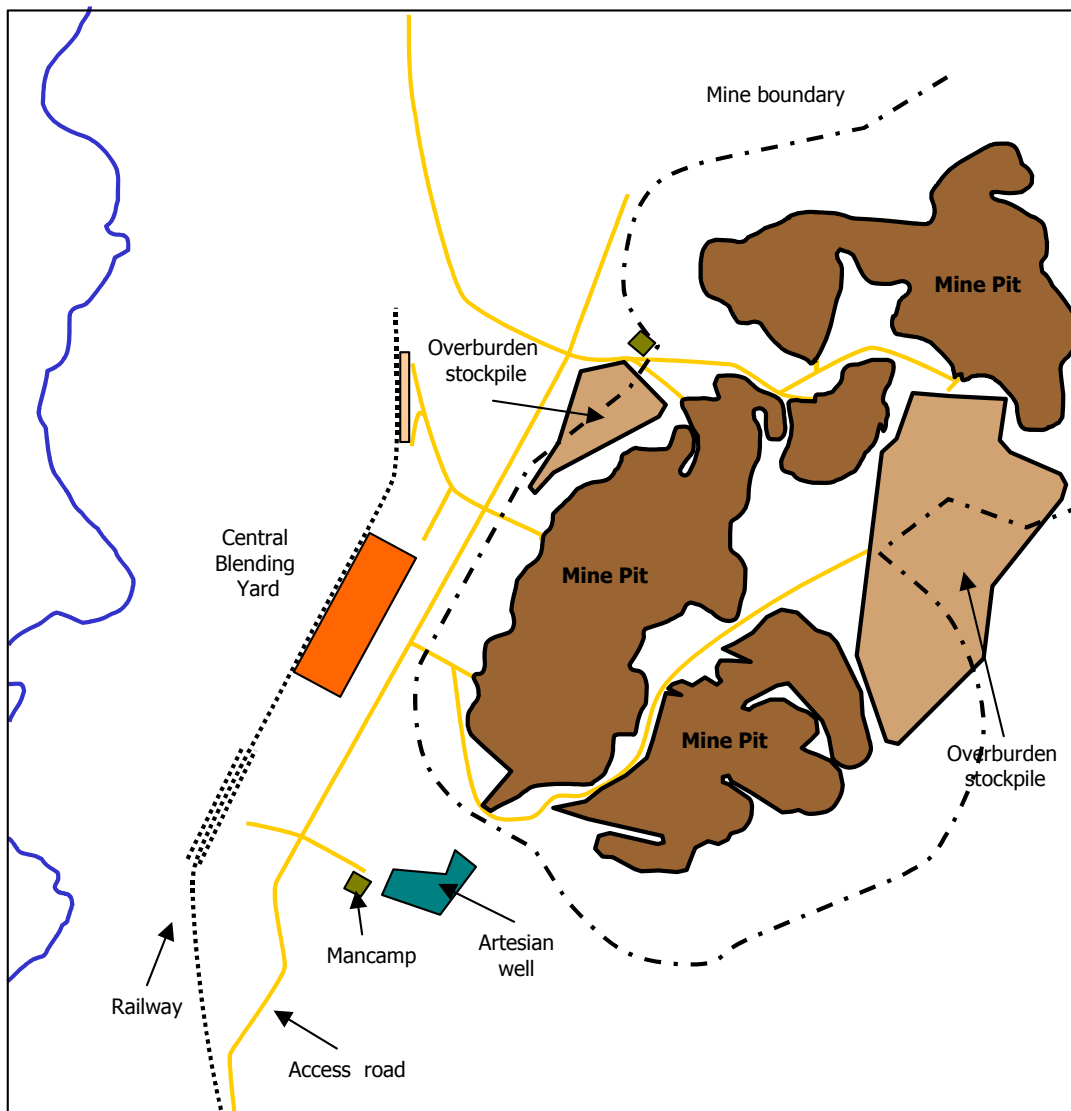


Figure 3: Layout of the mine showing the key features including the mining pits, overburden stockpiles, central blending yard, mancamp and access road and railway

Wastewater from the mine is principally a domestic wastewater and sewage discharge from the living quarters and kitchen. The sewage effluent is channeled to a solids separator where it is also dosed with chlorine before being discharged into the environment. This disposal system is inappropriate for the current loadings (Plate 5). In the event that production at the mine is expanded above the current level (i.e. the staff complement at the mine settlement increases) this situation will become worse. The mine requires a properly designed effluent treatment system, capable of neutralizing bacterial loads and stripping nutrients from the effluent to ensure compliance with Russian standards and IFC guidelines.



Plate 5: Surface demarcation of existing sewage and domestic effluent containment and soak away system

5.4.3 Hydrodynamics

Given the position of the base of the mine pit relative to the water table, water entering the mine immediately soaks through the underlying bauxite and dolomite. Despite rain having fallen when the mine was visited during the audit there were no obvious areas of water pooling within the mine pit. This implies that there is no need to pump water from the pit and dispose of the same. Given the rapid infiltration of the water together with the underlying geology there is no mechanism for the formation of acid mine drainage and this is confirmed in the groundwater monitoring results. The groundwater monitoring further indicates that applicable water quality standards are not exceeded, and this is true also for nitrates/nitrates (from the continued use of explosives in blasting operations).

There is a need to better understand the hydrodynamics of the mining operation especially the effect of changing the surface runoff regime in opening the pit and clearing the overburden. The physical changes to the landscape are illustrated in Figure 4. There is also a need to understand the hydrodynamic implications of excavating lower lying bauxite deposits especially in respect of the proposed capacity increases. There are indications, for example, that mining ore deposit 11 may lead to the draining of the Varykva River. The mine is currently undertaking an extensive study to address the issue of the hydrodynamics in the mining of other bauxite deposits.

The topsoil and overburden, which have relatively low permeability, would normally cause water to run off to rivers, whereas the mining operations are exposing the Bauxite layer, and in effect provide a funnel for precipitation to be transported to groundwater. It should be noted that this is true for precipitation directly into the mining pit, as well as runoff that is intercepted by the pit. The depth of groundwater can be up to 200 meters, but is often much less. Unnatural recharge of the aquifer could take place, which would affect geohydrological conditions. The expected effects could include an increase in the groundwater levels, increased discharge at springs, increase in baseflow to rivers and changes to the groundwater chemistry.

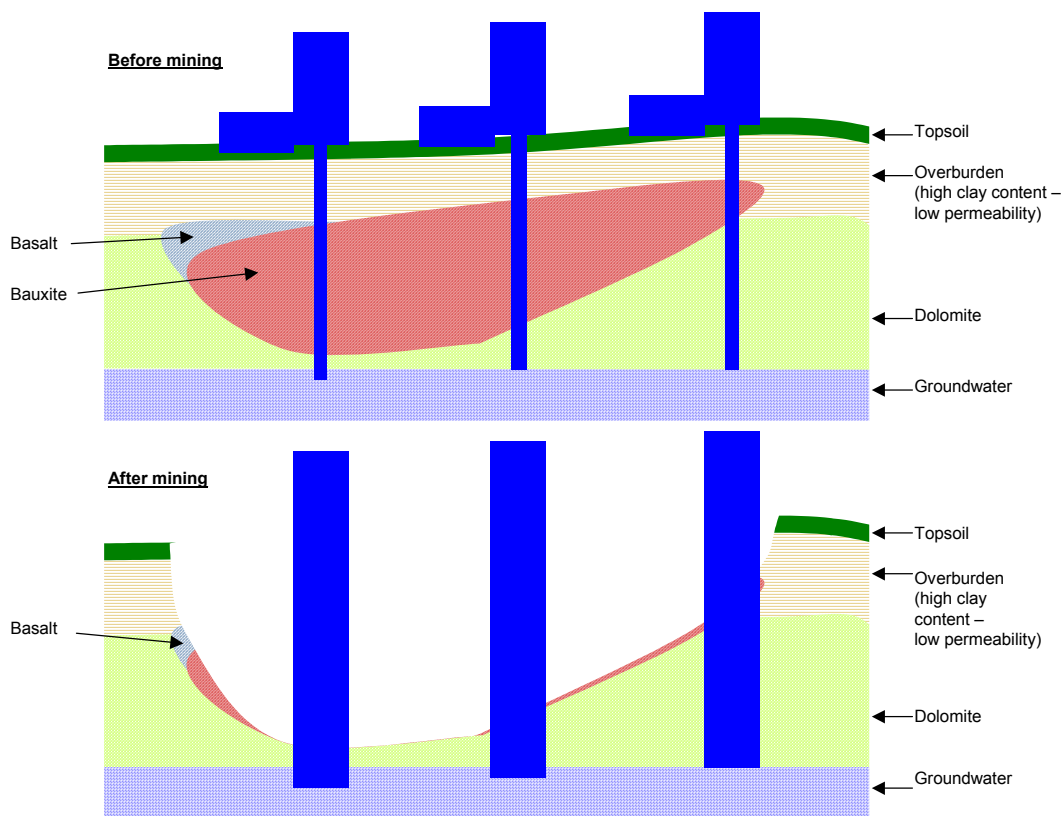


Figure 4: Schematic presentation of the effect on hydrodynamics of mining at MTBM.

5.4.4 Sediment loading in stormwater

There are several areas where the handling and stockpiling of bauxite presents the risk of contaminated stormwater runoff most notably in the Central Blending Yard (CBY). The highest concentration of bauxite fines are generated at the mine's CBY and rail loading facility (Plate 6). Under the relatively high rainfall conditions, this material is easily mobilised, transported from the yard in storm water run-off and potentially introduced into nearby surface water bodies. There are no diversion ditches evident to reduce the quantity of rainwater entering the CBY. The thread of sediment loading also applies to the overburden stockpiles and to the access road and railway line. There are numerous examples of small-scale erosion from the road and railway embankments where the absence of vegetation on the embankments (Plate 7) exposes the soil to the effects of storm water erosion .

Similarly, clearing of forest in advance of opencast mining (Plate 8) and the preparation of other mining facilities exposes the soil to the effects of storm water erosion – resulting in the potential introduction of turbid (e.g. clay loads) water into nearby surface water bodies. The rivers and streams in the area carry very low suspended sediment loads and increased water turbidity could result in several environmental impacts (e.g. unfavourable habitat conditions for fish). Given the naturally high levels of water clarity of the streams and rivers in the proximity of the mine, and their designation as ichthyologic reserves, the environmental impacts of high turbidity storm water run off are assessed to be of moderate significance.



Plate 6: Central Blending Yard (CBY) and rail loading facility where high concentrations of fines are generated



Plate 7: Erosion of unvegetated road embankment



Plate 8: Clearing of forest for the purpose of pit excavation, showing the effects of unconsolidated soils and concomitant erosion risk



Plate 9: Profile of the bauxite, overlain by basalt, overburden and topsoil.

The soils in the area are of the Gleyic Podzoluvisol type (FAO), mainly acidic (surface pH 4.2-5.8) and are 0.6-1.0 meters deep. The clay content ranges between 10% and 25%, which gives rise to low permeability⁸ (Plate 9). Disturbed soils can give rise to suspended sediment loads and dissolved salts in surface runoff water. The clay particles of less than 1 µm in diameter are easily suspended and generally take much longer to settle out than coarse material.

The impacts of increased suspended sediment relate to physical characteristics of the water body, as well as the downstream deposition of such material. The primary impacts of such changes to the water in rivers could include the following:

- Reduced hunting success of predators due to reduced sight
- Increase in water temperature due to absorption of light energy
- Reduced primary production (photosynthesis) due to lower light penetration
- Less efficient respiration of aquatic species
- Modified breeding behavior due to reduced sight
- Increased sediment will reduce the aesthetic appeal of the rivers, and as a secondary impact of ecological response, fishing potential could be reduced.
- A higher sediment load will increase the scouring potential of the water body, which could affect geomorphological processes.

Mobilized sediment will be deposited in downstream, with the following potential environmental impacts.

- Deposited sediment will reduce the available habitat to bottom-dwelling aquatic species (invertebrates and fish)
- Deposited sediments will reduce the aesthetic appeal of rivers
- Pools/dams can become filled with sediment
- Submerged vegetation can be coated with fine sediment
- Changes to the channel morphology will change hydraulic processes
- Sediments deposited before surface runoff reaches rivers would change the surface characteristics of soils, with potential impacts on germination and growth of smaller plants

In addition to the effect of increased sediments, water quality will also be affected through increased dissolved salts and reduced pH.

5.4.5 Audit findings for water resource protection

The following are the key audit findings for water resource protection:

- There are no large-scale water management problems as a result of either rainwater or ground water entering the mining pit under the current mining scenario. However, it should be noted that mining of lower-lying bauxite deposits under an expanded operation may result in groundwater entering the pit and the need for de-watering.
- There are no indications of exceedances of relevant water quality standards for the current mining operation.

The following were identified as gaps in terms of water resource management.

⁸ Stolbovoi V., and I. McCallum, 2002. *Land Resources of Russia* (CD-ROM), International Institute for Applied Systems Analysis and the Russian Academy of Science, Laxenburg, Austria.

- The design and function of the sewage and domestic effluent disposal system is inadequate, resulting in the discharge of chlorinated effluent into the environment
- There is no formalized drainage and suspended sediment control system at the bauxite blending yard resulting in the risk of introduction of high loads of sediment (clay, etc.) into surface water bodies.
- Erosion of soil from sites cleared in advance of mining and overburden storage presents a risk of the introduction of high loads of sediment (clay, etc.) into surface water bodies.
- Erosion of soil from road and rail embankments presents the risk of the introduction of high loads of sediment (clay, etc.) into surface water bodies.

5.5 Air pollution emissions

5.5.1 Main air emissions sources

The principal air emission from the mining operation is dust, which is both mechanically generated and wind blown. Dust is generated during the excavation, transport and dumping of the overburden, during blasting operations, during bauxite handling in the central blending yard, and transport of the bauxite in rail cars. In addition to dust, there are some 22 other air pollutants listed for the mine including aerosols (fine particles), carbon monoxide, nitrogen oxides and sulfur dioxide. Total emissions to atmosphere are projected at 5586.76 tons per annum (for mine capacity of 2.5 mtpa)

Some fifty air emission sources have been identified across the mine including the activities associated with mine operations (blasting, loading, materials handling), plant (excavators, crushers, stackers, bulldozers and road scrapers) vehicles (utility motor vehicles and trucks) and from the boilers and electricity generators. In addition smoke is generated during burning of timber from areas that have been felled. The emissions from the mine are summarized in Table 5.

Table 6: Air pollutants, sources and maximum permissible emissions from the mine.

Pollutant	Sources	MPE (Tonnes per annum)
Aerosols	Vehicle and plant emissions, timber burning, diesel generators, boilers.	1,404
Dust (organic and inorganic)	Overburden stripping, transport and dumping, bauxite excavations, transport, dumping, blending, loading, vehicle movement	1,058.7
Carbon monoxide	Vehicle and plant emissions, diesel generators, boilers	1,111.81
Nitric oxides		636.34
Sulphur dioxide		786.04
Soot		344.70

Emissions from blasting are regulated as emissions per draught. The maximum permissible emissions (MPE) are summarized in Table 6. There have been no exceedances of the specified MPEs during the last two years (State reporting tables "2TP-(air)" and "4-OC").



Plate 10: Air pollution sources in the central blending yard including the diesel locomotive and generator (in the foreground).

Table 7: Maximum permissible emissions in tonnes per annum, from blasting operations at the mine

Pollutant	MPE (tonnes per annum)
Aerosols	50.7
Carbon monoxide	42.51
Nitrogen oxides	5.26

The principal emissions abatement is water spraying which is used during the summer months on the roads in the mine. In the design of the 2.5 mtpa mine expansion, mention is made of the use of a different type of crushing system to that used currently. The envisaged crushing system would have been fitted with dust removal equipment, which would have reduced total air emissions from the mine, from 5,586.76 to 5,511 tonnes per annum.

The mine's sanitary protective zone (SPZ) is defined as 1000m from the mine boundaries in terms of Sanitary Norms and Regulations (SNR) 2.2.1/2.1.1.1031-01. There are no residential areas within the defined SPZ.

5.5.2 Permit status

Indications are that MTBM is currently meeting all regulatory requirements in terms of the timely and complete submission of air pollution emission data. Current performance is measured against a series of maximum permissible emissions that were defined by the Komi Republic (KR) Institute of Biology in 2002 and approved by the KR Head Agency on Nature Resources (HANR) on April 11, 2003. The mine has air emission permit № 09034 (dated 31.01.2003), which is valid for one year from date of issue. No claims were encountered from government authorities that indicated failure to timely submit the required data, as defined in the air emissions permit.

5.5.3 Actual emissions and results of air protection actions.

According to the state statistical reporting format “2 ТП (air)”, there were 7 air pollution sources at the mine (of which 5 were point sources) at the beginning of 2003. For the first six months of 2003 air emissions were estimated as 600.425 tons totally (including 0.003 tons of gaseous pollutants). However, these emissions are for the current production capacity of 1 million tones per annum, rather than the 2.5 mtpa on which the current emissions permit is based. Total emissions from the mine are summarized in Table 7, to show an emissions trend for the last three years. The reason for the fairly dramatic increase evident in Table 7, is the introduction of a boiler that was commission in early 2003.

Table 8: Air pollution emissions from Timan Middle Bauxite Mine

Year	Quantity (tones per annum)	Comment
2003	600.425	This is for the first 6 months of the year
2002	41.024	The whole year
2001	60.87	The whole year

It should be noted, however, that some sources are not defined correctly in the state statistical reporting format “2 ТП (air)”. For example, the permit is based on operations of a coal-fired boiler, rather than the diesel-fired boiler, that currently operates. This implies that the state statistical data needs to be revised to account for the actual sources on the mine including correctly calculating the emissions from the diesel generators. There is currently no gas cleaning equipment at the mine and abatement is limited to dust suppression activities during unfavorable meteorological conditions.

Air pollution emissions and ambient air quality monitoring is performed within the mine territory and at the SPZ boundaries. The monitoring is conducted according to a defined schedule that has been approved by mine’s top management and agreed with the state environmental protection bodies. The monitoring schedule includes industrial air emissions monitoring (boiler and diesel generators) and ambient air quality monitoring at the SPZ boundaries (this has not yet been implemented but will be in the last quarter of the 2003 calendar year. The main pollutants (aerosols, soot, nitric oxides, sulfur dioxide, carbon monoxide) are measured quarterly by an external third party and the measured data presented in reports. No exceedances of the prescribed maximum permissible emissions have been measured to date.

5.5.4 Pollution payments

Air pollution payments for 2001-2003 are presented in Table 8. The state statistical reporting tables “4-OC” reveal that in the last 2 years there have been no payments for exceeding the specified maximum permissible emissions.

Table 9: Pollution payments (in rubles and dollars) for air pollution emissions from the mine over the last three years as well projected payments under full capacity.

Time period	Amount	
	Rubles	Dollars
2001	27,375:00	897
2002	36,400:00	1,110
2003 (first half of the year)	20,172:00	661
At full capacity (2.5 mtpa)	215,693.45	7,072

5.5.5 Audit findings for air pollution emissions

The following are the key audit findings for air pollution emissions:

- Currently the mine operational facilities do not have a significant negative impact on air quality. Total air pollution emissions for 2003 are expected to be about 1200 tonnes (viz. under the current operating capacity of 1.5 mtpa). That amounts to some 22% of planned emissions for the projected production capacity of 2.5 million tons of bauxite per annum.
- All atmospheric protection permits are in place for the mine and the mine's operations comply with existing air emissions regulations.
- Operational environmental monitoring at the mine is conducted following a schedule agreed with the state environmental protection bodies.
- There are no residential areas within the defined SPZ for the mine.
- There were no exceedances of the specified maximum permissible emissions during the last two years of mine operations.
- Air pollution emissions abatement is limited to dust suppression spraying during adverse meteorological conditions.

The following gaps have been identified in terms of air quality management:

- The boiler constructed in 2003 is diesel-fired rather than coal-fired as specified in the air pollution permit. As a result there is a large (positive) discrepancy between the calculated emissions in the permit documents and current emissions (presented in the state statistical reporting files for the first six months of 2003).
- In a similar vein, air emissions from diesel generators have been calculated incorrectly in the state statistical reporting files "2-ТП (air)" for 2002 and 2003.

5.6 Noise and vibration

Noise is generated by a range of activities across the mine. These noise sources are summarized in Table 9. The only significant source of vibration is blasting. There are no significant sources of electro-magnetic radiation at the mine. Noise limits that apply to the mines activities are summarized in Table 10.

Table 10: Principal noise source on the mine and typical noise levels for those sources.

Source	Noise level
Drilling machines	115 dB(A)
Bulldozers	106 dB(A)
Crushing excavators	105 dB(A)
Excavators	80 dB(A)
Generators	72 dB(A)

Table 11: Noise limits that could be applied to activities at the mine

Where	Limit	Limit source
Residential areas (07:00 – 23:00)	60 dB(A) average 75 dB(A) maximum 55 dB(A) maximum	SNR 11-12-77 World Bank
Residential areas (23:00 – 07:00)	50 dB(A) average 65 dB(A) maximum 45 dB(A) maximum	SNR 11-12-77 World Bank
Site boundary	70 dB(A)	World Bank
Occupant exposure	93 dB(A) maximum 85 dB(A) average	GOST 12.1.003-83

According to calculations, the noise level at the SPZ boundary is less than 50 dB(A) and this has also been confirmed by annual measurements. As has been indicated there are no residential areas in close proximity to the mine that could be impacted upon by noise generated by the mine. In similar vein, there are no direct limits on vibration from blasting operations⁹.

5.6.1 Abatement measures

There are no direct measures to reduce ambient noise but these are not required given the noise levels that are measured at the site boundary. Abatement measures are all geared towards occupational health protection and include the use of ear protectors and hermetically sealed cabins on the excavators.

5.6.2 Audit findings for noise and vibration

The following are the key audit findings for noise and vibration (as they apply to current mine operations):

- Given the lack of proximity of residential areas and the noise levels generated by the mining activities, which do not exceed 50 dB at the mine boundary, noise does not pose a significant ambient environmental risk.
- Noise level from certain mining activities requires the use of personal protective equipment (PPE) specifically ear protectors. Ear protectors are provided to mine personnel and the cabins of excavators are hermetically sealed.
- Again due to the lack of residential areas in the immediate vicinity of the mine, there are no direct restrictions regarding vibration as a result of blasting operations.
- Gaps identified in terms of noise management issues that require intervention are described in the Health and Safety section.

5.7 Waste management

As is typical of mining operations of the nature of the TMBM, there are a range of waste types generated but these all occur in relatively small volumes. There is no rock waste from the mining operation and the overburden is temporarily stockpiled for later use in reclamation and rehabilitation. Wastes generated at the mine include hazardous wastes such as used mercury lamps, oil contaminated wastes and general municipal waste (including putrescible waste). The general municipal waste is currently disposed of on the overburden stockpile as there is no formalized waste disposal facility. Hazardous waste is temporarily stockpiled and then removed for recycling.

5.7.1 Regulatory compliance

The mine has an approved waste management plan "Waste Storage and Neutralization" approved by the KR HANR letter № 04-09/1441 of 07.04.2003. The plan, which was developed by JSC "Municipal Centre of Expertise – Ecology" (Saint-Petersburg), is valid for one year from date of issue. According to the plan some 36 waste types will be generated at the mine at full capacity (2,5 mtpa) will total some 5645.153 tonnes per annum. The projected waste types and quantities are summarized in Table 11. The planned payments for

⁹ Federal regulations exist that would limit the charge and time of day of blasting, if residential areas were affected by noise and/or vibration from the blasting activities.



Plate 11: One of several examples of the lack of formalization of waste management practice at the mine.

waste disposal are estimated as 1,068,993.26 rubles (about US\$ 35,049). These payments include both the payments made to the authorities and the actual disposal costs.

Table 12: Waste types and quantities anticipated for MTBM once the mine is operating at 2, 5 mtpa.

Waste type				Quantity (tpa)	Planned disposal
Hazardous	1	-	waste	0.095	Recycled by "Sartar" (Syktyvkar), agreement #16-u-2002
mercury lamps					
Hazardous	grade 2	-	mainly oil sludge generated in reservoir cleaning	6.986	"LukoilNefteProdukt" (Ukhta) agreement # KHT 02-20-21
Hazardous	grade 3	-	mainly waste oils and oil products	53.468	
Hazardous	grade 4	-	mainly coal clinker	5584.604	Burned in the boiler
Domestic	waste/municipal		solid waste	No quantity specified	N/A ¹⁰
Scrap metal				No quantity specified	Landfill to be established at the mine
					Sold to a scrap metal merchant twice a year
TOTAL				5646,153	

Actual waste generation and disposal rates for 2002 are listed in Table 12. Payments for

¹⁰ Given that there is no coal feed boiler thus waste tyre will not materialize

waste disposal in the same period were 68,900 rubles (approximately US\$ 2,259).

Table 13: Waste types and quantities generated during 2002 at MTBM

Waste type	Quantity (tonnes)	Disposal
Waste mercury lamps	0.003	Recycled
Waste oils	6.0	Recycled
Oiled rags	2.0	Burned in boiler
Accumulator acid	0.64	Recycled
Municipal solid waste	2.0	Overburden stockpile
Used tyres	38.0	Temporarily accumulated
TOTAL	48.643	



Plate 12: One of several small dumps of used tyres at the mine.

5.7.2 Audit findings for waste management

The following are the key audit findings for waste management (as they apply to the current operations at 1.5 mtpa):

- For the most parts the mine's operations comply with existing waste management regulations and permit requirements.
- A waste management plan (Waste Storage and Neutralization) has been developed and has been approved by the state environmental bodies for the period of 1 year.
- All the wastes are removed and disposed of timeously except tyres, which are temporarily stockpiled.
- Because the mine is still relatively new, there are few used batteries. Batteries that have become unserviceable are temporarily stored at the mine and will be recycled in future.
- There are no asbestos-products at the mine that require disposal.
- Again, given that the mine is relatively new, there are no transformers with PCB containing transformer oil.



Plate 13: An example of redundant plant (scrap metal) at the mine

The following gaps have been identified in terms of waste management:

- There is no formal disposal facility for municipal solid waste (MSW) and the current practice of disposing the same to the overburden stockpile is not an acceptable waste management practice. The planned introduction of a formalized landfill for MSW at the mine should be expedited.
- Although the quantity of used tyres is relatively small (approximately 200 a year), the ongoing accumulation of used tyres may start to pose a problem in future.
- There are a number of scrap metal stockpiles in an around the mine which also contravene good waste management practice. Containers are not clearly separated and marked as required by regulations.
- It is recommended that as part of the landfill development, a waste transition facility be developed that provides segregated areas for waste disposal that are properly marked and numbered.
- The 1 year validity of the waste management plan is unduly restrictive and should be developed for a 5 year period.
- Again, the installation of a diesel-fired rather than a coal-fired boiler has resulted in the incorrect classification of waste from the mine (clinker coal is currently specified as a waste type).

5.8 Ecology

The Timan Bauxite Mine lies in a belt of forest-tundra between the tundra in the north and the taiga to the south. The area in which the mine is situated contains peat bogs, spruce forests and, in some places, fir forests. The mine is situated between the Vym' and Varykva Rivers which collectively make up an ichthyological reserve (zakaznik) known as the "Vymski" (Figs. 5 and 6). Given the close proximity of the mine to the reserve, much of the mine's environmental management functions focus on ensuring that there is no impact on the reserve as a result of mine activities. As part of the development of the mine plan it will be necessary to plot the position of the deposits relative to the ichthyological reserve for consideration in deciding on which deposits to mine. In addition to the ichthyological reserve, there are also other protected areas (important landscapes) to the west and east of the mine respectively, namely "Udorski" (in Udorski district) and "Belaya Kedva" (Ukhta municipality). The mine has no direct impact on these other protected areas.

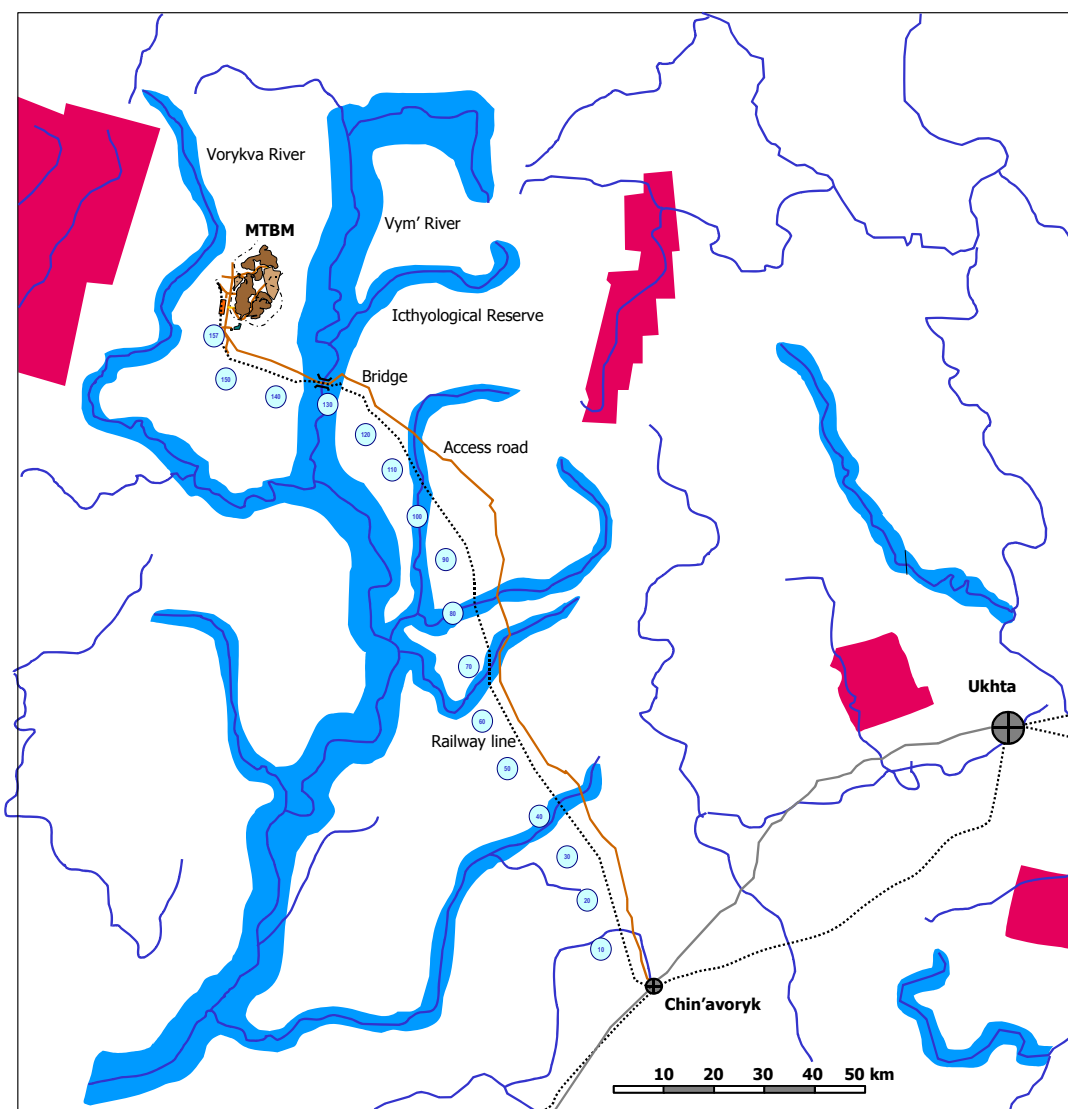


Figure 5: Map showing the position of MTBM relative to the ichthyological reserve and other protected areas.

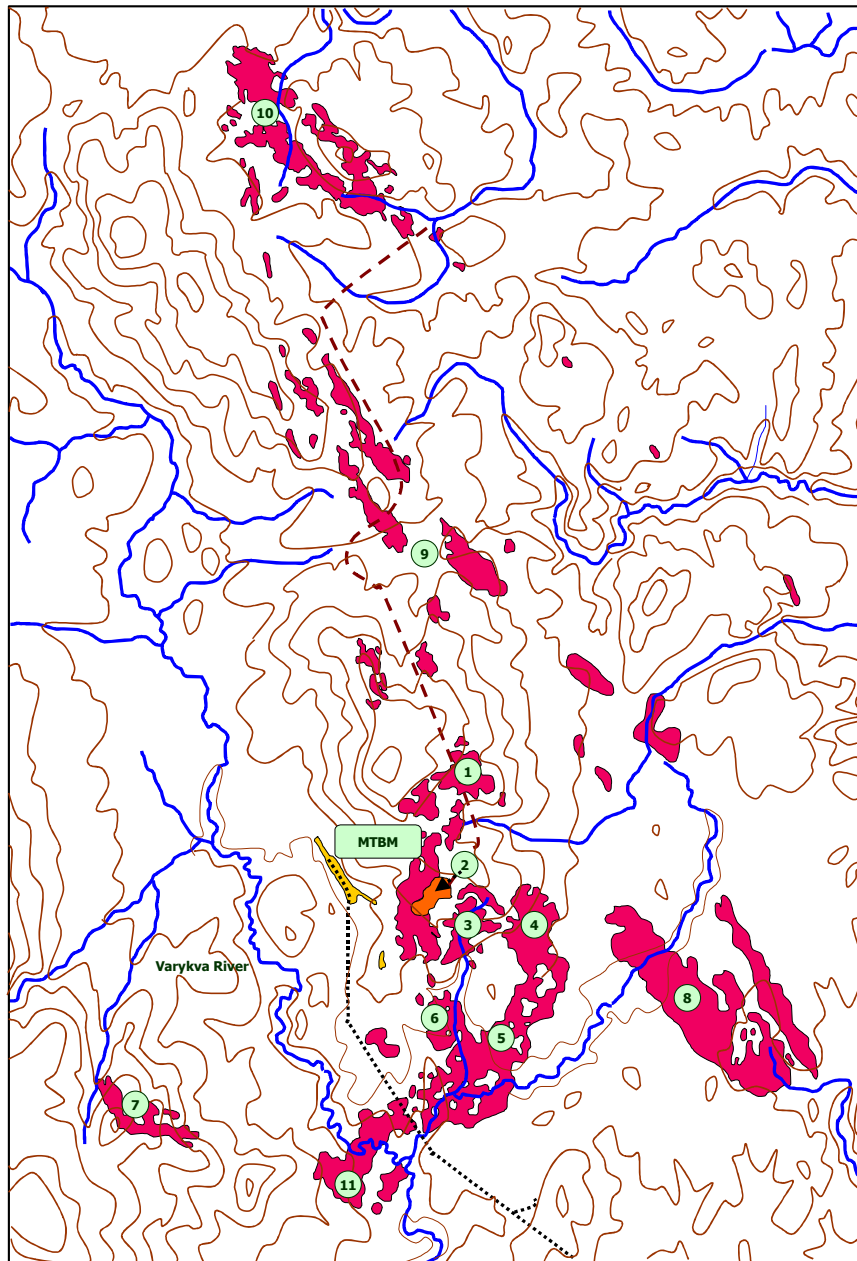


Figure 6: Map of the bauxite deposits in the vicinity of the MTBM. Note the position of ore deposit 11 in relation to the Varykva River.



Figure 7: Boreal forest in the vicinity of the mine.

5.8.1 Construction of the rail bridge over the Vym' River

As part of the railway construction a bridge was built over the Vym' River. It is worth noting that in order to ensure that the potential impact of the bridge and its construction on the river was minimized, there were two important design changes. These were the removal of a planned supporting pillar for the bridge in the middle of the river and the extension of the length of the bridge to reduce the impact on the stream banks. These modifications resulted in additional cost in the construction of the bridge in order to reduce potential impacts on the river.

5.8.2 Impact of the road and railway line on drainage

The construction of the main access road to the mine (also, some of the internal mine roads) and the railway line connecting the mine with the railway junction at Chin'avoryk may have resulted in the disruption of the natural pattern of surface drainage at various places. This phenomenon is most marked in the vicinity of the mine and extending some 50 km southwards towards Chin'avoryk, where the topography is relatively flat. In this situation, where there was previously unimpeded drainage of overland water flow the road and rail foundations now have a damming effect, resulting in back flooding up-slope of the road and rail foundations – with resulting ecological impacts (Fig. 8) - In areas with undulating topography, the interrupted drainage is easily re-directed down slope, parallel to the road or railway line, explaining the absence of any major ecological effects in these areas.

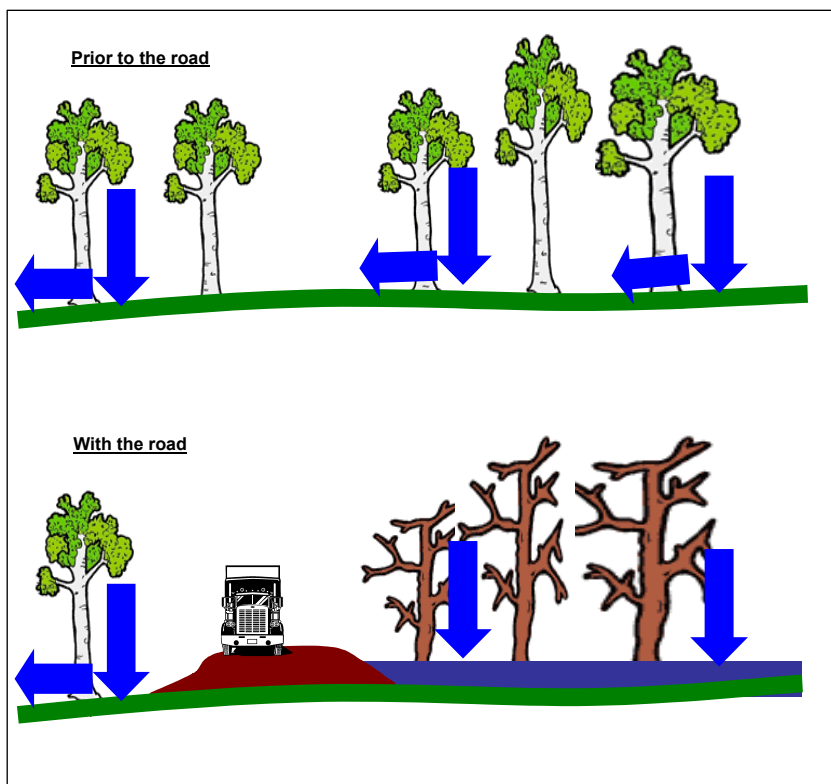


Figure 8: Schematic illustration of the effect of the TBM access road (Also railway line) on surface drainage, particularly in shallow gradient areas, resulting in forest die-back.

The most obvious ecological consequence of the effect of the disruption caused by the road and railway line to the surface drainage is the dieback of forest on the upslope side of the road. In many instances where this phenomenon manifests, there has been dieback of relatively tall, dense forest (Plate 16). However, in some instances, the natural structure of the affected forest is indicative of an already (naturally) stressed state attributable to high water table conditions, where this is indicated by the presence of stunted and sparse forest (Plate 5.xx). The main ecological effect attributable to this risk source is the conversion of forest to aquatic/semi-aquatic sedge swamp (Plate 17).



Plate 14: The Vym' river which forms part of the ichthyological reserve in the vicinity of the mine.



Plate 15: The rail bridge that crosses the Vym' river.



Plate 16: Dieback of forest as a result of the disruption of surface drainage caused by the MTBM access road and railway line

The extent of the impact of the road and railway line on the forest ecosystem affected by this risk source has not been quantified. However, it is estimated that several hundred hectares are affected – probably an area greater in extent than the area of forest lost to opencast mining, stockpiling of overburden and road and other infrastructure situated within the boundaries of the mine.

Commercial logging has had a relatively minor effect on the state of the natural forests beyond approximately 100 km north of Chejavorak; i.e. the forests in the vicinity and extending approximately 50 km southward, of the mine are in a relatively untransformed and natural state. Associated with the risk source described here, there has been quite extensive transformation of the forest adjacent to the TMBM access road and railway line (probably a greater area of affected forest than that lost to opencast mining). In this situation, HIGH significance is provisionally assigned to the described ecological impacts (provisional, since the spatial extent of the impact must still be quantified).



Plate 17: Naturally stunted and sparse forest, attributable to (natural) high water table conditions. In this situation, the artificially raised water table results in rapid dieback of forest

5.8.3 Forest clearing

Clearing of forest in advance of opencast mining (Plate 18) is a predicted consequence of this form of development, and is an environmental cost. The audit inspection reveals that relatively large areas of forest are also affected by essential mining support operations, such as site preparation for overburden storage (Plate 19), the establishment of roads, etc. However, in many instances, it appears that a considerably greater area of forest is cleared (or is damaged) in the course of such site preparation and infrastructure establishment than is absolutely necessary.



Plate 18: Area cleared of forest adjacent to the current open-pit mining operation



Plate 19: Area cleared in advance of the expansion of the overburden dump (viewed from the top of the existing dump)

Given the relatively untransformed state of the forest within the mining area, any impacts resulting from non-essential or carelessly demarcated mining support operations are significant.

5.8.4 Audit findings for ecology

The following are the key audit findings for ecology (as they apply to the current operations at 1.5 mtpa):

- The physical transformation of the natural environment as a result of the mine and associated infrastructure is not considered to have resulted in a significant ecological impact.
- There are several protected ecological areas in the vicinity of the mine, these include:
 - The ichthyological reserve
 - Important landscape reserves
- Much of the environmental management effort on the mine is geared toward protecting the ecological reserve (the construction of the railway bridge is a good example). The mine has no direct impact on the important landscape reserves.

The following gaps have been identified in terms of ecological impact of the mine and associated infrastructure.

- The constructed road and rail infrastructure (for access and product conveyance), appears to have disrupted the surface hydrology (flow impedance and back-flooding) which may be affecting forest ecosystems.
- Forest clearing and resultant ecosystem loss in advance of mining, preparation of overburden stockpile areas and the construction of mining infrastructure especially roads, appears excessive.

5.9 Reclamation/rehabilitation

5.9.1 Mine area reclamation

There is currently no *in situ* reclamation/rehabilitation for mining operations. Current planning provides for the replacement of the overburden once the mining operation has ceased. The reason for the current reclamation practice is that all mine faces are kept open so that different bauxite qualities can be accessed on an as needed basis for the central blending yard. It is important to note that this applies to current mining operations only. *In situ* rehabilitation is planned for the new areas that will be mined as part of the mine expansion to 2.5 mtpa.

Following the clearing of forest in advance of opencast mining, during the peeling of overburden from above the bauxite deposits, topsoil is not stripped and stockpiled separately (from the overburden). The mixture of high clay content overburden, basalt and dolomite, which is currently intended for replacement into the mined out area, is not particularly suitable for vegetation re-establishment. This reduces the potential for effective post-mining ecosystem rehabilitation, which the ameliorated physico-chemical conditions of topsoil and its plant seed bank can promote.

Whilst the topsoil conditions favorable for the promotion of rehabilitation are unlikely to persist for a 20-year period (the current schedule for post-mining rehabilitation), given the

temperate climatic conditions experienced at the MTBM, they are likely to be retained for several years. In the event that annual production at the mine increases to 6.5 million tonnes, the opportunity for post-mining rehabilitation is likely to be accelerated – making the use of topsoil to promote rehabilitation a viable option.

5.9.2 Borrow pits and quarries

Numerous borrow pits have been quarried along the route of the mine access road and railway line. Whilst some of the pits have been shaped and trimmed (i.e. the worked surface has been smoothed) little else has been done to promote rehabilitation of the destroyed forest ecosystem. The exposed quarried surface of the borrow pits is not particularly suitable for vegetation re-establishment, which reduces the potential for effective post-mining rehabilitation. Topsoil, has not been stripped and stockpiled for rehabilitation purposes at these borrow pits.

Although not quantified, the total area of forest eliminated as a result of borrow pit-quarrying operations is estimated to be several hundred hectares. This area is probably greater in extent than the amount of forest lost to opencast mining and mine infrastructure.

5.9.3 Audit findings for reclamation/rehabilitation

The following gaps have been identified in terms of reclamation/rehabilitation.

- The current reclamation/rehabilitation practice is deemed to be problematic for the following reasons:
 - It is likely that the stripped top soil will become sterilized in the period before reclamation/rehabilitation commences
 - There will be a significant cost at the end of the mine life for reclamation/rehabilitation, which could hamper the extent to which reclamation rehabilitation is effected.
- There are a number of borrow pits that are associated with the construction of the road and the railway, that have not been rehabilitated.
- There is no mention of mine closure, simply references to reclamation and rehabilitation and it is not clear whether or not there is adequate provision for mine closure in the mine plan.

5.10 Hazardous materials management

Although there is cognizance of the need to properly manage hazardous materials, this has not been formalized in any way in terms of ensuring that the environment is protected. In particular there is no spill prevention plan and facilities where hazardous metals are stored lack spill prevention infrastructure. It is recognized however, that Russian regulations do not stipulate the need for hazardous material registers and control of the same in respect of possible risk to the environment, but do specify such requests in terms of industrial safety.¹¹ Hazardous materials that may be present on the mine are summarized in Table 11.

¹¹ Measures in place to ensure that occupational health and safety risk in terms of hazardous materials are addressed at the mine and this is described later in this report.

5.10.1 Fuel management

Diesel and petrol are transported by road tanker, approximately on a weekly basis, from Ukhta to the temporary fuel storage tanks at the mine settlement. The risk of spillage occurs when filling the storage tanks and withdrawing quantities for use on site. The tanks are not properly mounted nor contained within bunding with an impervious floor and of sufficient volume to contain a major fuel spill (e.g. two out of four tanks). The present earth bund wall is incomplete – importantly, on the downhill side of the tanks. The present spill capture arrangement at the hose couplings is completely inadequate (i.e. the half-drums placed



Plate 20: Fuel storage tanks at the mine indicating the lack of spill protection infrastructure

under the tank gate valves) and does not include a secondary bund system. At the same time, maintenance of and repairs to mining plant (ore trucks, bulldozers, etc) is undertaken at a number of apparently *ad hoc* locations in the settlement (Plates 21 and 22). At none of these sites is there protection against spillages of oil, hydraulic fluids etc., which soak into the soil.

Spillage of small quantities of diesel and other hydrocarbon products has occurred in association with the above risk sources - as evidenced by the observed surface contamination of soils in this area. Soil contamination is apparent at surface, but probably relatively shallow in depth; extending (probably) less than 1 m. Monitoring has not revealed any groundwater contamination. Compounds in diesel and fuel oil have low solubility in water and are strongly partitioned into the adsorbed phase in soils, so the dissolved concentrations in groundwater are likely to be low. However, contaminated soils, if unremediated, will act as a reservoir for the ongoing release of contaminants to groundwater (or air).

The release of organics with low water solubility (including fuels and oils) may lead to toxic impact to both fauna and flora. Such compounds and their derivatives are often persistent, with relatively small quantities leading to contamination of a groundwater aquifer or surface water resource. In addition to toxic effects, such water becomes less fit for human consumption due to health risks and undesirable taste. The effects on aquatic ecosystems can be a function of chronic or acute toxicity (death or deteriorating health) or result from biota (especially fish) avoiding contaminated areas.

Groundwater is not a significant pathway for human exposure to contaminants from fuel spillage. There are no existing beneficial uses of the groundwater in the proximity of observed fuel spills (the borehole used for the supply of potable water is relatively isolated and protected by a sanitary buffer area). The impact of hydrocarbon-contaminated groundwater is, therefore considered of low significance.

Table 14: Listing of hazardous materials that are kept at the mine together with their purpose and typical quantities.

Hazardous Material[†]	Purpose	Quantities
Chlorine	Chlorine dosing of sewage effluent	Unknown
Oils and hydrocarbon products	Fuel and vehicle maintenance	2,962.06 tonnes (2002) 1,411.32 tonnes (2003)
Paints, paint thinners, paint strippers	Building and plant maintenance	unknown

1. *There are no reagents used at the mine.*



Plate 21: An example of the *ad hoc* vehicle and plant maintenance seen at the mine. The operator is filling a can with oil to top up the crankcase on a bulldozer. Note the cooking fire and pots in the foreground.



Plate 22: The same bulldozer operator refilling the crankcase of the bulldozer

5.10.2 Audit findings for hazardous material management

The following gaps have been identified in respect of hazardous materials management:

- There is no formalized hazardous materials management on the mine for the purpose of protects the environment from the effects of uncontrolled release of hazardous metals.
- Vehicle and plant maintenance and servicing is *ad hoc* and scattered and has no hard surfaces, banded floor area, drip trays, etc. This implies a number of areas where the risk of spillage of fuel, oil, hydraulic oil, and resultant soil contamination is high
- There is no spill containment structure beneath and around the used oil storage cage, resulting in the risk of uncontrolled discharge of pollutants into the environment.
- No oily-water separator is in place.
- There is no spill containment structure beneath and around the vehicle refueling station and generator supply fuel tank resulting in the risk of uncontrolled discharge of hydrocarbon pollutants into the environment
- Field maintenance of plant (bulldozers) and ore trucks occurs currently on the overburden dump resulting in the risk of uncontrolled release of pollutants into the environment (oil, hydraulic fluid, etc.). Many of the vehicles were seen to be leaking oil.
- The fuel storage facility at the central blending yard is inadequate (no hard surface, no bunding, no drip trays etc.) resulting in the risk of uncontrolled discharge of pollutants into the environment.
- The above-ground fuel pipeline feeding the generator is vulnerable to being broken by passing plant or vehicles resulting in the risk of uncontrolled discharge of hydrocarbon

- pollutants
- The diesel tank used to supply heat-generating equipment for the workshops is not fitted with vapor venting equipment, there is no filler cap and no spill containment facilities around the filler point resulting in the risk uncontrolled release of hydrocarbon pollutants into the environment
- There are scattered accumulations of scrapped equipment, some of which may contain pollutants such as oil and hydraulic fluid with resultant risk of uncontrolled discharge into the environment

5.11 Social

5.11.1 Overview

The Middle Timan Bauxite Mine is situated in Knyazhpogostsky District of the Komi Republic with the nearest settlements being the village of Chin'avoryk (142 kilometers to the south of the mine) and the city of Ukhta (150 kilometers to the southeast). There are no directly affected communities in the mining area but the access road and railway line joins the main road and railway line at Chin'avoryk, where the community is directly affected by road and rail activities associated with the mine.

Beyond the directly affected community of Chin'avoryk, community issues focus to a much greater extent on the potential social benefits of the mine and mine expansion such as job creation and social investment in those communities. Environmental NGOs that have an interest in the mine and its potential impacts on the environment are mostly located in Syktyvkar. Non-governmental Organizations (NGO's) with an interest in Timan Bauxite's activities are listed in Table 12.

Table 15: Non-governmental Organizations (NGO's) that have an interest in the MTBM, together with their areas of interest and the location of their offices.

Name	Interest	Location
Komi Kotyr	A network NGO dealing with national culture development	This NGO is has branches in Emva and Ukhta being not very active last years
The Safe Pechora Committee	Network organization	Pechora, Ukhta, Syktyvkar
The Memorial	Komi branch of all-Russia NGO focusing on human rights	Syktyvkar
Greenpeace Russia.	Public campaign with a view to inform public opinion	Komi
Association of small business development	Community development/SME support activities.	Syktyvkar

5.11.2 Charitable contributions/social development

Timan Bauxite provides support to local schools in Emva and Chin'avoryk and the hospital (maintenance, purchase of computers etc.). In addition the local church in Emva has been supported as well. In general Timan Bauxite responds to requests that are put to the company and this is done in a largely *ad hoc* manner. The risk of operating in this manner is that unfounded expectations are created of what will be included in the social investment programme. As will be described later, during the public meeting in Chin'avoryk, questions were asked about a school and a hospital that were 'promised' by the mine.

5.11.3 Ongoing public consultation

The mine has had public consultation in the context of environmental assessment processes most notably as part of the OVOS for the expansion of the mine to 2.5 mtpa (2002), and the working project for the establishment of the car and railway bridge that crosses the Vym¹² River (1999). However, there are no established forums for ongoing consultation outside of the OVOS requirements.

5.11.4 Public consultation in Chin'avoryk and Yemva

During the course of the audit, two public meetings were held to gauge the state of the relationship between the mine and surrounding communities. These were held in Chin'avoryk and Emva respectively. During the course of the meetings, the following issues emerged as community concerns (see Appendix B for the proceedings of the public meetings).

5.11.4.1 The mine access road

The mine access road was initially used for transporting bauxite from the mine to the rail siding at Chin'avoryk. During this time there was a problem with 'red (bauxite) dust'. However, the opening of the railway line in 1998, and the transport of bauxite by rail, has alleviated this problem. That said, the condition of the access road is an important concern to local residents, including access to the road and dust from vehicles using the road.

That section of the road does not belong to the mine and is the responsibility of M-222 (a state enterprise within the Ministry of Internal Affairs that manages labor in the prison labor settlement [обеспечивает организацию трудового процесса в колонии, расположенной вблизи Разъезда Макарова]. The road is used by M-222 for transporting timber and they are technically legally responsible for the state of the road (although MTBM assists with the maintenance of the road). Nevertheless, the perception in the community is that MTBM is responsible for the state of the road and thus concerns and issues are directed at the mine.

5.11.4.2 Borrow pits for construction of the railway

There are a number of localized borrow pits that were reportedly used for the construction of the railway line and these have impacted on the local forest area. Borrow pits seen by the audit team were not rehabilitated in any way although it is not clear what regulatory requirements were specified in terms of rehabilitation. In addition the dumping of surplus material has blocked some pathways through the forest. While it is recognized that these were the actions of the sub-contractors who built the railway, the cradle-to-grave philosophy of modern environmental management dictates that the owner and user of the facility bears responsibility for impacts associated with both the construction and operation of the facility. Interestingly, the state of the forest itself along the access road (the patches of forest dieback) was not raised as an issue in during the public consultations.

¹² It is worth noting that the representative of Greenpeace Russia was complimentary about the process that had unfolded regarding the bridge.

5.11.4.3 Rail crossings

There was also a concern raised that there is a difference between the design of the rail crossing and what ultimately was constructed. The community indicated that there is no direct road access to the rail crossings as a result but the audit team was not able to further investigate this issue. While it is not possible to assess the significance of this issue it is important that it be noted as a public concern.

5.11.4.4 Perceived radioactivity in the bauxite

During discussions with the mine ecologist a public concern about radioactive materials in the bauxite was raised. The mine ecologist explained that in response to the concern, the mine had conducted a detailed investigation including measurements and concluded that there was no risk of the presence of radioactive materials in the bauxite. Although this had been communicated to the community, it was once again raised during the public meeting suggesting that communication with local communities can and should be improved.

5.11.4.5 Jobs and social investment

Not surprisingly, job creation and social investment feature prominently in public consultation. In terms of job creation there is a concern about career opportunities for young people in the communities. To this end communities requested that the mine consider education and training programmes that would make such people eligible for any work opportunities that may become available at the mine.

There is an obvious need for social investment in the area and an expectation that the mine would continue to provide such support. At the same time an issue raised during the public meeting in Chin'avorak was that there had been a promise of a school and a hospital in the area. It was not clear who made the promise but it was perceived within the community that the mine had made the promise.

5.11.5 Environmental NGO Concerns

Public consultation, within the previous EIA processes, highlighted environmental NGO concerns as related the ichthyological reserve "Vymski" (protected area close to the mine). The issue is that some of the deposits that may be mined as part of the expanded operation could impact on this protected area and that the mining of ore body 11 would result in an impact on the Vorykva river and the possible draining of the river. These issues must obviously be addressed during the expansion of the mine.

In general the NGO concerns relate more to the proposed integrated aluminium development than they do to the mine itself. Concerns regarding the development of the refinery and the smelter relate to the degree to which local communities will benefit from those developments versus the degree to which 'big business' will benefit.

5.11.6 Institutional/administrative capacity

Russian legislation dictates that public consultation must be lead by the local authorities. In the case of the mine, this means that the Knyazhpogost District is responsible for public consultation. Although the District has adequate administrative capacity, some concern exists as to their ability to deal with conflict issues during public consultation. There are also concerns about whether public consultation will be broadly based enough, to meet good practice requirements (and the IFC/EBRD requirements specifically) for public consultation. At the same time the capacity of the Chin'avoryk Administration in conducting public meetings could and should be improved. As a result capacity should be built in both the local authorities and interested parties during further consultation to ensure that both practice principles are upheld.

5.11.7 Communication with communities

In a related manner to that described earlier, the current administrative structures present an obstacle to direct communication with interested and affected communities. The reason for this is as described above, that federal regulations dictate that local authorities are responsible for public consultation. What is positive about this arrangement is that there is a good relationship between the mine and the local authorities. However, there is no mechanism for direct communication between the mine and the local communities. At the same time consultation on behalf of the mine, by the local authorities, also presents a platform for raising issues with the local authorities that may have little or nothing to do with the mine.

5.11.8 Small business development

Small business interests in the Knyazhpogost District are mostly represented by individuals (634 individuals and 20 SME are registered in Knyazhpogost district). The Komi Association of small business development (Syktyvkar) and the Ministry of Labor (SME department) mostly focus on the development of small business in the cities. There is a Knyazhpogost representative who promotes the interests of the SME community in the district but it does seem that the strategy of promoting SME development in the cities to a greater extent than in the rural areas, will require some additional thought to ensure that a more rural district, like Knyazhpogost, is also able to benefit from SME opportunities that may be presented by the mine.

In addition, parallel investigations conducted by the IFC (Private Enterprise Partnership - PEP) reveal that:

- Local SMEs are principally traders or service providers to the large industries in Komi
- Local SMEs are rarely competitive – tend to be more expensive than 'outside' suppliers
- The SME development potential of the mine is very limited (2-3% OPEX is on goods manufactured in Komi)
- Bank financing for SMEs is limited – high interest rates and very short-term loans (typically one year)
- Generally high skills levels – solid educational institutes
- Relatively high average wages drive demand for outsourcing
- Proactive support for SME development by Komi government and mayor of Ukhta
- Local business associations in Ukhta lead by energetic leaders

5.11.9 The prison and prison settlement

Ukhta is recognized for having being the administrative centre of a number of Gulags during the Soviet Era, which ceased to exist in the 1980s (and earlier in some regions of the country). Currently there is a prison for criminals as well as a prison settlement off the mine access road. Although these facilities are in relatively close proximity to the mine, the mine makes no use of forced or prison labor. Indeed it is stated SUAL policy that no forced labour be used within any of its operations and at a broader scale, no forced labor is currently acknowledged in Russia.



Plate 23: The prison settlement “Makaov’s Halt” on the access road to the mine

5.11.10 Indigenous populations

The location of the mine implies that impacts on indigenous peoples need to be considered. The Komi Republic is the titular area of one of the major Northern ethnic groups namely the Komi, and the ethnic homeland of several other Northern indigenous peoples, including the Nentsy, Khanty, and Mansi. Russian legislation makes provision for protecting the rights of indigenous peoples, their environment, traditional land use practices and life-style. For instance, a special regime of the territories of “traditional nature resource use” was introduced whereby special permission be obtained for development projects in these territories.

The local population is mostly non-native but there are several Komi families living in Chin'avoryk. They identify themselves as Komi but do not maintain a traditional livelihood¹³. There is no evidence of reindeer pastures and temporary settlements of indigenous peoples maintaining traditional land use practices (reindeer-raising) in the mine vicinity. There is also a special policy on 'small-numbered indigenous peoples' in the Russian Federation. The Federal Law "On Guarantees of the Rights of Small-Numbered Indigenous Peoples of the Russian Federation" sets out the following definition of small-numbered indigenous peoples of the Russian Federation.

Article 1.

Small-numbered indigenous peoples of the Russian Federation (referred further as 'small-numbered peoples') – peoples that reside in traditional ancestral territories, preserve traditional lifestyle, land use practices and crafts, have a population less than 50,000 people in the Russian Federation and identify themselves as independent ethnic groups. The Government of the Russian Federation shall approve the united list of small-numbered indigenous peoples of the Russian Federation based on proposals submitted by state authorities of the Subjects of Federation in which territories these peoples reside.

Those peoples that are not included on the official list of small-numbered indigenous peoples are not subject to special care of the Russian government. Since the Komi is not scheduled (they are among major ethnic groups of the North and Siberia) they do not need to be considered in this category.

In addition the World Bank provides a general definition of indigenous people and criteria for their identification. Indigenous peoples can be identified in particular geographical areas by the presence in varying degrees of the following characteristics:

- a close attachment to ancestral territories and to the natural resources in these areas;
- self-identification and identification by others as members of a distinct cultural group;
- an indigenous language, often different from the national language;
- the presence of customary social and political institutions; and
- primarily subsistence-oriented production. (OD 4.20, para. 5)

During the course of the audit it became evident that:

- There are no territories recognized as ancestral territories within the affected area.
- The Komi identify themselves as a separate ethnic group and during the last several years have become increasingly interested in their cultural heritage in Komi. The movement for cultural revival and development has become powerful.
- The Komi have their own language. At the same time, those people who identify themselves as the Komi consider both Komi and Russian languages as native languages and use them both for communication in their private life.
- In the Knyazhpogostsky District there is an NGO Komi-Kotor engaged in cultural revival. No specific national social and political institutions are in the district.
- Those Komi who live in Chin'avoryk Village people in Chin'avoryk do not keep traditional livelihoods, their lifestyle is not distinct from the rest of the local community.

Based on these findings the only native people to be affected by the mine are the Komi of Chin'avoryk and this is not an impact that would disrupt their traditional lifestyle. That said, maintaining dialogue with the NGO Komi-Kotor as a champion of Indigenous People's rights will be an important part of the overall consultation process.

¹³ It should be recognized though that many IP lost their traditional lifestyle because of forced government integration. Many are seeking to return to those traditional lifestyles.

5.11.11 Audit findings for social impacts

The following are the key audit findings in terms of social impacts of the mine (as they apply to the current operations at 1.5 mtpa):

- The Middle Timan Bauxite Mine is situated in Knyazhpogostsky District of the Komi Republic with the nearest settlements being the village of Chin'avoryk (142 kilometers to the south of the mine) and the city of Ukhta (150 kilometers to the southeast).
- There are no directly affected communities in the mining area but the Chin'avoryk community is directly affected by road and rail activities.
- Beyond the directly affected community of Chin'avoryk, community issues focus to a much greater extent on the potential social benefits of the mine and mine expansion such as job creation and social investment in those communities.
- Environmental NGOs that have an interest in the mine and its potential impacts on the environment are mostly located in Syktyvkar. Non-governmental organizations (NGO's)
- Timan Bauxite provides support to local schools in Emva and Chin'avoryk and the hospital (maintenance, purchase of computers etc.). In addition the local church in Emva has been supported as well. As will be described later, during the public meeting in Chin'avoryk, questions were asked about a school and a hospital that were 'promised' by the mine.
- Based on these findings the only native people to be affected by the mine are the Komi of Chin'avoryk and as a result it is not necessary to prepare an IPDP.
- The mine has had ongoing public consultation in the context of environmental assessment processes most notably as part of the OVOS for the expansion of the mine to 2.5 mtpa (2002), and the working project for the establishment of the car and railway bridge that crosses the Vym River (1999)¹⁴.
- Although there are prison facilities are in relatively close proximity to the mine, the mine makes no use of forced or prison labor. Indeed no forced labor is currently acknowledged in Russia
- No indigenous people are affected by the mines activities but attention needs to be paid to ongoing communication with NGOs representing indigenous peoples

The following gaps have been identified in terms of social impacts:

- Communication appears to be less than adequate with community concerns pertaining to:
 - Rail crossings
 - Radioactivity in the bauxite
 - Maintenance of the road
- Communities requested that the mine consider education and training programmes that would maximize the number of people eligible for any work opportunities that may become available at the mine.
- There are expectations of social investment that may or may not be met by the mine
- Environmental NGO concerns relate to the possible impact of mining ore body 11 and the impact that may have on the Vorykva river
- In general NGO concerns relate more to the proposed integrated aluminium development than they do to the mine itself. Concerns regarding the development of the refinery and the smelter relate to the degree to which local communities will benefit from those developments versus the degree to which 'big business' will benefit.

¹⁴ It is worth noting that the representative of Greenpeace Russia was complimentary about the process that had been used to authorize the railway bridge.

- While the Knyazhpogost District has adequate administrative capacity, concerns exist as to their ability to deal with conflict issues during public consultation. At the same time there are concerns about whether public consultation will be broadly based enough, to meet good practice requirements (and the IFC/EBRD requirements specifically) for public consultation. The capacity of the Chin'avoryk Administration in conducting public meetings could and should be improved.
- There are no established forums for ongoing consultation outside of the OVOs requirements.
- SME development focuses on the cities to a greater extent than in the rural areas implying that a more rural district like Knyazhpogost may not fully benefit from SME opportunities.
- There are some major barriers to the growth of SMEs including lack of credit access, the generally higher prices charged by local small businesses, low OPEX by the mine on local suppliers and several others.
- Maintaining dialogue with the NGO Komi-Kotor as a representative of IP will be necessary and desirable.
- In general Timan Bauxite responds to social investment requests that are put to the company in a largely *ad hoc* manner. The risk of operating in this manner is that unfounded expectations are created of what will be included in the social investment programme.
- The socio-economic baseline in the Komi Republic needs to be more clearly defined in preparation for the later environmental assessments.

5.12 Monitoring of environmental performance

The mine conducts extensive environmental quality monitoring and spends between 1.6 and 2.5 million rubles (USD 52,000-82,000) annually on this activity. Environmental monitoring is divided into two broad groupings, which are illustrated together with the variables that are monitored in each group in Figure 9. These two broad groupings are:

- On-site environmental monitoring (viz. in the area of mine operations) including drinking water monitoring;
- Integrated environmental monitoring (approved by the Main Department of Natural Resources).

5.13 On-site environmental monitoring

The purpose of on-site environmental monitoring is to 'provide environmental protection measures, rational nature use and environmental legal compliance'¹⁵. The mine's environmental monitoring plan has been approved by the Main Department of Natural Resources in Komi Republic and Chief Sanitarian Doctor in Knyazhpogost District. This Plan includes:

- Maximum permissible emissions (MPE) compliance control including dust, particulate matter, nitrous oxide, carbon monoxide, soot and sulphur dioxide must be measured once every quarter for the following specific sources¹⁶ (with the remaining sources requiring less frequent monitoring):
 - Diesel (three) generators (for NO₂ and CO);
 - Boiler (for all the components);
- Industrial (ambient) air quality monitoring on the SPZ boundary (quarterly).

¹⁵ State Law "On Environmental Protection", art. 67.

¹⁶ In practice the emissions are calculated rather than measured, as a function of the number of units that were operational together with the quantity of ore mined in the defined period.

- In addition to the approved procedure, MTBM uses snow analysis as an indirect method of air quality control.
- Air quality control in the operational area and working settlement (once a year).

In addition to the above air quality parameters, additional physical parameters (vibration and noise) are monitored in accordance with the approved monitoring programme. These include drinking water supplies from the borehole. Bacteriological parameters are monitored by the Centre of GosSanEpidNadzor in Ukhta and Sosnogorsk (Komi Republic), in three locations namely the water tower, the artesian well and the bibcock in the dining room. Chemical analyses are also conducted on the borehole water (these are presented later in monitoring summary table).

In general the monitoring is organized effectively and in compliance with the approved monitoring programme. The required air quality monitoring on the SPZ boundary is currently being established, with plans in place to conduct the monitoring in the fourth quarter of the calendar year. The mine has no formalized discharge into natural water bodies and it is for this reason that there is no provision for the monitoring of discharge/effluent water from the mine.

5.14 Integrated Environmental Monitoring

The program for integrated environmental monitoring was developed in accordance with recommendations of Main Department of Nature Resources and State Environmental Review (SER). It includes:

- Geological monitoring
- Ecological monitoring
- Monitoring of fish reserves

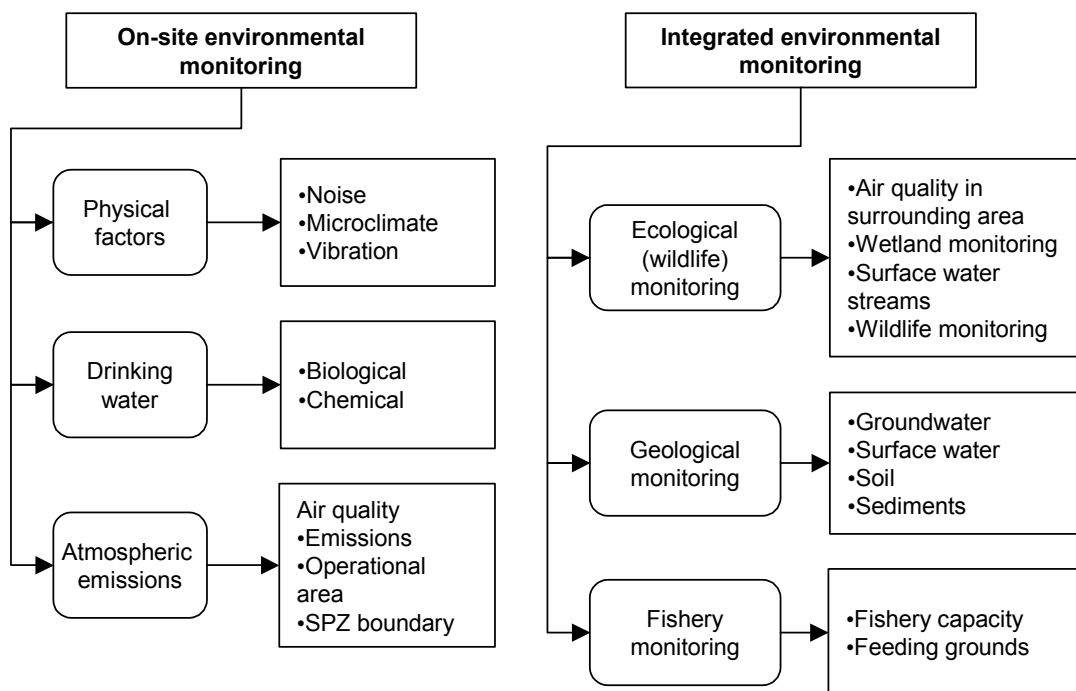


Figure 9: Schematic illustration of the environmental monitoring system at the MTBM.

Although discrete components, they are closely co-ordinated and to some extent are based on the same monitoring sites and methods. To date no direct impact on the environment has been detected and the monitoring mostly focuses on background data collection in order to establish baseline conditions baseline for both OVOS studies and continued environmental management.

5.14.1 Geological monitoring

Geolog Ltd, was contracted to carry out monitoring of geological media with the purpose of assessing the current state of the environment and MTBM impacts. In order to do so, the following studies have been undertaken:

- Continuous hydrogeological and hydrological surveillance (ground and surface waters). Hydrogeological monitoring is conducted using the boreholes drilled for geological investigations.
- Plotting the spatial extent of environmental and geochemical investigations including litho-geochemical distribution (soils), aero-geochemical (snow), hydro-geochemical (bottom sediments) and bio-geochemical (concentration of trace elements in plants).

The monitoring procedure includes annual sampling of the media mentioned above with analysis based on spectral analysis supplemented in some instances, by chemical assessment methods.

Based on the above the following conclusions have been drawn regarding environmental monitoring that took place in 2002:

- There are no discernible impacts on the groundwater and groundwater quality has not changed during the monitoring period. However, according to the monitoring report¹⁷, there is the exception of the three monitoring boreholes on the quaternary aquifers where a layer of mineral oil has been detected of between 3 and 10 cm thick. Given the nature of the contamination and the fact that there is no evidence of such contamination in the immediate area or in adjoining wells, it has been concluded that the contamination has occurred through deliberate pouring of fuel into the wellhead. The report contains the recommendation that the boreholes should be closed.
- Using visual methods (direct observation of snow colour) the zone of impact on ambient air is limited to the mine operations area and immediate vicinity – up to 300 m away. No clear evidence (within data on snow chemical analysis) of how big is the impact area has been found.
- The chemical analysis of surface water indicates concentrations of iron that exceed the maximum permissible concentrations (MPC) – in some locations considerably so. This can be caused both by anthropogenic and natural reasons but there is no direct evidence that it has been caused by the mine.

Ecological monitoring

The Institute of Biology (URB RAS) was contracted to carry out ecological¹⁸ monitoring including:

- Chemical analysis of snow – the chemical composition of snow and melt waters was derived from analysis of six snow samples. The analyses confirmed that the chemical composition of the melt water complies with water quality standards for fishery reservoirs and is therefore unlikely to pose a risk to the same. It is also expected that snow surveys will continue to be used for indirect monitoring of air quality. The data are compared with background measurements (samples taken in 'pristine' areas removed from the mine). This method provides reliable data in the context of longer term monitoring.
- Vegetation monitoring (state of photosynthesis and plant species composition) – Vegetation monitoring has included the identification and allotment of botanical sites, characterization of the state of photosynthesis and species composition for water and terrestrial ecosystems and finally the chemical composition of test species (mosses and lichens) has been analyzed. The mosses and lichens were used as indicators of air quality. Based on the above investigations there are indications of elevated metal concentrations (including iron and aluminium). The report¹⁹ concludes that the concentration of metals increases towards the mine. All samples have higher level of metals than samples from 'pristine' areas.

¹⁷ Организация и ведение мониторинга геологической среды на Везано-Ворыквинском месторождении бокситов в 2001-2002 г.г.». Отчет. – ООО «Геолог», 2003 г.

Organisation and implementation of geological minitoring on Vezhano-Vorykvinski Bauxite Mine in 2001-2002 – "Geolog" JSC, 2003.

¹⁸ Ecological monitoring is focused on establishing a baseline and early identification of impacts related to MTBM should these arise.

¹⁹ Проведение мониторинга состояния наземных экосистем в зоне влияния СТБР». Отчет о результатах НИР – Сыктывкар, 2002.

"Monitoring of the geological media on MTBM affected area" – Institute of Biology, 2002, Syktyvcar.

- Soil monitoring - Soil monitoring covered two aspects:
 - biocomplex surveillance (surveillance on biota transforming plant substrate (litter) into soil organic matter) and monitoring of content and composition of soil organics (humus and transformed litter)
 - monitoring of key biogenic elements and pollutants, pH and physical properties of soil.

The monitoring procedure includes large-scale soil mapping as a function of soil descriptions and sampled soil properties. Geobotanical investigations and plant sampling (which is conducted on a biennial basis) are used to supplement this information. Again analysis of soil chemical composition shows elevated concentrations of metals (including Fe and Al), sometimes significantly high concentrations) in samples analyzed, compared to existing standards. Nonetheless no particular conclusions can be drawn at this stage and monitoring will continue.

- Wildlife monitoring – this has included direct zoological studies on species diversity, surface vertebrate population and distribution within biotypes. The investigation was focused on hunting-and-game fauna and specially protected species and produced the following findings:
 - The establishment of the MTBM and subsequent operations has caused losses in hunting reserves due to land use and fragmentation as a result of the road and rail construction. The effect is not considered significant though given that the size of the area affected is relatively small compared with the spatial extent of the surrounding woodlands.
 - There are no threats to rare and/or endangered species as a result of MTBM's activities.
 - A concern that has emerged is improved access to the area as a result of the development of the mine/infrastructure with a possible increase in poaching.
 - Habitat conservation is considered a significant factor in reducing possible impacts on rare species (including goose and swan species). The linear facilities of the road and railway line have fragmented the habitat and as a result it will be necessary to provide some form of mitigation in the form of possible 'safe havens' along the Vym and Vorykva valleys.
- Radiological monitoring - radiological monitoring has focused on monitoring radiation level in the workplace (both operational area) and living quarters. Radiation has been measured using standard methods and testing equipment. Measured radiation levels are in compliance with national standards and there are no radiation impacts on either biota or humans within MTBM area.

Monitoring of fish reserves

Monitoring of fish reserves is conducted to define the significance of MTBM impacts on game fish populations and their feeding grounds. The mine's license prescribes the monitoring of fish reserves, for which a programme has been approved by Republic Federal State Agency Komirbyvod. The programme includes:

- Monitoring of surface water chemical composition;
- Counts of fish populations, structure and density;
- Study of salmon breeding redds: their filling with spawn and density of spawning nests;
- Estimation of benthos species composition, population and biomass.

Monitoring of fish reserves is conducted by Institute of Biology (URB RAS) by request of FSA Komirbyvod and the results presented in a report. Results from a surveillance conducted during 2002 includes a description of the climatic and hydrological features of the Vym catchment area and environmental conditions of the Vym' and Vorykva rivers. The temperature and water regime of the Vym catchment area is extensively described and the riverbed characterized along its full length. This characterization include a description of the state of feeding grounds within the river, which are described as sufficient and diverse.

Water quality in the Vym' and Vorykva Rivers has not changed over the last three years despite the mine's activities in that time. Water quality has remained good along the full length of the rivers with turbidity, oxygen content and pH continuing to meet the standards set for salmon rivers. Moreover, the quality of the Vorykva was comparable to that of Ural tributaries of the Pechora River, which are not directly subject to anthropogenic pressures.

An evaluation of the state of spawning shoals in the two rivers indicated that this was satisfactory with no obvious decreases in breeding numbers being identified over the life of the mine. However, it was noted that unfavourable hydrometeorological conditions (average yearly temperatures, precipitation, ice formation etc.) significantly influenced the North Dvina salmon spawning with the season having starting earlier than normal and under increased water level conditions. In addition an assessment of the biological characteristics of the European grayling and Siberian whitefish populations (the most abundant species in the Vym' catchment) suggested that the environmental conditions are generally less favorable in the upper reaches of the Vym than they are in the upper Vorykva. It is considered that bridges may be responsible for this slight deterioration of the environmental conditions of the upper reaches of the Vym'

Table 16: Environmental monitoring conducted by the mine together with the frequency of measurement and the party responsible for the monitoring:

Parameter	Frequency	Responsible party
Geological monitoring	Periodic	Ukhta branch of JSC (Polyarnouralgeologiya)
Fish stock monitoring	Annually	KOMIRYBVOD
Terrestrial ecosystem monitoring	Once In two years	Institute of Biology, Komi Research Center, Russian Academy of Science, Ural Division and Geolog LTD (soil, surface water, within geological monitoring)
Monitoring dynamics of the extent of landscape structure degradation	Once In two years	
Soil monitoring	Annually	
Flora and vegetation monitoring	Annually	
Reclaimed land monitoring	Annually	
Fauna monitoring (terrestrial invertebrates)	Annually	
Radiological monitoring	Annually	
Hunting ground monitoring	Every two years	Hunting division of Komi Republic
Surface water and ground water quality	Quarterly	Ukhta branch of JSC (Polyarnouralgeologiya)
Air quality and air emissions	Quarterly	Institute of Biology, Komi Research Center, Russian Academy of Science, Ural Division

In addition, to the mine co-ordinated monitoring programme, the state environmental protection body (KR HANR) conducts comprehensive inspections of the mine operations annually. A review of these inspection reports did not reveal any significant claims against the mine for regulatory or permit transgressions/violations.

5.14.2 Pollution payments

Pollution payments to the authorities are summarized in Table 14. Note that these figures exclude payments for the use of the minerals.

Table 17: Pollution payments made by the mine during 2002

Item	Payment	
	Rubles	Dollars
Air pollution emissions, waste water discharges and waste disposal	106,000	3,475
Natural resource use (land and water)	439,000	14,393

5.14.3 Audit findings for environmental monitoring

The following are the key audit findings in terms of environmental monitoring of the mine (as they apply to the current operations at 1.5 mtpa):

- The mine has an extensive monitoring programme that addresses a range of environmental monitoring requirements for a variety of media (see Figure 9 and Table 16 for listings of the environmental variables that are monitored. In addition a summary of the monitored data is presented in Appendix E). This monitoring programme is considered by the audit team to be an important environmental management asset.
- The integrated environmental monitoring program has been developed and approved by Timan Bauxite top management and MDNR.
- With some exceptions (monitoring of ambient air quality in the mine operational area and on the SPZ boundary) the monitoring programme has been fully implemented. The outstanding items will be implemented in the last quarter of 2003.
- There are no obvious exceedances of the WBG, EBRD or Russian standards in the monitored data (see Appendix E).
- There are, however, elevated concentrations of metals, including iron (Fe) and aluminium (Al) in several media which most likely are caused by natural reasons..
- Off-site environmental is mostly focussed on establishing a baseline.

The following gaps have been identified in terms of environmental monitoring:

- There is no monitoring of surface water runoff, which is likely to be characterized by at least high suspended solids loading and possibly other chemical parameters.
- The main source of impact on terrestrial ecosystems is dust. Air pollution monitoring is based on indirect measurements (mosses, lichens and snow). To get a proper understanding of the impact of the mine it is necessary to add direct fall-out²⁰ measurements.

²⁰ According with the interview with contractors, this work is partly started in 2003.

- The wide range of metals is measured in the monitoring procedure. Although useful in terms of a general assessment of the state of the environment and establishing a baseline, impact monitoring requires a specific focus on the pollutants specific for bauxite mining (Fe; Al).
- The relationship between the mine's activities and the elevated concentrations of iron and aluminium in surface water, vegetation and soil needs to be fully investigated. This to ascertain the degree to which these elements occur naturally versus the degree to which they occur as a result of the mine's activities.
- Links between the monitored data and corrective actions are not yet well developed. Some of the monitoring (for example the extended list of cations) appears to be conducted for the sake of monitoring, rather than for the sake of management.
- Different contractors currently implement the integrated environmental monitoring program and report separately. Although there is some co-ordination of effort through distribution of responsibilities, informal communications and discussions, it is considered that joint reporting would be an important improvement.

5.15 Health and safety

5.16 Health and safety management

The Health and Safety function at MTBM falls under the auspices of a Health and Safety Service which is headed responsibility of a Deputy Chief Mr Kaduk. MTBM has prepared and implemented a Health and Safety management protocol. The protocol provides for the following:

- A Health & Safety management policy;
- The roles and responsibilities for personnel in implementing the system; and
- Procedural instructions for Health & Safety issues.

Annually, the Service prepares information for the General Director and for the Annual General Meeting of shareholders. This information is prepared on the basis of an analysis of the Health and Safety issues within the given reporting period. It includes:

- The number of injures and accidents
- An analysis of reasons for the injuries and accidents
- A list of activities that have been planned, those carried-out and any reasons for non-delivery of planned actions
- The results of surveillance bodies examination and control and results of the internal audit); and
- Planning proposals for the next year's activities.

The annual reports and discussions with key personnel form the basis of the information provided in this audit.

5.16.1 Medical facilities

The mine holds a Contract with a medical entity located in the Nyagan' City to provide medical services to staff. In addition, the mine's staff comprises medical specialists who monitor the workers' health and provide prior shift control. Medical facilities providing first aid support are available at the mine. All staff are required to undergo an annual medical examination and are evaluated against a medical index that is specified in the Health and Safety protocol.

In cases where the on-site facilities are inadequate to deal with injuries a specially equipped vehicle transports deceased and traumatized workers to a hospital in Nyagan'. If necessary, a helicopter can be used for the medical transportation. First aid is rendered on site as a preference though.

The medical facilities are considered adequate for on-site treatment of minor injuries. The provision of transportation to better equipped facilities by road and air augments the on-site facilities and is also considered to be good.

5.16.2 Adherence to regulatory requirements

5.16.2.1 Safety declaration

The Safety Declaration of the dangerous industrial objects was developed for MTBM by Severouralsky Specialized Project Institute (SPI) "СУБР-проект" in 2001 and submitted to Pecherskiy District Municipality (PRA) of Gosgortekhnadzor of Russia for approval. The expert commission of the Committee on the Civil Defense and Emergency Measures of the Komi Republic agreed with the safety measures proposed in the Declaration (decision N 12/79 – . 17.01.2002). Furthermore, the Municipality has registered the mine under N 47-PD-00497-2002 and approved the findings of the Declaration.

The Declaration includes provision for a number of dangerous manufacturing materials, which include: basic stock of explosive materials, explosive materials short-term consumption stock and unloading site of explosive materials and storage facilities for explosive materials. The analysis of industrial injuries occurrence and the responses to injuries included in the safety Declaration. Section 3 of the Declaration provides management measures to ensure legal requirements in relation to the following issues:

- Expertise of project industrial safety (expertise done);
- Registration of dangerous manufacturing objects (DMO) in the list of Gosgortekhnadzor (DMO are registered in the Pechorskii District Municipality);
- Insurance of civil responsibility for the caused harm to life, health and environment in case of occupational injuries (the civil responsibility is insured, the staff insurance agreement is available; insurance payments for injuries – payments for injuries within 2001-2002 paid out);
- Licensing of the activity in the area of industrial safety (licenses and permits of Gosgortekhnadzor of Russia, Gossanepidemnadzor, the Territorial Committee on the Civil Defense and Emergency Measures have been received);
- Organization and conduct of manufacturing control on industrial safety requirements observance (Regulation manufacturing control conduct was developed as a part of Declaration);
- Certification of technical facilities for compliance with requirements of safety standards (Certificates for Technical Terms on DMO received and introduced to Gosgortekhnadzoru); and
- Staff training (procedure of staff training of Industrial Safety issues, it has been developed and it is in compliance with the requirements of Gosgortekhnadzor and Ministry of Labor of the RF).

In addition to the above a number of standard documents of Gosgortekhnadzor of Russia have been revised, including:

- The Unified Safety Rules on the minerals mining (PD 03-498-02);
- The Unified Safety Rules within the explosion works (PB 13-407-01), and
- Instruction on warning, discovery and liquidation of the misfired charges of explosive

materials on the earth surface and in the underground workings (PD 13-552-02).

5.17 Emergency response plan

No Emergency Response Plan was available during the audit and is to be developed separately from the Safety Declaration. The Emergency Response Plan is still to be approved by the enterprise management.

5.17.1 Accidents at MTBM and key sources of risk

5.17.1.1 Accidents

Within MTBM the following official classification of accidents is adhered to:

- Accident with a lethal outcome and a group accident (2 and more sufferers);
- Disabling injuries (causing limitation of ability to work and disablement); and
- Mild (without limitation of ability to work).

In other periods under review, there were no officially registered employee accidents nor were any incidences of work related illness identified. The potential for worker accidents is increased due to the current working conditions of the labor force. The 11-hour shift period over a 28 day rotation will result in worker fatigue, potentially creating risk of accident, which is not accounted for directly in the health and safety protocol.

5.17.1.2 Transportation related facilities

On the whole, transport facilities are well organized, the roads are good, pits and bumps are absent, there is a possibility for safe maneuverability and double-track road for transport coming from the opposite direction, light and sound signals are in good working order and are observed in accordance with the regulations. A few areas on non-conformance were identified at the site, including:

- Informal pedestrian rail line crossing used by personnel and visiting scientists and absence of train warning signs;
- Inadequately equipped outdoor vehicle maintenance facility (no heavy lift equipment, gantry, stairs, proper lighting);
- Uncovered and poor visibility in vehicle servicing pit inside workshop, with resultant risk of falls;
- Sharing of mine roads by both ore trucks and general traffic, where vehicles are not fitted with adequate safety signals (flashing warning lights, flagged aerals etc.);
- Presence of non-earth moving vehicles in the mining pit without adequate safety signals (flashing warning lights, flagged aerals etc.); and
- The non-functioning of the reversing warning signal of ore trucks (one truck observed in this state).

These areas of non-conformance are considered to be of a minor nature and should be easily rectified.

5.17.1.3 Blasting

Explosive materials delivery to the mine is provided within 24 hours. The preparation process for the explosions is done in conformity with the procedure of the Unified Norms of explosive material Operation. All staff and subcontractors are informed in advance about the operation.

When blasting is conducted, an official notification on the date, time and place is issued. The dangerous zone is fenced, light and sound signaling is provided during blasting activities.

5.17.1.4 Electrical facilities

The electrical reticulation system does not appear to coincide with general mine planning. Inadequate design of electrical reticulation systems at bauxite blending yard and within settlement area (e.g. cables strung too low and laid on the ground) resulting in the risk of electrical shock and fire.

5.17.1.5 Personal Protection Equipment (PPE)

The working places around the mine have been classified according to the potential risks to which workers may be exposed. In response to the risks identified, safety measures are implemented, including personal protection measures for the staff (ear protection against increased noise levels etc.) and measures on reducing the source of risk (such as engineering-technical measures).

However, during the course of the audit a number of occupational health and safety contradictions of best practice were identified, including:

- Mechanics, welders, etc. not using safety harness PPE when working higher than 2 m above ground, and no harness attachment scaffold;
- Mechanics, welders, etc. not consistently wearing appropriate PPE (e.g. full face mask welding shield, gauntlets, steel toe cap boots);
- Personnel servicing and working in close proximity to generators not wearing PPE (in particular hearing protectors); and
- Machine operators in bauxite blending yard not wearing PPE (in particular hearing protectors).

5.17.1.6 Fire risks

The fuel storage area is not bunded, nor are there preventive valves, systems of air lines with steam purification, level control of tank filling in, protection from static electricity, safety level measurement etc. Therefore, the fuel storage area presents a significant fire risk and may also result in ecological impacts. In addition, diesel fuel is stored in unventilated indoor conditions. The informal placement of field equipment maintenance activities (e.g. including the storage of oil and hydraulic fluid) adjacent to an informal field kitchen (open fire) poses significant fire risks.

The significance of the fire risks is increased as a result of an inadequate fire protection system within MTBM. The following facilities are absent: extinguishing equipment, alarms, evacuation and muster point plans, absence of fire extinguisher service certificates, etc.

5.17.2 General

The following general areas of health and safety concern were identified throughout the site:

- Scattered accumulations of scrap metal and scrapped equipment creating obstacles and creating the potential for minor injuries;
- Absence of guardrail along edge of upper level of blending yard resulting in the potential for staff to overbalance and fall;
- Accumulation of slippery clay on the treads of the access stairs between the upper and lower levels of the bauxite blending yard; and
- Inadequate warning signage close to the steep overburden stockpile slipface.

On arriving at the site, no health and safety briefing of the audit team was provided. The lack of a visitor safety briefing programme could potentially result avoidable injuries to visitors and potentially litigation against the mine.

5.17.3 Audit findings for health and safety

The following are the key audit findings in terms of health and safety management on the mine (as they apply to the current operations at 1.5 mtpa):

- On the whole the Health and Safety measures implemented on the mine are considered to be satisfactory
- The mine has prepared the necessary health and safety plan and complies with the Russian Federation health and safety requirements.
- No injuries were recorded in the review period (three years) – which is testament to an effective management system;
- Blasting risks are adequately controlled to acceptable levels;

The following gaps have been identified in terms of health and safety management:

- There is no on-site Emergency Response Plan;
- Transportation (and related facilities) could potentially result in accidents on site;
- Staff not supplied with appropriate PPE equipment for the areas in which they are operating; and
- Fire risks are significant and fire-fighting equipment considered inadequate to cope with the size of this potential risk.

5.18 Compliance with Russian Regulatory and IFC/EBRD requirements

In general terms, activities at MTBM are materially in compliance with the Russian Regulatory and IFC/EBRD requirements. However, there are some areas where this is not directly the case and these include:

- **Sewage treatment:** The current sewage treatment facility is unlikely to comply with the IFC/EBRD guidelines for waste water discharge although there is no direct monitoring data to support this assertion.
- **Waste disposal:** The current waste disposal practice of disposing of MSW on the overburden stockpile does not comply with Russian Regulatory and IFC/EBRD requirements.
- **Occupational health and safety:** There is a range of issues that contradict the IFC/EBRD requirements regarding OHS, although the mine is technically in compliance with the Russian Regulatory requirements.

6 ENVIRONMENTAL MANAGEMENT AT SUAL HOLDING

6.1 SUAL Holding corporate health, safety, environment and community management

SUAL Holding is a self-sufficient aluminium producer who is rated as one of the top seven global aluminium producers. The 21 different facilities of the group extract, refine and smelt aluminium to produce ingots and semi-finished and finished products. The purpose of SUAL Holding, is to improve the efficiency of the SUAL group of companies through the implementation of standardized production, technology, investment, transportation, and social policies. At present, SUAL Holdings does not provide a corporate "Environmental Management" co-coordinating function.

There is currently neither dedicated specialist nor staff overseeing corporate level environmental management and permitting issues for exploration, development, and operations. SUAL Holding is in the process of setting up a corporate environmental, health and safety (EHS) management function to co-ordinate EHS activities among companies. The purpose of this function will be to develop a corporate-wide EHS strategy and policy and then facilitate its implementation. Through this corporate function, the group companies could be exposed to key EHS standards generally and within the aluminium industry specifically, including *inter alia*:

- ISO14001 (Environmental Management Systems) and ISO18000 (Occupational Health and Safety) certification;
- World Bank Group Pollution Prevention and Abatement Handbook aluminium manufacturing and European Union Integrated Pollution Prevention and Control Directive aluminium industry guidelines;
- Greenhouse Gas savings through energy efficiency;
- Aluminium Industry Sustainable Development Report;
- Dow Jones sustainability index for the aluminium industry; and
- International Committee for Studying of Bauxite, Alumina and Aluminium conferences and exchange of information within peer group.

In addition, the centrally co-ordinated EHS function would enable the effective communication of environmental information, which in turn would increase transparency build and stakeholder confidence.

6.1.1 SUAL Holding

Sual Holding is currently looking at building capacity at the corporate level. The Human Resources and Social Policy function is currently preparing a job description for a Corporate Environmental, Health and Safety Senior Manager. It is anticipated that international recruitment will take place in the first half of 2004. This executive level job will need a seasoned principal environmental/safety specialist with broad experience in the aluminium industry. At the same time the appointment of a corporate HSEC Manager will serve to ensure that HSEC issues are properly prioritized and given the required attention across all of SUAL's operating entities. This will be especially important for the proposed Komi Aluminium Project where compliance with Russian Regulatory and IFC/EBRD requirements will need to be achieved throughout all project phases.

6.1.2 Komi Aluminium Project

With the development of the Middle Timan Bauxite Mine Expansion, Sual Komi BV proposes to hire an Environmental Manager and a Health & Safety Manager to assist on all environmental, health, and safety and community matters during the development of the Komi Aluminium Project. This person will have senior environmental experience, mining experience, and strong Russian regulatory knowledge. These managers will report directly to the Project Director of Komi Aluminium.

The Komi Aluminium Environmental Manager will initially have the following responsibilities:

- Management of the project ESIA and OVOS preparation, documentation, consultation and approval processes
- Training local persons;
- Ensuring subcontractors complete work to international standards;
- Hiring of the local environmental staff in Russia; and,
- Assisting the corporate office with any other SHEC issues at other Sual Holding operations.

6.1.3 Middle Timan Bauxite Mine

Currently, the mine has one environmental person based in Ukhta whose title is 'Ecologist'. For the most part the ecologist's functions focus on the maintenance of the mine's monitoring programme and the required reporting to the authorities and does not extend to a broader SHEC management function. Two environmental persons will eventually be hired to work on rotation at the mine site to fill the company's environmental needs (the current schedule is to work 4 weeks at the site/4 weeks off). These people will report to the mine manager and the General Director in Ukhta and their responsibilities should include:

- monitoring all environmental parameters;
- ensuring compliance with all regulatory guidelines and permits;
- developing annual reports as required under Russian and IFC/EBRD guidelines;
- developing annual budgets for the environmental department at the mine; and,
- developing long-term programs to ensure protection of the environment.

Additionally, two Health and Safety specialists work at the mine site on rotation. These people report to the mine manager and the General Director in Ukhta.

Environmental training will be conducted using specialists from Russia and abroad that are familiar with both Russian and World Bank Group (WBG)/EBRD guidelines to ensure compliance with all permitting requirements. This training will take place as needed throughout the first two field seasons (May-August 2004-2005).

6.2 Audit of Uralsky Aluminium

6.2.1 Background

A qualitative environmental evaluation was conducted of Uralski Aluminium (UAZ). The evaluation is descriptive as it is based on a site visit (undertaken on 12.09.2003 – along with other members of the EBRD/IFC project team), following discussions held with Uralsky Aluminium management and after reviewing environmental performance information provided.

6.2.2 The UAZ facility

Uralsky Aluminium has been operating an alumina refinery and aluminium smelter in Kamensk-Uralsky since 1939. The facility is SUAL Holding's second and Russia's third largest alumina facility by output, with production of some 700,000 tpa alumina and more than 90,000 tpa aluminium in 2002 (Plate 24).



Plate 24: View of UAZ alumina refinery and aluminium smelter

The facility operates a combination of old (Sinter and Söderberg) and new (Bayer and pre-baked) technologies in parallel. An ongoing modernization programme will ultimately result in the phasing out of the old technology and will increase alumina production to 1.5 mtpa and aluminium to 150 ktpa. A further consequence of the modernization process is an improvement in the overall environmental performance of the facility.

The following description is a reflection of specific areas of concern with regard to environmental management and performance of the facility as it currently (September 2003) operates.

6.2.3 Environmental management at UAZ

UAZ has a well-developed environmental department (4 engineer + 30 laboratory technicians). The head of the department (Mr Gorenkov) reports directly to the technical director. The environmental manager maintains good connections with the city authorities and the press. Regular (monthly) disclosure of environmental, specifically atmospheric emissions, information in the local media as well as holding regular public feedback sessions have enhanced the environmental reputation of UAZ.

UAZ does not have a formalized environmental management system (EMS) and it is recommended that the facility consider implementing such a system.

6.2.3.1 Atmospheric emissions

In 2002, UAZ paid Rbl 27 million (approximately \$1M) in environmental fees and fines due to exceedances in fluoride, dust and Polycyclic aromatic hydrocarbons (PAH) emissions. Management at UAZ expect that no fines will be imposed on UAZ after 2007 when the new pot-lines will be commissioned and the Söderberg potline closed down. It is recommended that this expectation be tracked.

Fluoride

By comparison with global standards (0.3 – 0.6 kgF/tAl), the fluoride emissions from UAZ at 7.8 kg/tAl (in 2002) are high. This is a result of unhooded Söderberg pot-lines and limited in-stack gas cleaning. The 2002 emissions are significantly reduced from the 1993 levels which were 30.5 kgF/tAl. As a result of the commissioning of a pre-baked block anode pot line, representatives of the environmental department anticipate that emissions will reach 0.8 kg/t by 2005 when the Söderberg pot-lines will be replaced and a dry (sandy Al_2O_3) gas scrubber commissioned.

Sulphur dioxide (SO_2)

It is likely as a result of relatively high (by global standards) sulphur containing coke (1.2% S) and the emissions not being cleaned by the stack that sulphur dioxide (SO_2) emissions from UAZ are relatively high – no monitoring results for could be established. The likelihood of high SO_2 emissions is supported by evidence of significant acid attack on buildings in and around the site (Plate 25).

SO_2 emissions could be reduced through sourcing coke from an alternative lower S containing supply but will definitely be reduced following the replacement of the Söderberg potlines and the wet $\text{Ca}(\text{OH})_2$ solution for SO_2 absorption gas scrubber commissioned. In stack measurement for SO_2 is encouraged and an emission target of 1 kg SO_2 /tAl (the World Bank guideline value) should be set.



Plate 25: Evidence of brick corrosion on buildings at UAZ

Dust

Dust is generated at a number of areas throughout the facility, including the calcining plant, bauxite-handling facility. Specific dust measurements could not be established. The commissioning of a calcining furnace in January 2003 is expected to be able to produce sandy alumina 50% less dust emission.

Polycyclic aromatic hydrocarbons (PAH)

Polycyclic aromatic hydrocarbons (PAH) are produced during the manufacture of anodes for modern "pre-bake" aluminium smelters, and during the electrolytic process itself in the older "Söderberg" type facilities. PAH emissions at UAZ have been reduced from 12.1 (in 1993) to 5.5 (in 2002). The current levels still exceed global norms of 0.05 kg kgPAH/tAl for pre-bake smelters and 0.25 kgPAH/tAl from Söderberg plants. It is recommended that UAZ research further methods to reduce the PAH emissions from the facility.

Greenhouse gas (GHG) emissions

Emissions of GHG's are not recorded, however, greenhouse gases in the form of Perfluorinated carbons (CF's), carbon dioxide (CO₂) and carbon monoxide (CO) will be generated directly through the alumina refining and aluminium smelting processes. Energy consumption at the facility is currently 14.5 MWh/tAl, which exceeds the 10-11 MWh/tAl that is typical in smelters globally. A number of opportunities for the implementation of energy efficiency are possible and it is recommended that UAZ research these opportunities. Greenhouse gas emissions resulting from the generation of energy from fossil fuels by an external party for UAZ are not recorded.

Energy supply to the facility is provided through four different utilities. The resultant consistent supply has a positive environmental effect in that no cleaning facility downtime will be experienced. It is recommended that UAZ put in place a GHG measurement system (based principally on energy consumption) and that emissions are reported on annually. Air monitoring data are published in the local press monthly and UAZ are in the process of launching a large health study in the local community.

6.2.3.2 Solid waste management

Spent Potlining (SPL)

Spent potlining from aluminium smelters typically comprises fluoride, cyanide and carbonaceous compounds which on contact with water can result in hydrogen, methane and hydrogen cyanide release and contamination of water resources. The SPL's from UAZ are stored in a temporary enclosed and watertight designated building approximately 20 km from the facility. In the absence of an existing hazardous waste facility and/or treatment and reprocessing – storage in this manner is a typical global standard. A programme is currently underway to determine how the SPL's can be treated or reprocessed for beneficial use.

Red mud

Red mud (typically comprising sodium, iron, silica and titanium oxides with trace concentrations of zinc, phosphorous, nickel and vanadium) results from the Bayer refining process. UAZ is responsible for three red mud disposal tailings dams as follows:

- Dam 1: Occurs approximately 1 km from the site directly adjacent to a community. The dam was in operation from the start of UAZ until 1964. The dam was recultivated in 1964. At present the dam is not fenced resulting in access for grazing cattle and the local community. No visible slumping was evident during the site visit. Groundwater adjacent to the dam is monitored and according to the environmental manager, no contamination has been found.

- Dam 2 (Plate 26) is currently in operation and is located approximately 5 km from the facility. The dam is located on an old wetland site which was determined by the district geologist as being most suitable due to favorable transmissivity conditions ($K=10^{-7}-10^{-8} \text{ m}^3/\text{m}^2$) and the poor agricultural potential. A mud slurry is pumped from UAZ at a ratio of 1:3 and fed onto the dam through feed valves spaced at approximately 30 m intervals. Gravity feed collects water into a return facility. The dam is designed with a 50 cm compacted red mud base to prevent groundwater contamination. Groundwater is monitored to a depth of 20m at 15 points around the dam and (according to the environmental manager) no contamination has been found.
- Dam 3 is under construction adjacent to dam 2. The dam will be approximately 160 ha. With the proposal to raise the height of dams 2 and 3 to 35 m, UAZ will be in a position to dispose red mud beyond 2030.

Due to the potential for ecological impact from red muds, UAZ have recognized the need to evaluate options for more beneficial utilization. The Institute for Geology and Mineralogy (IGEM) in Moscow has been commissioned to study the mineral and element composition, physicochemical and mechanical properties of red muds and elaborate recommendations on their use.



Plate 26: Red mud dam 3 at UAZ

General waste

General (non-industrial) and building rubble waste from the facility is disposed in the local municipal landfill – according to the environmental manager, the local landfill is engineered for general waste and not for hazardous substances.

Wastes are not analysed prior to disposal, therefore, there is the possibility of contaminated waste being improperly disposed. It is recommended that UAZ implement an analytical programme for solid waste prior to disposal.

6.2.3.3 Liquid effluent

Process water

A detailed water balance was not available for the site during the site visit. However, the according to the environmental manager approximately 92% of process water is recycled. The remaining water is released into the local river systems. UAZ monitors upstream and downstream of the site for pH, Cl, Zn levels and report no exceedances of Russian standards. It is recommended that the monitoring programme be increased to include:

- Total suspended solids;
- Fluoride;
- Aluminium;
- Chemical oxygen demand; and
- Temperature.

Stormwater

In the absence of a detailed water balance it is not possible to establish the environmental impact of stormwater. A number of stormwater drains were observed around the site. According to the environmental manager, stormwater is recirculated through a treatment facility and then used as process make-up water. The treatment facility was not observed, therefore, its efficiency cannot be commented upon.

It is recommended that stormwater management be carefully considered at the site. The % hard surface around the facility was not determined (but is estimated at 80%) with the result that significant volumes of water falling onto the site report to stormwater control facilities. Given the relatively high levels of atmospheric emission and likely on-site fallout, concentrations of key pollutants (as outlined above) are likely to be high. Undetermined on-site precipitates support this assumption (Plate 27).



Plate 27: Evidence of precipitate from atmospheric fallout on site. Precipitate on soft surfaces may be chemically mobilised and cause groundwater contamination.

Groundwater

As above, in the estimated 20% of the site not covered by hard surface, atmospheric fallout is likely to be mobilised resulting in the possibility of groundwater contamination. The level of groundwater contamination could not be established during the site visit. It is recommended that, in addition to the red mud dam groundwater monitoring stations, UAZ implement groundwater monitoring for the contaminants detailed above around the facility itself.

6.2.4 Occupational health and safety

Occupational health and safety is a priority of UAZ management. This is reflected in excellent OHS statistics reported by management including:

- The last fatal accident occurring approximately 10 years ago when a transport worker was crushed due to poor stacking of materials;
- Only 3 lost time injuries were experienced in 2002;
- Ongoing health monitoring of employees identifying that only workers who have spent more than 20 to 25 years in the Söderberg potlines (according to a new policy 10 years is the maximum allowed period in a Söderberg pot room) experience work related illness. Annual testing, includes:
 - Urine testing for fluoride followed by x-rays if problems are suspected; and
 - Lung function tests.

In addition, management reports that staff are fully trained in OHS requirements and supplied with the necessary personal protection equipment (PPE) including:

- Fire retardant overalls;
- Hard hats;
- Hard boots;
- Ear protection;
- Goggles;
- Gloves and
- Respirators (the current respirators only filter dust, therefore, plant management are proposing to purchase chemical filtering respirators in the future).

UAZ have their own on-site fire department who (according to senior management) have a fire response time of approximately 40 seconds.

It is recommended that the OHS system on site could be augmented through the following aspects:

- All visitors should be required to undergo a short OHS induction programme through which the on-site hazards would be explained and the safety precautions described;
- The use of PPE should be strictly enforced;
- General safety precautions should be considered, for example:
 - The height of all hand rails throughout the site should be determined and raised appropriately in places where they are considered too low;
 - Harnesses should be supplied and enforced to all staff working in areas where no handrails are provided;
 - OHS signage could be increased – excellent signage was evident in the canteen areas but not in the production areas themselves; and
 - Vehicles should be fitted with reversing signals.

6.2.5 Social performance

6.2.5.1 Employment

UAZ employs 6,315 people according to the following breakdown:

- Refinery: 1,429
- Smelter: 1,308
- Calcining plant: 196
- Undifferentiated support (including: maintenance, transport, construction staff and management): 3,382

Management estimates that, despite the future increase in production, the labor force could be reduced to approximately 5,000 and still fulfill the necessary tasks. An organic reduction process of retirement and voluntary resignation will take place over a period of four years.

6.2.5.2 Interaction with environmental NGOs

At the beginning of the 1990's NGO pressure (specifically through the Green Movement – Zelyenoye Dvizhenie) was high. At the time the Kamensk-Uralsky organization campaigned for a complete closure of Uralski Aluminium on environmental grounds. In the time between then and now, UAZ has embarked on the implementation of a complete modernization programme, which has shown significant improvements in the environmental performance of the facility – most notably in emission controls.

6.2.5.3 Social responsibility programmes

UAZ plays an active role in the Kamensk-Uralsky community through various social responsibility programmes. Most noteworthy of these programmes is ongoing support of the local Technical College in which UAZ sponsors equipment, training facilities and materials. In addition, UAZ provides significant funding to the local municipality.

7 ENVIRONMENTAL AND SOCIAL ACTION PLAN

7.1 Introduction and Purpose

An Environmental and Social Action Plan (ESAP) is a direct requirement of the IFC/EBRD²¹ and forms a logical conclusion to the due diligence audit. The ESAP is prepared in response to the gaps identified in the due diligence audit and includes recommendations on what needs to be done to address those gaps. This includes specific activities together with a schedule for implementation and a provisional budget. The schedule is based on the significance of the gaps identified during the audit, where items of high significance are assigned interventions/remedial action, with items of lesser significance being addressed in the medium to long term. Before presenting the ESAP it is necessary to describe the principles of an integrated health, safety, environment and community (HSEC) management system.

7.2 Integrated Health, Safety, Environment and Community (HSEC) Management

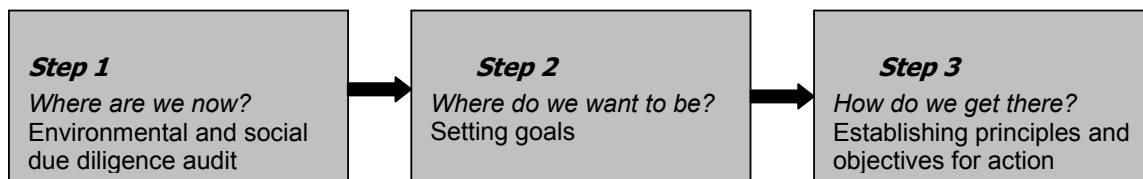
Perhaps the most significant audit finding is that MTBM does not have an integrated HSEC management system. The purpose of an integrated system is to ensure a systematic approach to the management of HSEC issues. An integrated management system provides a detailed approach as to how each environmental and social aspect of the mine's activities will be managed to ensure that negative impacts are minimized or prevented and that positive impacts (benefits) are maximized. The system thus includes the actions, procedures, measures, monitoring, and budgets required to mitigate and manage activities and associated environmental aspects.

7.3 The structure of the ESAP

The structure of the ESAP is shown schematically in Figure 10. The diagram shows the proposed ESAP in the left hand side of the diagram, with the commensurate components of a generic HSEC management system on the right hand side. It is important to emphasize that the ESAP focuses only on the gaps identified in the due diligence audit, but the integrated HSEC system should ultimately encompass the full suite of the mine's environmental and social management functions. Each of the five components of the generic HSEC management system is described below, together with the actions required to address the gaps that were identified in the audit.

7.4 HSEC Policy

The policy is the driver for implementing and improving the mine's HSEC system so that it can maintain and potentially improve its performance. It also forms the basis upon which the mine sets performance objectives and targets. The policy should be sufficiently clear to be understood by internal and external interested parties and periodically reviewed to reflect changing conditions and information. There are three steps in the preparation of a HSEC policy, as follows:



²¹ IFC (1998), *Procedure for Environmental and Social Review of Projects – Guidance Note C: Outline of an Environmental Action Plan*, pp 45-46.

The policy also provides stakeholders with a clear statement from the company on its intent in terms of corporate social responsibility and provides an opportunity to demonstrate the human face of the company. A policy statement on environment, health, safety and social issues represents a commitment of the company to particular goals and standards of operation. Arising out of the policy formulation process, the HSEC policy should reflect the mine's top management commitment as well as:

- a commitment to continual improvement;
- a commitment to comply with relevant environmental legislation and regulations and any other requirements that the organization subscribes to; and
- the framework for setting and reviewing environmental objectives and targets.

The policy should be widely communicated, prominently displayed within the workplace and available to the public. Documents that can provide a framework with which to prepare the policy are listed in Box 3.

Box 3: Applicable directives, policies and guidelines



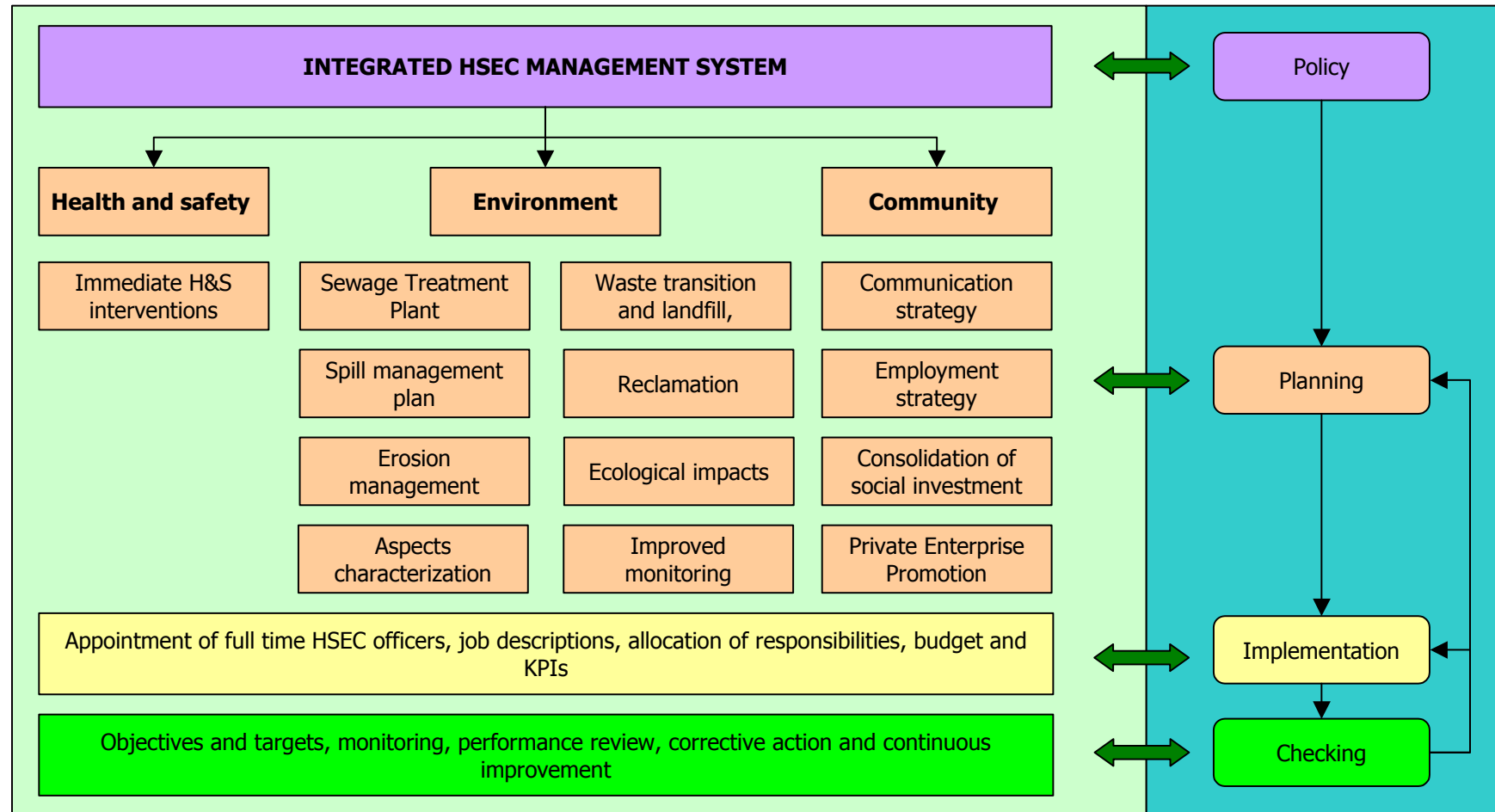


Figure 10: Schematic illustration of the environmental and social action plan (ESAP). The block on the right shows key components of a generic HSEC management system, the block on the left the specific environmental and social actions to be implemented by MTBM.

7.5 Gap analysis

In Table 18 the key gaps identified during the due diligence audit are summarized together with a qualitative indication of the significance (derived from a more detailed description provided in preceding Chapters) of those gaps in order to prioritize the response.

Table 18: Key gaps in the HSEC performance of MTBM and impact significance

Category	Gaps	Significance
Water resource protection	Inadequate sewage and domestic effluent disposal	Low
	No formalized drainage and suspended solids control	Moderate
	Soil erosion from areas cleared for mining and overburden	Moderate
	Erosion of soil from road and rail embankments	Moderate
Air pollution emissions	Diesel-fired rather than coal-fired boiler	Low
	Incorrectly calculated air emissions from diesel generators	Low
Waste management	No formal disposal facility for municipal solid waste (MSW)	Moderate
	Ongoing accumulation of used tyres	Low
	Scrap metal stockpiles in an around the mine	Low
	Containers not clearly separated and marked	Moderate
Ecology	Road and rail infrastructure disruption to surface hydrology	High
	Excessive forest clearing and resultant ecosystem loss	High
Reclamation/rehabilitation	Current practice of no reclamation/rehabilitation	Moderate
	Borrow pits not rehabilitated	Moderate
	No statement on mine <i>closure</i>	High
Hazardous materials management	Ad hoc and scattered vehicle and plant maintenance	Moderate
	No spill containment structures	Moderate
	Scattered accumulations of scrapped equipment	Low
	Chlorine management	Low
Social	Community misconceptions	Moderate
	Requirement for education and training programmes	High
	NGO concerns – impact on Vorykva river	High
	NGO concerns - 'big business' will benefit.	High
	Institutional capacity	High
	No established forums for ongoing consultation	Moderate
	Limited SME development efforts in rural district like Knyazhpogost	High
	Barriers to SME development	High
	Social investment largely <i>ad hoc</i>	Moderate
	Limited socioeconomic baseline information	Moderate
Environmental monitoring	No monitoring of surface water runoff	Moderate
	Approved air quality monitoring is not fully implemented yet.	Moderate
	More focused impact monitoring is necessary with specific focus on iron and aluminium concentrations.	High

In response to the gaps listed above, a series of interventions or corrective actions have been identified and these are presented in the section that follows.

7.6 Corrective actions

7.6.1 Immediate health and safety interventions

During the course of the audit a number of health and safety practices were identified that lag behind international best practice. It is presented here that at very little cost a number of these could be implemented on the mine. These are:

- Safety signage and barriers – indicating hazard areas, the hazards presented and the required personal protective equipment (PPE) for entering the areas.
- Personal protective equipment (PPE) – establishing minimum PPE requirements for the mine personnel including hard hats, hard toed boots, flame retardant overalls and eye and hearing protection, and implementing campaigns to establish the behavior of consistently wearing PPE.
- Fire protection – establishing comprehensive fire protection across the mine, ensuring that fire fighting equipment is suitable and serviceable, and that all fire risk areas are covered
- Establish visitor induction – a short but comprehensive presentation that alerts visitors to mine hazards and the appropriate safety behavior while on the mine;
- Suitable hazard warnings on vehicles - including serviceable reverse hooters and flashing warning lights.
- Improved housekeeping – consolidation of waste heaps, scrap used tyres, building rubble etc. with a view to minimizing hazards across the mine site.
- Safety handbook – a small handbook should be developed that can be kept on hand by mine personnel during their shift. The handbook should contain a brief description of the hazards on the mine, required PPE and behavior when in the presence of such hazards.
- A comprehensive emergency response plan must be developed and implemented at the mine. The emergency response plan should follow on from a detailed risk assessment on the various mine activities and provide for an emergency response in the event of an accident.

7.6.2 Establish a sewage treatment plant

A proper sewage treatment plant that will cope with the loading conditions of the mine following the mine expansion must be established as a matter of some urgency. The sewage treatment plant must make provision for sterilisation of the effluent stream and removal of nutrients. Expert technical advice should be sought in the design of the facility to ensure that these objectives are achieved.

7.6.3 Develop and implement a spill management plan

A register of hazardous materials must be developed for the mine and for each hazardous material planning to prevent the uncontrolled discharge of such materials into the environment must be effected. Examples of such planning include:

- Storage tanks should be installed on properly founded elevated mountings (stands) within concrete-floored spill containment area;
- Filler connections should be positioned outside the main containment area and equipped with their own separate spill (drip) containment areas;
- Tanker loading/unloading areas should be sealed with concrete and graded to direct spills to a sump where product can be recovered;

- Outdoor maintenance areas should be consolidated into a single repair yard adjacent to the covered workshop;
- The floor of maintenance area should be sealed with concrete and graded to direct spills to a sump where product can be recovered; and
- Where water can enter the bunded areas, provision must be made to drain such water through an oily water separator.

7.6.4 Develop and implement an erosion/stormwater management plan

All areas where the risk of contaminating stormwater with suspended solids exists must be identified. Those areas where such contaminated water may enter surface water systems must be identified and a stormwater management plan developed and implemented. The stormwater management plan must ensure that mitigation is established to prevent such effects. A particular concern lies in the runoff from the CBY (see audit findings chapter) and here it is proposed that a storm water containment dam should be constructed down slope from the CBY – into which storm water from the facility should be directed. The purpose of the dam will be to promote the settlement of suspended sediment loads prior to the overflow and discharge of the (clarified) water from the dam. The sediment accumulation within the dam will need to be removed from time to time and disposed of appropriately (e.g. mixed with stockpiled overburden material). Expert technical advice should be sought regarding the design of the containment dam. In addition the following should be implemented:

- Clearing of forest in advance of mining developments should proceed in a staggered fashion, ensuring that no expansive areas are exposed to the erosive effects of storm water for extended periods of time;
- Following the clearance of forest from sites proposed for development, a sufficient quantity of mulch material should be left on site to reduce the transfer of energy from incident rain onto the soil surface. The mulch will also promote infiltration, rather than surface flow, of rainwater;
- Cleared sites that are likely to remain undeveloped for more than six months should be properly contoured to retard the velocity of surface water flow and to promote infiltration;
- All road and rail embankments should be vegetated immediately following the construction of the infrastructure they support. Existing exposed road and rail embankments should, similarly, be vegetated as soon as possible; and
- Expert technical advice should be sought regarding the stabilization of embankments with vegetation.

7.6.5 Revisit reclamation planning

It is proposed that the current reclamation strategy be revisited with a view to assessing the possibility of implementing *in situ* rehabilitation of the existing mine pits. In particular planning for *in situ* rehabilitation following the expansion of the mine should be reviewed to see whether the rehabilitation approach can be applied to the current operation. In addition the following actions must be implemented on the mine:

- Following the clearance of forest in advance of mining operations and the positioning of essential mining support infrastructure, the top 1 m of soil must be stripped and stockpiled separately from the overburden;
- Topsoil stockpiles should be optimally designed and properly managed (stockpile thickness not in excess of 2 m; stockpile armoured appropriately against wind and water erosion; left undisturbed prior to its re-use);
- Topsoil should be used for rehabilitation as soon as possible;

- At the time of post-mining rehabilitation, topsoil should be distributed as a thin veneer on top of the replaced overburden;
- Unlike the bauxite mining operation, where it is not practically possible to carry out rehabilitation in parallel with the mining operation, rehabilitation of borrow pits can be undertaken as quarrying operation proceed; and
- The existing borrow pits should be used for the conduct of experimental rehabilitation trials - involving (*inter alia*) the distribution of topsoil as a thin veneer on top of the quarried surface – in order to optimise the approach to be used in future for post-mining rehabilitation. The trials should be properly designed and monitored in order to produce statistically credible results.

7.6.6 Develop a waste transition station and municipal solid waste (MSW) landfill

The mine has plans for the establishment of a MSW landfill that can be used for the disposal of general waste from the mine. It is recommended that the establishment of the landfill be expedited and the scope extended to include the further establishment of a waste transition station. The purpose of the waste transition station is to provide for the clear segregation of waste into the required disposal categories, provide temporary holding space for those categories, and provide for the proper marking and numbered of those waste categories. The transition station can also be used to temporarily store scrap metal and tyres (allowing the consolidation of the same from across the site), prior to a suitable disposal option being identified. In addition to the landfill and waste transition station it is further proposed that:

- possible solutions to the problem of gradually accumulating tyres be explored by MTBM with a view to developing a medium to longer-term strategy for the suitable disposal of tyres; and
- current ad hoc stockpiles of scrap metal should be consolidated and the scrap metal sold.

7.6.7 Minimize ecological footprint of the mine

Regarding the possible impact of the road and railway line it is proposed that:

- Interpret satellite imagery to quantify spatial extent of impact;
- If a significant impact is confirmed following the above interpretation of satellite imagery, a technical investigation aimed at the development of practically implementable and effective impact mitigation measures should be commissioned; and
- The technical investigation should include impact mitigation measures that focus on eliminating the impedance of surface drainage by the road and railway through the installation of an effective drainage system beneath the road and railway in priority areas (where extensive forest dieback is confirmed). Note: reversal of the ecological impacts attributable to the risk source is likely to be a protracted process.

In addition to the above, the mine must implement a programme that ensures that:

- Only the minimum area of forest should be cleared in order to position mining support infrastructure; etc.
- In consultation with the TMBM environmental officer, areas of forest deemed essential for clearing should be clearly demarcated in advance. There should be no encroachment of forest clearing operations outside of these demarcated areas; and
- Where there has been unnecessary past clearing of forest, these areas should be protected from further disturbance in order to promote rehabilitation, which should be assisted where practically possible.

7.6.8 Monitoring programme

The monitoring programme should be optimised and integrated with future EMS. This should also extend to stakeholder communication on the performance of the mine. Specific actions required include:

- quarterly monitoring of air quality in the mine operational area and at the boundary of the SPZ must be implemented (in accordance with the monitoring program approved within the 'Volume of Maximum Permissible Emissions');
- atmospheric fall-out dust measurements should be implemented so as to provide a more direct measure of possible impacts of mine dust on the surrounding environment;
- the monitoring of the state of the environment should be continued and a clear and reliable baseline established. Such a baseline will provide important information for future environmental management purposes for MTBM.
- Specific attention should be paid to aluminium and iron.
- The individual monitoring efforts require integration (viz. joint reporting/data analysis/recommendations/reporting) to ensure that proper corrective actions can be implemented as required.
- Monitoring of surface water runoff quality should be implemented;

7.6.9 Properly characterize all environmental aspects of the mine

There is a range of circumstances, where the current operations of the mine have been incorrectly characterized (such as the diesel, rather than coal-fired boiler). It is accordingly recommended that all emission sources be correctly characterized and that all permits where mine activities are incorrectly characterized be revisited and corrected. The pending OVOS for the mine expansion to 6 mtpa presents an ideal opportunity to correctly define the mine's activities as well as formalizing many (if not all of the above actions).

7.6.10 Develop and implement communication strategy

A communication strategy is necessary to build a relationship between MTBM and its stakeholders. Communication will ensure that the company's activities are transparent and open and take cognizance of stakeholder concerns.

7.6.10.1 Stakeholder identification

The location of MTBM within a social environment means that there are a number of groups who have a vested interest in the project. Company stakeholders range through employees, shareholders, communities, NGOs, consumers, partners, suppliers, governments and society at large (WBSCD 2002). The company has a responsibility to share information with its stakeholders on regular basis. The key stakeholders for the MTBM are reflected in Table 19:

Table 19: Key stakeholders for the MTBM

Internal	Government	Community-based	NGOs
Shareholders Employees Funders - IFC/EBRD	Insert	Local community at Chin'avoryk Community representatives from Ukhta? Association of small business development	Komi Kotyr The Safe Pechora Committee The Memorial Greenpeace Russia

Delineating the boundaries of an operation and thus its sphere of influence for corporate social responsibility is difficult. It is important when identifying stakeholders to consider the social footprint of the operation and whether the nature of the influence is direct or indirect.

7.6.10.2 Stakeholder engagement mechanisms

Two main opportunities for stakeholder engagement occur during the project life-cycle. At the early stages, there is a need for project consultation and disclosure on the new development. This form of engagement centers around sharing of issues and concerns about the development. A detailed project consultation and disclosure plan has been developed for the project. External consultants, as part of the environmental assessment and audit processes, often carry out the project consultation. Stakeholders involved in project consultation do not always have a role in the decision-making process. Once the decision-making process is complete, this opportunity for engagement comes to an end.

The likely objectives of project consultation and disclosure are to:

- Provide stakeholders affected by the project with regular information on the progress of work and its implications for the stakeholders;
- Inform MTBM of any stakeholder-related issues;
- Monitor the implementation of mitigation measures through direct feedback from stakeholders; and
- Manage any complaints against the MTBM team or contractors.

The second opportunity for engagement is the on-going and long-term interactions between a company and its stakeholders. It is clear that in many situations, the lack of appropriate communication has led to misperceptions about the mine and the safety of its operations. Maintaining on-going engagement through-out the mine's operations will breakdown the barrier of miscommunication and mistrust between the mine and local communities. The company, itself will manage this engagement through its Social Investment Manager and public relationships/community liaison team. The company seeks to involve its stakeholders in both consultation and participation the social investment activities of the company.

The likely objectives of on-going engagement throughout the project life-cycle are to:

- Provide stakeholders with regular information on the mine and its activities;
- Provide a platform for stakeholders to raise their issues and concerns;
- Engage with stakeholders on priorities for social investment; and
- Establish partnerships for implementation of social investment programmes.

Box 4: IFC Principles for consultation – can be used as the basis to draw up MTBM principles for their communication strategy

- Written and oral communications in local languages and readily understandable formats;
- Easy accessibility to both written information and to the consultation process by relevant stakeholders;
- Use of oral or visual methods to explain information to non-literate people
- Respect of local traditions of discussion, reflection and decision-making;
- Care in assuring that groups being consulted are representative (with adequate representation of women, vulnerable groups, and ethnic minorities, and separate meetings for various groups, where necessary); and
- Clear mechanisms to respond to people's concerns, suggestions and grievances.

7.6.10.3 Partnerships

In addition to consultation, which tends to be a one-way flow of information, stakeholders present opportunities for partnerships. Tri-sector partnerships between the government, MTBM and civil society, represented by local communities and NGOs, can lead to effective management of relationships and resources (Table 17).

Table 20: Partnership Opportunities

Government Authority	Corporate Operations	Civil Society
Public/political mandate Coordinated development Resource rents Conduit for donor funds Public meeting facilitation	Leadership and advocacy Quality performance Equipment and technical skills Infrastructure development Capacity building	Local knowledge Community mobilization and self management Labor

Opportunities for partnerships will be discussed in greater detail in the sections below.

7.6.11 Develop and implement employment strategy

MTBM has a committed workforce. With the planned expansion of the mine, more personnel will be recruited. MTBM should develop a recruitment policy, which explicitly states its approach to recruitment. The policy will take into consideration national and IFC/EBRD labor policies and re-commit the company to use local labor as far as possible, support human rights and non-discrimination, and not to use forced or child labor.

Within the framework of the policy, employment should be done through an employee registration programme. Potential employees should undergo a skills assessment. Successful recruits will be registered in the skills database and undergo health and safety training. Contractors should also be registered on the database and undergo the mine's health and safety training.

Recognizing that personnel are fundamental to a successful operation, the company recognizes the need for participative management and staff development. MTBM should establish mechanisms to provide formal worker representation in decision making. This can occur through fora established at different levels of employees and management. In addition, employees should take responsibility and accountability for matters of healthy and safety.

In order to enable and empower individuals to perform optimally, performance management and career development programmes can be put the place. These can include:

- Graduate training schemes;
- Systems training scheme;
- Operative training schemes;
- Technician training schemes;
- Technical executive education;
- Skill and job orientation training; and
- Modular training and equipment/systems oriented training.

When personnel have participated in the training programmes, their improved skills must be registered on a central skills database.

7.6.12 Consolidate social investment programme

The objectives of the social investment programme are to share mineral wealth benefits with local communities and to contribute to the improvement of the standard of living of stakeholders and facilitate socio-economic upliftment in the Komi Republic. At present, MTBM is investing in community initiatives such as the local schools and hospitals in Emva and Chin'avoryk, as well as a local church in Emva. This demonstrates the willingness of the company to invest in the local communities. However the investments have tended to be *ad hoc* and lack a clear long-term strategy for investment priorities. The inconsistency and lack of a clear and well-communicated strategy has led to community expectations and disappointment about the mine's investments.

In line with an integrated framework for environmental, health, safety and community, MTBM will develop a long-term strategy for their social investment programme. The programme will underline the commitment of MTBM to the communities and the population affected by the mine and its activities.

The strategy will explicitly define the areas in which MTBM will invest and its role in relation to government, NGOs and CBOs. The strategy will be developed using a participatory approach to consult with local communities and government about priority needs for investment. Out of the strategy, social investment projects will be identified for support from the company.

7.6.13 Socio-economic baseline

As the mine continues to operate and expand, there may be socio-economic changes in the neighboring areas, as well as in the city and village. A common phenomenon related to large development projects is the development of communities around the operation and the growth of secondary businesses around the mine. As there are already plans underway to commission three further developments in the Komi Republic, it is likely that the cumulative socio-economic impact of the developments will be significant.

In order to understand these impacts as they evolve, it is important to have an understanding of the current socio-economic situation. This will provide a baseline against which future changes can be mapped. Social and economic assessments will be carried out as part of the environmental assessments.

7.6.14 Implement private investment partnership

One of the positive impacts of the mining operation is the opportunity for job creation both within the company as well as through secondary contracting operations. MTBM can enhance this benefit and improve local economic development by committing to utilize local businesses as far as possible to provide a variety of services and products. This benefits the company by providing a local source of skills and products as well as creating a more sustainable economic environment.

MTBM can devise a SME strategy in order to support small and medium sized local enterprises. The strategy will identify opportunities for local business to undertake contract work for the mine and assist them in tendering and delivering on the contracts. In order to achieve this, the mine can provide support by making services and staff available to assist SMEs in their activities. This can include technical assistance in tender advice, training, bookkeeping, health and safety, quality support systems and business linkage opportunities. The transfer of expertise to local citizens and organizations will extend the influence of the company on local economic development and meet the following objectives:

- Increase access to markets for SMEs;
- Raise the level of local management skills;
- Reduce administrative and legislative barriers; and
- Educate and inform the public of the importance of the private sector.

Special areas of influence to focus on include:

- Creating transparent demand profile that can be disseminated to local suppliers
- The design and implementation of a solid, sustainable strategy
- Complement SME development efforts with a targeted, sustainable financial model

7.7 Environmental and Social Action Plan (ESAP)

7.7.1 Implementation

Implementation is the development and putting into practice of processes that will bring about environmental goals and objectives. In other words putting the planning described under above into practice. The implementation of the ESAP requires the most time and effort within an EMS project. For effective implementation, an organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

There are a number of requirements for effective implementation of the ESAP, all of which will require a substantial amount of human and financial resources. If top management and the employees that are implementing the ESAP are not committed and convinced of the advantages of the system, it is likely to fail here. No matter how good the environmental policy is, if it is not implemented at all stages of the organization's operations, very little benefit will be forthcoming.

7.7.1.1 Capacity requirements

The existing full-time HSEC function at MTMB is not integrated and is delivered by one individual (the mine ecologist – who focuses principally on environmental issues) based in Ukhta. This function is augmented by outsourced monitoring activities. In order to ensure that an integrated HSEC system is implemented effectively, a more comprehensive HSEC structure should be put in place. The structure should include:

- HSEC manager (based in Ukhta); and
- on-site environmental officers.

HSEC Manager

The HSEC manager should report directly to the Mine Director. The role of the HSEC manager is to ensure that all components of health, safety environment and community are properly addressed through an integrated system (explained below). Ideally, the HSEC manager should have a background (including the necessary training and experience) in health and safety and/or environmental management and science. The existing mine ecologist should undergo training to fulfil the role of HSEC manager. In specific, the HSEC manager's responsibilities should include:

- To plan and direct the implementation of the integrated HSEC system;
- To ensure that the requirements of the HSEC system are communicated, understood and enforced by all personnel at MTBM;
- To train all staff in the requirements of the HSEC system;
- To hiring and manage on-site environmental officers;
- To ensure that officers on site develop, implement and monitor the specific HSEC programmes;
- To ensure the implementation of all applicable corporate HSEC initiatives at the mine;
- To develop and manage HSEC budgets;
- To manage scheduled audits and inspections, with subsequent report back to management; and
- To liaise and maintain contact with the local community and with the regulatory agencies, including the development and distribution of annual HSEC reports.

On-site HSEC officers

Two on-site environmental officers should be employed to implement the HSEC system on-site. With the 28-day rotation, at least one of the officers should be on-site at all times. The officers will report to the HSEC manager and will have the following specific tasks:

- Investigate and report on major environmental incidents;
- Monitor all environmental parameters;
- Ensure compliance with all regulatory guidelines and permits;
- Provide background information and support in the compilation of annual reports; Ongoing liaison with appropriate on-site personnel; and
- Monthly reporting.

7.7.2 Checking and corrective action

Checking and corrective action requires monitoring and measurement of environmental indicators to ensure that objectives and targets are being met.

Internal audits need to be undertaken on a regular basis to ensure that the system is working as intended. External auditors must document all non-conformances for use. A corrective action plan to address the non-conformances must be drawn up, documented and carried out. All internal audits, non-conformance records and corrective action plans must be documented and stored to be used by external auditors as *evidence* when undertaking an external audit. An external audit only becomes necessary when an organization wants to achieve certification.

7.7.3 Review and continual improvement

All audits should be reviewed by top management to check that the system is operating efficiently and to ensure continual improvement of the system. This review should also address any changes that may need to be made to the environmental policy, objectives and targets or the EMS itself.

7.7.4 Management review

Management review is the last requirement but arguably the most important. The requirement dictates that the performance of the HSEC management system be reviewed by the organization's top management, to ensure its continuing suitability, adequacy and effectiveness and continual improvement.

7.8 Cost implications

The implementation of the ESAP will have direct and indirect cost implications for MTBM, Komi Aluminium and SUAL Holding. In Table 21 the required corrective actions have been listed together with an estimate of the cost implications of implementing the same. It is strongly recommended that the specified corrective actions be included in the definition of the scope of the proposed expansion of MTBM to 6.0 mtpa. The cost implications are estimated at some USD852 000 to establish all the corrective actions with some USD200 000 being required per annum to maintain the corrective actions.

Table 21: Implementation plan for environmental and social actions

	Description	Item	Detailed Requirements	Schedule	Estimated budget (US\$'000)	
					Up front	Recurrent (annually)
1	Integrated HSEC management system	1-1	Design and implement integrated HSEC management system	December 2005	30	5
2	Immediate health and safety interventions	2-1	Emergency Response plan	March 2004	5	2
		2-2	Safety signage and barriers	March 2004	5	1
		2-3	PPE	March 2004	20	5
		2-4	Fire protection	March 2004	20	5
		2-5	Visitor induction	March 2004	2	-
		2-6	Hazard warning on vehicles	March 2004	5	2
		2-7	Improved housekeeping	March 2004	15	NA
		2-8	Safety handbook	March 2004	2	NA
3	Sewage treatment plant	3-1	Design, construct and operate	December 2005	50	5
4	Spill management plan	4-1	Hazardous materials register	March 2004	2	NA
		4-2	Bunding for storage tanks, filler connections and loading/unloading areas	December 2004	30	2
		4-3	Consolidation of outdoor maintenance areas	December 2004	10	2
		4-4	Seal maintenance area floor	December 2004	10	2
		4-5	Oily water separators	December 2004	5	2
5	Erosion management	5-1	Stormwater management strategy	March 2005	15	NA
		5-2	Design, construct and operate stormwater retention dam	December 2006	100	5
		5-3	Contour undeveloped areas	March 2005	25	10
		5-4	Stabilise road and rail embankments	January 2007	Unknown	Unknown
6	Aspects characterisation	6-1	Identify and classify all aspects and impacts as component of OVOS for 6 Mtpa expansion project	May 2004	NA	NA
7	Waste transition station and landfill	7-1	Design, construct and operate waste transition station	September 2005	30	5
		7-2	Design, construct and operate landfill facility	December 2006	100	10
		7-3	Tyre disposal solution	December 2005	5	NA

Due Diligence Audit - Environmental and Social Action Plan
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	Description	Item	Detailed Requirements	Schedule	Estimated budget (US\$'000)	
					Up front	Recurrent (annually)
		7-4	Consolidation of scrap metal	December 2005	30	5
8	Reclamation	8-1	Assess viability of <i>in situ</i> reclamation on existing pits	September 2004	15	NA
		8-2	Experimental rehabilitation trials	December 2006	40	10
9	Ecological impacts	9-1	Assess impact of road and rail line on forest ecology	December 2004	15	NA
		9-2	Mitigate (as necessary)	March 2005	Unknown	Unknown
		9-3	Programme to minimise forest clearing	September 2005	1	1
		9-4	Rehabilitation of unnecessarily cleared areas	December 2006	Unknown	Unknown
10	Communication strategy	10-1	Stakeholder identification	March 2004	5	1
		10-2	Stakeholder engagement mechanisms	September 2004	10	2
		10-3	Implement strategy	September 2005	25	10
11	Employment strategy	11-1	Develop strategy	December 2004	10	1
		11-2	Implement strategy	Ongoing	100	20
12	Consolidation of social investment	12-1		September 2004	5	NA
13	Private enterprise promotion	13-1	Develop SME strategy	March 2004	10	2
		13-2	Train SME	September 2004	50	10
		13-3	Create market space opportunities for SME's	September 2004	NA	NA
14	Socio-economic baseline	14-1	Conduct socio-economic baseline	May 2004	20	NA
15	Employ HSEC manager and officers	15-1	Appoint 2 full-time HSEC officers	March 2004	NA	50
16	Improved monitoring	16-1	On-site monitoring of air quality	December 2003	NA	2
		16-2	Monitoring of surface water runoff	December 2003	NA	2
		16-3	Establish indicator parameters (specifically aluminium, iron) rather than measuring/data collection of wide range of the parameters.	December 2005	NA	6
		16-4	Other environmental parameters (as defined by HSEC MS)	December 2004	30	15
Total					852	200

8 CONCLUSION

The environmental and social audit has on the whole found MTBM to be a well run organisation at its current levels of operation (1.5 mtpa). The audit process did, however, identify a number of areas where the current practice and performance falls short of international 'best practice'. The most noteworthy area that should be addressed is with respect to an integrated environmental management system. The advantages of implementing a formalised management system include:

- Compliance with Russian legislative, international best practice and IFC/EBRD requirements;
- Possibility of reduced operating costs and increasing competitive advantage through more efficient resource use and ensuring compliance with environmental biased purchasing; and
- Public recognition and motivation for employees.

The formalisation of the management system will ensure that the key gaps between current operations and international best practice are provided with an appropriate structure for their improvement.

The audit included a gap analysis in which gaps between current activities and international best practice were highlighted together with the significance of these gaps. These gaps were there prioritised as a function of their significance and corrective actions structured into an Environmental and Social Action Plan (ESAP). The key elements of the ESAP include:

- Integrated HSEC management system
- Immediate health and safety interventions
- Sewage treatment plant
- Spill management plan
- Erosion management
- Aspects characterisation
- Waste transition station and landfill
- Reclamation
- Ecological impacts
- Communication strategy
- Employment strategy
- Consolidation of social investment
- Private enterprise promotion
- Socio-economic baseline
- Employ HSEC manager and officers
- Improved monitoring

The mine has existing environmental approval to expand operations from 1.0 to 2.5 mtpa. Although an ESIA has not been prepared for this expansion, the audit and OVOS documents should provide sufficient basis to prepare such a document readily. The further expansion of the mine (from 2.5 to 6.0 Mtpa) will entail the preparation of a "Construction" OVOS – there is already sufficient information for the "Investment" OVOS to be readily prepared. There are no obvious fatal flaws evident from the audit that would have a bearing on the proposed expansion of MTBM to 6.0 mtpa providing that the expansion makes no demands for mining the ore bodies that could impact on the ichthyological reserve. The proposed expansion to 6.0 mtpa also presents opportunities to address a number of the corrective actions specified in the ESAP, but it should be noted that several of the required corrective actions need to be implemented sooner, and even as part of the completion of the 2.5 mtpa expansion.

APPENDIX A:
ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AUDIT: MIDDLE
TIMAN BAUXITE MINE

Results of the structured interview with MTBM
Management, Ukhta²²

The following persons employed by TMBM participated in the structured interview process. Continuity in this regard was provided by Mrs Maria Kotova (Environmental Manager).

Mr Karapetyan	General Director
Mr Blkokhin	Chief Engineer
Mr Vaydner	Head of Energy Department
Mr Nikitin	Head of Quality Department
Mr Pararin	Chief Mining Engineer
Mr Sirotin	Chief Geologist
Mrs Maria Kotova	Environmental Manager

The responses to the following questions are those of the mine's management; i.e. they represent the views of management and not those of the Due Diligence team.

1. CORPORATE STRUCTURE

- 1.1. Please explain the mine's corporate structure (i.e. is it a division of a parent company, or is it independently owned?)

The Timan Middle Bauxite Mine (TMBM) is owned by Timan Bauxite, which is a business subsidiary of KOMI Aluminium. Komi Aluminium is a larger business subsidiary of SUAL. SUAL owns 75% of the shares of TMBM; 25% are owned by the KOMI Republic (governmenty).

- 1.2. Please explain the corporate relationship between the mine, the proposed alumina plant and the smelter. What is the corporate relationship between the railway and electricity supply utility?

SUAL will provide the overarching corporate structure within which the expanded mining operations and the proposed alumina plant and smelter will operate.

- 1.3. Please provide copies of any draft agreements between the above entities (e.g. between

²² The structure of the interview is based on an environmental due diligence questionnaire compiled by the South African environmental law firm *Winstanley, Smith and Cullinan* – who are acknowledged in this respect.

the mine and the product processing facilities) should there be any formal relationship.

There is no formal relationship between the proposed business entities yet in place.

2. **SITE HISTORY**

- 2.1. What properties (land, buildings or other immovable property) are owned, leased, occupied or controlled by the mine.

The land on which the mine is located (and the mineral product – to which TMBM has licensed) is owned by the government. Mine buildings and immovable property that are on site (e.g. at the settlement area) in support of mining operations are owned by TMBM; i.e. all liabilities associated with such property are the responsibility of TMBM.

- 2.2. What moveable property (plant/equipment) is owned, leased, occupied or controlled by the mine?

TMBM owns all movable mining property (excavators, bulldozers, etc.). The rolling stock (rail wagons) used to convey bauxite from the mine (via the privately-owned section of railway line) to the junction with the main Moscow- Syktyvkar junction railway line is owned by the “Department of Temporary Exploitation”, a SUAL subsidiary.

- 2.3. Please furnish copies of all title deeds, mining rights and permits, and any leases or other documentation relevant to the occupation of the mining land and/or the immovable properties situated on it.

These documents (e.g. certificates of mining rights) are in the possession of TMBM and can be furnished for inspection. It was accepted by the Due Diligence team that the company does have the requisite approvals (reflected in deeds, licences, etc.) for the occupation of the mine property and the general conduct of its business.

- 2.4. What activities were carried out on the current mine property before the current activities commenced there?

Mining is the only use to which the land has been put. Prior to mining, the area existed in a wholly untransformed state (i.e. essentially a wilderness state); i.e. to the extent that environmental liabilities may exist, associated accountability rests with TMBM and not any previous occupier of the land.

- 2.5. What permits and/or other approvals were required and/or obtained in order to undertake the mining operations (and, for example, the operation of the railway)? Please make available copies of all applicable permits and/or approvals.

See 2.3.

3. **LAND USE ISSUES**

- 3.1. Is the property occupied by the mine (and/or the relevant portions of properties where discrete activities related to the mine's current business are carried out) appropriately zoned and/or otherwise demarcated in law for the activities carried out there?

The land is formally zoned for mining operations and support activities.

- 3.2. Please make available all documentation relevant to land use and zoning, including relevant approvals.

TMBM can provide proof that the land is zoned for mining and this can be furnished to the Due Diligence audit team for inspection. It was accepted that mining is conducted in accordance with the existing zoning of the land.

- 3.3. Have any activities been carried out on any of the properties in contravention of the zoning?

No operations other than mining have been conducted on the site – certainly nothing for which prior authorization has not been obtained. Whilst not in contravention to the zoning of the land, the mine's domestic waste disposal system is deficient with regard to permitting requirements.

- 3.4. Was all land or facilities acquired or constructed specifically for purposes of the current mining activity?

Yes

4. **NEIGHBOUR ISSUES**

- 4.1. To what purpose(s) is neighbouring land put?

The land immediately neighbouring the mine is largely untransformed and is managed by the government authorities as a forestry area. The degree of land transformation changes towards the south, where the effects of logging are more pronounced.

- 4.2. Has the mine previously received any complaints, claims, actions or proceedings (or threatened litigation) from any of its neighbours concerning the activities that take place at the mine (also complaints etc. related, for example, to the railway, etc.)?

Essentially, no; however, the cumulative effects of the mine railway and access road (also the gas pipeline servitudes to the south of the mine) on the integrity of the forest ecosystem, which is highly valued by, for example, the local community at Chin'avoryk, has been an issue of complaint.

- 4.3. If the answer to question 4.2 is positive, please furnish details of these complaints.

See above response.

- 4.4. Please furnish plans of the mine's lay-out, and any other maps, charts or diagrams that may be relevant to undertaking this environmental due diligence exercise.

Appropriate maps indicating the various ore bodies (currently in production and proposed for production) were shown to the Due Diligence team

5. **ENVIRONMENTAL MANAGEMENT ISSUES**

5.1. **Environmental (ecological) effects of opencast mining**

- 5.1.1. Please describe all environmental impacts caused by mining and related operations.

Mining is not considered to have resulted in environmental impacts of high significance – based on the premise that there has been an effective/desirable substitution of natural forest capital (forest directly affected by mining) for other forms of capital (economic and social). The disposal of sewage and domestic effluent (chlorinated, but not circulated through a proper treatment and disposal system) is an issue of concern, as is the discharge of rainfall runoff from areas disturbed through mining and related activities (high suspended sediment/clay load). This has the potential for polluted and turbid run-off to be released into the small black stream, which flows in to the Vorykva River - situated 4 km from the mine (a Fishery Protected system with a 1km protection zone extending landwards from either bank).

5.2. **Water use**

- 5.2.1. Please furnish us with copies of all relevant approvals that govern water supply, abstraction, use and discharge at the mine.

The water supply for the mine (mainly for potable and domestic use; also, water used for dust control during dry season) is sourced from a single borehole, which exploits an aquifer exploited at around 48 m depth. TMBM has a permit for special water use in this regard (issued by Ministry of Natural Resources). The permit is for the use of 23 000 m³ /yr (currently, approximately 7 000 m³ are consumed annually). The borehole supply system is monitored regularly. TMBM has a licence for the discharge of waste-water

- 5.2.2. Please describe all environmental impacts caused by water acquisition, abstraction, use and discharge at the mine.

There are no apparent impacts attributable to the extraction of water for domestic use. The impacts associated with domestic effluent and rainfall runoff from the mine are outlined in 5.1.1.

5.3. **Effluent and/or waste water discharge**

5.3.1. Do the mining activities result in the production of effluent and/or waste-water?

See 5.1.1 and 5.2.2.

5.3.2. If the answer to the previous question is positive, please supply information regarding the quantities of wastewater and/or effluent produced and disposed of by the mine.

The quantity of domestic effluent that is discharged is unknown; neither is the quantity of rainfall runoff from the mining area.

5.3.3. How does the mine dispose of effluent and/or waste water?

Domestic effluent is chlorinated prior to discharge into the receiving environment (via a soak away system). It is not subjected to biological treatment for nutrient reduction. Rainfall runoff from areas disturbed by mining and related activities, which is discharged, for example, via roadside drains, carries moderate quantities of suspended sediment (clay).

5.3.4. Is the effluent and/or waste water purified prior to discharge and if so, to what standards?

Only chlorination in the case of domestic effluent.

5.3.5. Is the discharged effluent and/or waste water monitored (i.e. its quality) and if so, describe the parameters that are monitored and how frequently monitoring takes place?

A complex monitoring programme is in place to establish the effects of mining (if any) on the ground water system. This comprises 32 boreholes and 16 surface water monitoring sites (including control sites far removed from the mine). Monitoring is undertaken at least monthly and more frequently in summer and autumn. Water samples are analysed for a range of parameters (pH, metals, BOD, radio activity, etc.) Results that have been interpreted to date indicate that no impacts can be traced to mining activities –including impacts relating to the discharge of domestic effluent.

5.3.6. Describe any measures taken to avoid and minimise the discharge of effluent and/or waste water.

If mining operations are expanded, TMBM plans to construct a run-off settling pond to retain suspended sediment - In response to the known environmental sensitivity of the Vorykva River. The mine also plans to build a proper domestic effluent treatment and disposal system in order to ensure its acceptable quality prior to discharge into the receiving environment. These measures must still be implemented.

5.4. **Water pollution**

5.4.1. Are there any ground or surface water bodies above, near or beneath the mine?

There is a well-developed aquifer beneath the mine, which is currently exploited as a supply of high quality potable water. A study of the aquifer characteristics is documented in a report held by TMBM. Apart from the Vorykva River and the small black stream that drains into the river from the mine property, there are no well-developed surface water bodies in the vicinity of the mine (e.g. there are no lakes in close proximity).

5.4.2. Please describe fully any activities that cause or have the potential to cause pollution to water bodies at or around the mine.

See previous responses (e.g. 5.3.3).

5.4.3. Are you aware of any ground or surface water pollution either on the mine or adjacent to it, arising from current activities undertaken there?

Mining-related pollution of ground water is not anticipated – thus far, monitoring confirms this. Pollution of surface water bodies, in particular the Vorykna River is an issue of concern, particularly if mining operations expand to 6.5 Mt/a and include the extraction of ore body no. 11 (i.e. increased run-off of water carrying a high suspended sediment load; also, greater quantities of produced domestic effluent).

5.4.4. Are you aware of any activities or practices that took place on or near the mine in the past that may have caused water pollution?

None

5.4.5. Have any groundwater surveys been conducted during the mine's history? If so, please furnish us with copies of survey reports.

A comprehensive groundwater monitoring programme is in place for the mine (see 5.3.5). A data report was presented to the Due Diligence audit team - the interpretation of which indicates that the mine is not having a polluting effect on the groundwater and monitored surface water bodies.

Some examples of groundwater monitoring results indicate the following:

pH = around neutral

Mn 0.01-0.33 mg/l

Cr 0.003-0.009

Fe <0.1-0.4

Cu 0.0004-0.002

Pb 0.0015-0.0004

Mo 0.0006-0.02

- 5.4.6. Describe any measures taken to avoid and minimise the discharge of contaminants that could or may cause water pollution.

No specific designs have been considered to avoid or minimise the discharge of contaminants that might cause water pollution (explained by the positive present situation reflected via the monitoring programme). There are plans to construct a drainage impoundment structure down-gradient of the Central Blending Yard at the railway loading area.

5.5. **Air pollution**

- 5.5.1. Are any atmospheric emissions produced at the mine that have a significant environmental impact?

Exhaust emissions are produced by mechanical equipment used on the mine (e.g. ore trucks, excavators, electricity generators). These are operated within manufacturer specifications and no associated environmental impacts are, therefore, anticipated.

- 5.5.2. Does the mine use any boilers, smoke-generating or heat-producing devices?

A diesel-fuelled burner is used to heat the workshop area on the mine. This is operated according to manufacturer specifications.

- 5.5.3. Does the mining operation give rise to dust-related impacts?

When more use was made of road conveyance of bauxite, this gave rise to dust-related problems. Since the extension of the rail system to the mine, this problem has been largely eliminated. The conveyance of bauxite by rail does not generate dust (wagons are not filled to the top and the product is generally wet).

5.6. **Waste management**

- 5.6.1. What quantities of solid waste does the mine produce *per annum*, and what is the nature of this waste?

The overburden that is stripped from above the bauxite is not regarded as solid waste. Waste products such as used oil, broken mercury lamps, etc. are stored temporarily on the mine before being dispatched for proper disposal or re-cycling (e.g. used oil) in Ukhta.

- 5.6.2. Has any solid waste ever been disposed of at the mine? (If so, please provide copies of any authorisations obtained.)

No.

5.6.3. Where is solid waste disposed of?

Waste is disposed in Ukhta. It was pointed out to the Due Diligence audit team that the situation regarding waste generation on the mine is best understood through inspection of the mining and support operations.

5.6.4. Please identify and describe comprehensively past waste streams of any significance.

The area has not been used for alternative uses in the past (i.e. no waste previously generated).

5.6.5. In the event that the mine uses a waste disposal company for the disposal, recycling or re-use of any of its waste, please furnish appropriate details of that contractor and a copy of any agreement that regulates that relationship – in particular, any environmental performance standards specified in such an agreement.

A contractor is used to dispose of problematic waste (i.e. used oil, broken mercury lamps, etc.). The terms of the contract are specified in writing (i.e. what the expectations are regarding the proper disposal of the waste).

5.6.6. Please provide details of any system for monitoring the *generation* and *disposal* of waste on the mine.

The mine has a waste management plan, which is approved by the competent authority - to which a report is submitted every six months (in a standard format that meets permit requirements).

5.7. **Noise**

5.7.1. Is any significant noise generated at the mine?

Mechanical (e.g. vehicles) and electricity-producing devices used on the mine generate noise. Blasting is also carried out regularly. Past investigation of the effect of noise on, for example, fish have shown that there are no resultant impacts.

5.7.2. If so, is the noise level measured? How loud is the noise?

Typical noise levels from different sources on the mine have been measured in the past by an official monitoring body. The noise levels have been found to be acceptable.

5.7.3. Have any complaints ever been received concerning any noise emissions? (If so, please provide comprehensive details.)

None received.

5.8. **Odours**

5.8.1. Are any noxious or offensive odours generated at the mine?

None are generated

5.8.2. Have any complaints (from either public bodies or individuals) ever been received concerning odour emissions?

N/A.

5.9. **Soil pollution**

5.9.1. Are you aware of any soil pollution either at the mine or adjacent to it, resulting from mining or support/related operations?

There are no significant sources of soil pollution.

5.9.2. Are you aware of any activities or practices that took place on or near the mine in the past that may have caused soil pollution?

There have been no previous polluting activities in the area.

5.9.3. Have any soil surveys pertaining to pollution issues been conducted in the mine's history? If so, please furnish us with copies of these survey reports.

A comprehensive environmental monitoring programme, which has been approved by the competent authority, is in place. This also addresses potential soil pollution issues. The results indicate that there has been no measurable pollution as a result of the mine's operation.

5.9.4. Has any soil on land at the mine ever been subjected to any remediation or rehabilitation measures to deal with any pollution or other degradation of the property? (If so, please provide comprehensive details.)

No.

6. **HAZARDOUS SUBSTANCES**

6.1. Please list the names and quantities of any hazardous substances stored on the mine (chemicals, poisons, explosives).

The mine has an inventory of hazardous substances stored at the facility (relatively few such substances are used).

- 6.2. What procedures govern the control, storage, transport and use, and disposal of these substances and of any containers or other material contaminated by hazardous substances? Please furnish all relevant details (including written agreements where relevant).

The most relevant substance is dynamite, which is used for fragmenting the bauxite ore. This is not stored on site, but is supplied on demand by a certified blasting contractor. The conditions under which explosives are stored, transported and used are very strictly defined and enforced by the competent authority.

- 6.3. Do any of the buildings or equipment located on the mine contain asbestos or lead?

Asbestos is not used as a roofing material and is unlikely to have been used for any other purpose on the mine. Vehicle batteries contain lead.

- 6.4. Have there been any significant spills of hazardous substances on site or elsewhere (attributable or related to mining activities), which caused significant pollution or environmental degradation? (If so, please describe any measures taken to remediate any pollution or environmental degradation caused and to prevent future incidents of the same nature.)

No.

7. **FUEL**

- 7.1. Please describe in detail the operational activities that regulate the storage of oil and any other fuel types at the mine.

The main fuel types used on the mine are benzine (petrol) and diesel. These are stored in relatively small volumes – the preferred strategy being to source top-up supplies at frequent (weekly) intervals. Fuel is expensive and it is considered to be not cost-effective to hold large volumes thereof in storage.

- 7.2. What quantities of oil and/or other fuel types are stored at the mine?

Diesel (200 m³); petrol (50 m³).

- 7.3. Have there ever been any leaks from fuel storage tanks? If so, please furnish all relevant details regarding measures taken to control leakage, to remediate any environmental damage caused and to prevent future occurrences of the same type.

The have been no major fuel leaks on the mine. The high cost of fuel makes it essential to minimise any wastage thereof.

- 7.4. Please furnish copies of all reports, assessments and plans relevant to the nature and operation of the mine's oil/fuel storage facilities.

There are no such plans. Temporary storage facilities are currently in use, and plans will be developed for the construction of more permanent facilities.

- 7.5. Please provide all appropriate detail on the collection, storage and disposal of waste oil/fuels.

Used oil and other similar products are stored temporarily on the mine prior to dispatch for recycling. Small quantities of waste oil are burned from time to time – an incinerator is not used.

8. **ENVIRONMENTAL COMPLIANCE**

- 8.1. Are you aware of any environmental (or related permits), registration certificates, other approvals or exemptions the mine requires that it does not hold at present?

It is believed that the mine currently holds all most permits that are required. Deficiencies in this regard include a permit for landfill operation and domestic effluent treatment and disposal. As upgrades of these two operations are budgeted for the mine will submit permit applications.

- 8.1.1. Please furnish copies of all permits, approvals, records of decision and the like (including any applications for permits or other approvals) that have any bearing on the environmental performance of the mine. These should include (but not be limited to) permits or approvals required in terms of relevant legislation.

A permit/legislation compliance audit of the mine was conducted by Ekoservis Ltd in July 2002. Essentially, this audit found that the mine was in possession of all key permits required in terms of legislation. The mine's production activities are generally in compliance with requirements of environmental legislation. A permit for the discharge of effluent from the sewage treatment facility needed to be obtained. Emissions generated by the mine still had to be quantified and evaluated against the maximum permissible level of emissions.

9. **OCCUPATIONAL HEALTH AND SAFETY**

- 9.1. How many people are employed on the mine?

The mine employs 221 personnel. Of this total, 49 are employed at the company's Ukhta offices and 172 are employed at the mine.

- 9.2. Please furnish us with copies of all correspondence, records and/or approvals relevant to compliance with the provisions of the relevant occupational health and safety legislation.

The mine is in compliance with all provisions of OHS legislation. Regular inspections by the competent authority confirm this.

- 9.3. Please furnish us with copies of all documentation demonstrating compliance with the provisions of the regulations promulgated under the relevant occupational health and safety legislation.

See response to 8.1.1.

- 9.4. Does the mine have an occupational health and safety policy?

The mine does not have an OHS policy per se – the requirement for which is perceived to be met through the by demonstrated adherence to stringent legislative requirements. All personnel are required to acknowledge (sign) that they understand and agree to abide by the 'safe operating procedures' that are issued by the mine management.

10. **ENFORCEMENT**

- 10.1. Has the mine ever received notice from any enforcement authority concerning the unauthorised or irregular operation of any equipment or activity at the mine?

Notice issued by various authorities to adjust or improve aspects of the mine's operation is received from time to time; however, none of these have related to environmental performance and none has attracted penalties of any kind.

- 10.2. Has there previously been any significant incident (defined to mean noteworthy or of considerable effect, and including any spill or leak), which has not been reported to the relevant authorities?

There have been some OHS incidents, which have been regarded as borderline with respect to the need for these to be reported; i.e. they have not been reported. There have been no other reportable environmental incidents.

- 10.3. Is there any prosecution pending against the mine, or its management or employees or independent contractors in respect of contravention of any environmental legislation?

No.

- 10.4. Please furnish comprehensive details of notices issued, inspections made or enforcement actions taken by any authority in respect of the mine.

N/A.

11. **LOCAL/REGIONAL AUTHORITY**

- 11.1. Please furnish the telephone numbers and other relevant contact details of the local/regional authority/ies under whose jurisdiction the mine falls.

Details of all authorities whose area of jurisdiction affects the mine are provided in the permit compliance audit conducted by Ekoservis Ltd. In July 2002.

- 11.2. Is the mine management aware of any local authority and/or regional authority by-laws or regulations that govern aspects of the mine's operations (such as water supply and waste disposal)?

There are, for example, District bylaws about which the mine is aware and with regard to which there is compliance. For example, the designation of the Varykva and Vym' rivers (situated close to the mine) as ichthyologic reserves is specified through such regulation – which is recognised by the mine.

- 11.3. Is the mining operation contravening any of the local authority's regional by-laws or other legislation?

Mining activities are monitored by the state inspectorate, which alerts the mine to compliance issues requiring attention. The mine responds accordingly.

- 11.4. Does the mine have copies of the by-laws or other local authority legislation that apply to it and its operation?

Yes.

12. **CONTRACTORS**

- 12.1. Please furnish us with a list of all agreements with contractors where obligations to comply with relevant environmental regulations or laws are stipulated, as well as any agreements that do not contain such obligations but in the view of the mine's management, should contain reference to such responsibilities.

Contractors are employed to conduct various operations on the mine (e.g. stripping of overburden, implementation of the mine's environmental monitoring programme). Contracts negotiated with these service providers specify the performance standards that are expected, including those pertaining to environmental performance.

13. **TRANSPORT**

- 13.1. Does the mine transport its raw materials and/or products to and from the mine itself (does the mine own the railway)?

Product is railed for refining by SUAL's "Department of Temporary Exploitation" – a different business entity to TMBM.

- 13.2. If not, are these goods transported by third parties, and if so, are those third parties appointed in writing by the mine?

See above.

- 13.3. If the answer to the previous question is in the affirmative, please furnish copies of all relevant agreements – especially pertaining to environmental performance standards to which such parties are expected to adhere.

There are written performance criteria stating TMBM's expectations of the "Department of Temporary Exploitation" (e.g. schedule of quantities to be transported and delivery dates). Such contract agreements also address environmental performance criteria to be met by TMBM – e.g. permit requirements pertaining to wagon filling levels (to minimise dust generation).

14. **GENERAL ISSUES**

- 14.1. Does the mine have a disaster management plan? Please furnish us with a copy of that plan.

A disaster management plan has been prepared; however, this is considered to be out of date. A copy of the plan is not held at the mine.

- 14.2. Is there adequate control over public access to the mine (fences, control gates, notice boards)?

Public access to the mine is controlled through a checkpoint located at the road/rail crossing of the little black stream. Given the 160 km separation distance between the mine and the closest town (Chin'avoryk), problems regarding uncontrolled public access to the mine are minimal.

- 14.3. Please furnish copies of any environmental policy, environmental management plan or environmental management system implemented by the mine, or to which it subscribes.

A mining rehabilitation plan (replacement of overburden, planting of trees) comprises part of the mine's 23 volumes of project documentation. No rehabilitation has been conducted thus far, and none is scheduled for 20 years.

APPENDIX B:
ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AUDIT: MIDDLE
TIMAN BAUXITE MINE

**Outcome of the public meetings in Emva and
Chin'avoryk**

Emva

Боксит Тимана приглашает к диалогу
Итоговый документ встречи с общественностью

15.09.03, г. Емва

15 сентября в районном центре Емва состоялась встреча с общественностью, посвященная перспективам развития Средне-Тиманского бокситового рудника. Встреча проходила в Администрации Княжпогостского района. Цель встречи – информирование населения района о планах развития рудника и обсуждение плана общественных консультаций. Также предполагалось, что встреча будет способствовать выявлению ожиданий общественности и наиболее острых проблем, связанных с развитием рудника. Повестка встречи приведена в Приложении 1. Встреча была организована Администрацией района, в ней принимали участие жители Емвы и Чиньяворыка, представители служб Администрации. На встрече присутствовали представители Международной финансовой корпорации (МФК) и Европейского Банка реконструкции и развития (ЕБРР). Список участников слушаний приведен в Приложении 2.

Встречу вел Глава Администрации Княжпогостского района Попов Виктор Александрович. С докладом о планах развития глиноземно-алюминиевого комплекса в Республике Коми выступил руководитель проекта «Комиалюминий» К.Л. Чугункин. Об организации работы и экологических аспектах деятельности Средне-Тиманского рудника рассказал генеральный директор ОАО «Боксит Тимана» А.В. Карапетян. Общую оценку экологическим аспектам деятельности рудника дал представитель независимой экологической фирмы CSIR Шен О'Берн. План общественных обсуждений в рамках экологической оценки будущего проекта представила Хотулева М.В. Центр по экологической оценке Эколайн.

С вопросами и предложениями выступили:

- житель района. Какова перспектива развития – вахтовый метод или строительство поселка?

Чугункин: вопрос будет решаться комплексно. Будет расширяться станция в Чиньяворыке. Соответственно, нужны будут работники. Предпочтение будет отдаваться жителям поселка. Будут также новые места на руднике. Там работы будут организованы вахтовым методом.

- Житель: планируется ли вторая ветка?
Чугункин: Объем перевозок будет возрастать. Будет перевозиться боксит. Часть базальта будет перерабатываться на щебень. Соответственно, общий объем перевозок увеличится с 3,5 млн. т/год до 7 млн. т/год. Строительство второй ветки не предполагается.
- Предполагается строительство дополнительных разъездов.
Базовые предприятия Чиньяворыка (М-222) теряет мощность, СУАЛ – наращивает ее. Необходимо наладить систему обучения и переобучения, чтобы жители могли получить работу.
- Вопрос будет прорабатываться.
Директор школы в Емве. Нельзя ли организовать обучение для выпускников нашей школы? Хорошо бы также организовывать познавательные экскурсии на рудник, с целью расширения кругозора выпускников, а также профориентации. Возможно, кто-то из них захочет в дальнейшем работать в подразделениях СУАЛ.
Билл Шор. Вопросы обучения, подготовки и переподготовки кадров будут решаться комплексно, в рамках республиканской программы.
- Житель Чиньяворыка. Будет ли «Боксит Тимана» содействовать развитию школы и мед учреждения в Чиньяворыке?
- Карапетян. Мы к вам приедем и обсудим все вопросы в рамках подготовки проекта.
- Экологические аспекты:
 - a) Каким образом будет осуществляться рекультивация? Что останется после того, как рудник будет отработан?
 - b) Велико воздействие дороги. Жителей Чиньяворыка беспокоит красная пыль.
Билл Шор: мы надеемся получить рекомендации от специалистов, приглашенных для этой цели.
- Шен О'Берн. Мы проводили краткие исследования. Проблемы, поднятые вами, мы также отметили. Мы будем работать над рекомендациями по смягчению этих воздействий. Будут разработаны рекомендации.
- Директор школы №1. Бокситовая пыль влияет на здоровье. Будет ли проводиться обследование детей?
Ответ уточняется.
- Волкунович, Председатель поссовета Чиньяворыка. Мы возлагаем большие надежды на этот проект. От этого проекта во многом зависит наша судьба. Хотелось бы, чтобы наш поселок изменился. Было бы хорошо, чтобы он принял вид хорошего рабочего поселка (например, как это выглядит в Южной Африке). И очень бы хотелось иметь в поселке храм.
Билл Шор. Спасибо. Это зависит от нас от всех. Совместными усилиями мы многого можем добиться.
- Предприниматель из Емвы. Необходимо развитие малого и среднего бизнеса. Доход СМЕ напрямую зависит от доходов населения. Что получит каждый житель от реализации этого проекта?

Глава Администрации. Подробно рассказал об ожидаемых бюджетных поступлениях.

Билл Шор. Добавил, что это зависит от активности жителей (какие услуги они предложат компании?).

Хотулева Марина. Вопрос о перспективах развития малого бизнеса будет прорабатываться, в т.ч., в рамках оценки воздействия на окружающую среду. Вернемся к этому вопросу в рамках общественных обсуждений.

- Жуковский, рыбинспекция.

Нас тревожит повышение доступности территории. Незаконная рыбалка и охота (не связанная с деятельностью рудника) принимает все большие размеры, рыбные запасы уничтожаются.

Предложение: приблизить службы рыбоохраны, охотнадзора к месту, сделать совместный пункт контроля. Кроме того, необходимо, чтобы хотя бы часть платы за ущерб оставалась на месте. Средства на восстановление рыбных запасов должны расходоваться целевым образом.

Глава Администрации. Необходимо забить строку в бюджете. Давайте поработаем над этим вопросом.

Карапетян. Основа – это мониторинг. Предприятие уделяет этому большое внимание, проводит ихтиологический мониторинг. Кроме того, мы две недели назад организовали пункт контроля. Посторонние люди на территорию не попадут.

Глава Администрации. Давайте решать проблему совместно: Администрация, «Боксит Тимана», спецучреждение, надзорные органы.

- Павел Павлович. Почетный житель Емвы. Нас интересует, что будет на руднике через 35 лет? Озеро?

Остро стоит проблема дорожной пыли. Что будет дальше?

Шен О'Берн. Мы предложим компании свои рекомендации по этим вопросам.

Директор школы. Поблагодарила «Боксит Тимана» и СУАЛ за постоянную поддержку. Отметила, что главный вопрос – вопрос становления человека. Будем и дальше решать его вместе.

Заключительные слова.

Кристофер Глосс. Нам понравился процесс сегодняшних обсуждений. Вопросы стимулирующие. Мы рассматриваем процесс вовлечения общественности как критически важный для успеха проекта. Спасибо всем за участие. Надеемся на дальнейшее сотрудничество.

Представитель EBRD. Мы приехали не для того, чтобы делать долгие выступления, а для того, чтобы слушать. Сегодняшний процесс нам показался весьма полезным. Надеемся на сотрудничество.

Глава Администрации. Подчеркнул, что к нам пришла серьезная компания, серьезно относящаяся к проблемам района, настроенная на сотрудничество. Со своей стороны, мы дабы поддержать ее деятельность. Пожелал успеха в реализации проекта.

Приложение 1. Повестка дня

1. Приветствия, цели и задачи встречи (Глава Администрации)
2. О проекте расширения Средне-Тиманского рудника (К.Н. Чугункин, руководитель проекта, директор ЗАО «Алюминий Коми»)
3. Экологические аспекты деятельности Средне-Тиманского рудника (А.В. Карапетян, Генеральный директор ОАО «Боксит Тимана»)
4. Экологический аудит Средне-Тиманского рудника (Sean O'Beirne, Южная Африка)
5. Общественные обсуждения (М.В.Хотулева, Центр по экологической оценке Эколайн)
6. Общая дискуссия
7. Заключительное слово Главы Администрации

Chin'avoryk

Боксит Тимана приглашает к диалогу
Протокол встречи с общественностью
12.09.03

п. Чиньяворык

Повестка дня

1. Обсуждение текущих (экологических, экономических и социальных) проблем, связанных с работой рудника ОАО «Боксит Тимана».
2. Информирование общественности о планах компании по расширению рудника и повышения производительности до 6.5 млн.т.

Выступали:

1. Председатель поселкового совета Волкунович А.С. Цели и задачи встречи.
 2. Зам.Главного инженера Блохин. О перспективах расширения Средне-Тиманского рудника.
 3. Шен О'Берн и Хотулева Марина. Экологические аспекты деятельности рудника.
- Ответы на вопросы.

Обсуждение:

Вопрос: (Оксана Ронк) – Бокситовые руды являются спутником урановых руд. Как обстоят дела с радиоактивным загрязнением?

Ответ (М. Котова) – Разъяснила, что бокситы не являются спутником урановых руд. По существу заданного вопроса сказала, что ОАО «Боксит Тимана» заказывал специальное радиологическое исследование в СЭС, а в настоящее время проводит мониторинг. Все показания в норме. В настоящее время данные передаются в СЭС. В будущем, по-видимому, целесообразно передавать их в сельсовет и/или публиковать в СМИ, для повышения осведомленности населения».

Вопрос: (Лариса) – Основная проблема для населения – дорога, от нее одна пыль. В настоящее время «красной пыли» стало меньше. Однако качество дороги очень низкое. Что собираетесь делать?

Ответ: (Блохин) – «Дорога не вся в нашей зоне ответственности. Давайте разберемся.

Вопрос: (неизвестный) – «Переезды через ж/д линию есть, но они не стыкуются с автодорогой (в т.ч. с боковыми съездами). Почему?»

Ответ (М. Котова) – «Есть отдельные недоработки при строительстве. Мы их будем устранять.»

Дополнение. Хотулева М.В. Возможно, это проблема отклонений от проекта?

Вопрос: (неизвестный) – Что будет строиться в Ченьяворыке? Уже были обещаны школа, больница, дом для учителей.

Ответ: (Блохин) – «Непонятно, кто обещал. Давайте разбираться. Мы построили кусок дороги и очистные. Не все из запланированного можно иметь сейчас, т.к. этот процесс растянут во времени.

Вопрос (неизвестный) – Хотелось бы понять, что конкретно будет строиться в Ченьяворыке.

Ответ: (Блохин) – Больше ничего.

Вопрос: (Нина Иннокентьевна) – «Что делать с мужьями и молодежью? В поселке безработица, повышается уровень пьянства. Вы их не берете. Очень ограничены возможности получения специальности.

Ответ: М.Котова и Блохин – Мы берем тех кто нужен. Их 120-ти работающих на руднике, из Ченьяворыка 50 человек. Проблему занятости надо решать комплексно.

Вопрос: (Нина Иннокентьевна). В лесу брали песок для строительства дороги. За собой не убрали. Остались завалы из срубленных деревьев. Не рекультивирован и сам карьер. В этих местах мы ходим по грибы. Это нам мешает. Предлагаю вам пройти в лес и убедиться самим.

Заключение:

Основные вопросы, наиболее интересующие население Чиньяворыка:

1. Необходимость обучения и переобучения.
2. Новые рабочие места.
3. Развитие инфраструктуры (школа, больница, качество дороги).
4. Рекультивация отработанных карьеров (песок, гравий для строительства дорог).

Председатель сельсовета: Давайте подведем черту, если больше вопросов нет. Вы выберете 4 –х человек, которые 15 сентября поедут в Емву и там расскажут о позиции населения по этому вопросу. Спасибо.

Собрание завершилось осмотром лесного массива, прилегающего к п. Чиньяворык (отдельный протокол прилагается).

ОАО «Боксит Тимана» приглашает к диалогу

В связи с планируемым расширением Средне-Тиманского бокситового рудника и развитием проекта строительства глиноземно-алюминиевого комплекса в Республике Коми, ОАО «Боксит Тимана» и ЗАО «Коми Алюминий» начинают серию общественных слушаний. Публичные обсуждения пройдут в период с сентября 2003 г. по середину 2004 г. в городах Емве, Чиньяворыке и Сыктывкаре и будут посвящены вопросам развития рудника, его вкладу в экономику района, а также экологическим аспектам проекта.

Первая из серии встреч с общественностью, на которой будет представлена общая информация о проекте и программа дальнейших обсуждений, состоится 15 сентября в 17.00 в Администрации Княжпогостского района.

Организаторами встречи выступают Администрация Княжпогостского района и «Коми Алюминий». В обсуждениях примут участие представители Европейского банка реконструкции и развития (ЕБРР), Международной финансовой корпорации (МФК), руководство проекта «Коми Алюминий», специалисты «Боксит Тимана», российские и зарубежные консультанты по вопросам оценки воздействия на окружающую среду.

Мы надеемся, что эта встреча положит начало большому и серьезному диалогу о перспективах развития Средне-Тиманского месторождения и строительства глиноземно-алюминиевого комплекса в Республике Коми.

Мы приглашаем всех жителей принять активное участие в нашей встрече. Ваши вопросы, предложения, пожелания помогут нам точно спланировать нашу работу и, в конечном итоге, найти оптимальные решения, отвечающие духу и принципам устойчивого развития, на благо жителям Республики Коми.

С обсуждаемыми документами можно ознакомиться в Администрации Княжпогостского района по адресу Емва, уд. Дзержинского, 71 и в Администрации Чиньяворыка.

Мы ждем Вас в 17.00 в актовом зале Администрации.

Администрация Княжпогостского района
Руководство проекта «Коми Алюминий»

APPENDIX C:
ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AUDIT: MIDDLE
TIMAN BAUXITE MINE

Public Consultation and Disclosure Plan for MTBM

FINAL REPORT

Public Consultation and Disclosure Plan

EXPANSION OF THE MIDDLE TIMAN BAUXITE MINE, KOMI REPUBLIC, RUSSIAN FEDERATION

Prepared By:

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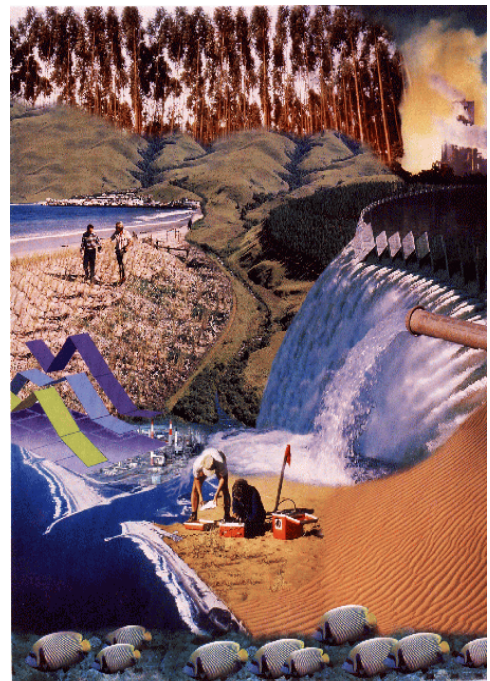
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In Partnership with:

ICF/EKO (Moscow)
DewPoint International (USA)
Snowden (Australia)

DATE:

21 November 2003



DOCUMENTS

The following documents will be produced during the course of evaluating the environmental and social implications of the proposed Integrated Aluminium Complex in the Komi Republic, Russian Federation.

Project	Public Consultation and Disclosure documents	'OVOS' documents	Environmental and Social Impact Assessment Documents
Integrated Project	Strategy for Public Consultation and Disclosure: Integrated Project		
Expansion of the Middle Timan Bauxite Mine	Public Consultation and Disclosure Plan	Declaration of Intent	Due Diligence Audit
		Investment OVOS	Environmental and Social Impact Assessment
		Construction OVOS	Environmental and Social Action Plan
Commissioning of an Aluminium Refinery near either of the towns of Ukhta or Sosnogorsk	Public Consultation and Disclosure Plan:	Declaration of Intent	Environmental and Social Impact Assessment
		Act of Site Selection	Environmental and Social Action Plan
		Investment OVOS	
		Construction OVOS	
Commissioning of an Aluminium Smelter near the town of Pechora	Public Consultation and Disclosure Plan	Declaration of Intent	Environmental and Social Impact Assessment
		Act of Site Selection	Environmental and Social Action Plan
		Investment OVOS	
		Construction OVOS	

This document

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1 BACKGROUND

SUAL Komi BV, a member of SUAL (the Russian integrated aluminium producer) is proposing to establish an Integrated Aluminium Complex development program in Komi Republic (North Urals, Russian Federation). The program comprises three separate projects :

- **Project 1: Expansion of the existing Middle Timan Bauxite Mine** – including the necessary associated infrastructure – from the current operation of 0.9 to 2.5 million tons/year (Mtpa), with the possibility to expand further to 6.5 Mtpa.
- **Project 2: Possible commissioning of an Aluminium Refinery** near either of the towns of Ukhta or Sosnogorsk (depending on the outcome of a site suitability assessment) with a proposed capacity of 1.4 Mtpa.[#]
- **Project 3: Possible commissioning of an Aluminium Smelter** near the town of Pechora with a proposed capacity 300,000 to 500,000 tpa.[#]

The Integrated Aluminium Program represents one of the most significant expansion developments with “greenfields” projects, currently being evaluated in the Russian Federation. The Komi Aluminium projects are considering by Komi Government as the key point of economic growth and sustainable development of Komi Republic. SUAL Komi BV realizes the big social and environmental responsibility and follows the principles of responsible business.

As a key component to determining the feasibility of the aluminium projects and in accordance with Russian legislative requirements and international norms, SUAL Komi BV are required to undertake an Environmental Impact Assessment (EIA) for each of the three Projects. Public consultation is integral to the EIA process and provides an opportunity for all people to identify opportunities and concerns associated with development projects. The primary objective of public consultation is to provide a process to improve the decision making process whereby the public, technical specialists, the authorities and the developer work together to produce a better project through informed decisions than if they had worked independently. In addition, public consultation is recognition that all people have environmental and societal rights and responsibility.

This document outlines the approach for public input into Project 1: Expansion of the existing Middle Timan Bauxite Mine and should be read in conjunction with the *Strategy for Public Consultation and Disclosure* that has been prepared for the Integrated Aluminium Complex in the Komi Republic Russia (CSIR, 2003).

[#] The specific locations of the development sites are dependent on ongoing site suitability assessment processes being undertaken by SUAL Komi BV.

2 SETTING OF MIDDLE TIMAN BAUXITE MINE

Middle Timan Bauxite Mine (MTBM) was established in 1996. It is located in the north of Knyazhpogost district of the Komi Republic in the Russian Federation.



Figure 1: Location of Middle Timan Bauxite Mine (MTBM)

Knyazhpogost district occupies an area of 24,600 km² and has a population of 33,100 with 53 settlements. The district capital is the city of Emva which contains the district sub-ordination. The distance from Emva to Syktyvkar is 125 km. Knyazhpogost District is mostly a rural area with no big cities. The main settlements are: villages Sindor, Tract, Meschura, Vet'yu, Chin'avoryk, Seregovo, Shoshka, Knyazhpogost.

There are 75 enterprises registered in Knyazhpogost Administration. The biggest ones are: "Knyazhpogost factory DVP", "Knyazhpogost SelMash" (agricultural machinery construction), "Kyplovski LesPromHoz" (forestry enterprise); five departments of M-222 enterprise, state enterprise "Seregovski salt-making production", "Bauxite Timan" company, "Dolomite" company.

The key industries are: forestry and timber production (85% of total production). The other industries are: food production (4,5%), light industry (6,5%), machinery and metal-working (3,1%). Small business is presented by 20 SMEs and 634 individual businessmen registered in the District Administration.

The official level of unemployment in the District is 3.5% (630 persons) which is higher than the average level in Komi Republic (2.1%). The number of unemployed persons per 1 vacancy is 4.9 (compared with 2.1 in Komi Republic)²³.

The Knyazhpogost Administration has experience in conducting the public hearings but mostly associated with smaller projects.

3 MTBM EXPANSION: PUBLIC CONSULTATION AND DISCLOSURE POLICY

The main aim of PCDP for the MTBM expansion is to develop an environmentally and socially sound project through a participatory approach to development. The PCD project policy focuses on the promotion and further development of the MTBM environmental and social practice. Special attention will be paid to the specific issues of rural community involvement/community building. The linkages to the Refinery and Smelter projects will help to build trust and good relationships between the company and the communities and NGOs for all aluminium projects.

The stakeholders are listed in Annex 1 (Communication list).

The PCDP includes three stages:

1. Preliminary Assessment;
2. Main stage and Public Hearings;
3. Concluding stage.

These stages are legally established in OVOS Regulation of 2000. In addition, the first stage is partly combined with ESHS Audit required in IFC/EBRD policies.

²³ This is the official data of Stage Centre of Employment. The real level of unemployment may be higher as far as the low percentage of unemployed people is addressed to the Centre.

3.1 Stage 1: Preliminary Assessment

The purpose of public consultation during this Stage will be to present the proposed project to the public and to identify all issues of concern that will need to be evaluated in the more detailed stages of assessment (Stage 2). The stage is typified by the following:

- Wide information dissemination;
- Identification and specification of project target groups;
- Evaluation of interests and preferences; and
- Specification of significant environmental aspects that are subject to OVOS/EIA.

This stage has been already been initiated with the series of individual consultations with key players and two public meetings carried out in Emva and Chinyavoryk. These were undertaken within ESHS Audit in September, 2003. These meetings and consultation have been used as one of the tools of the Audit and to identify stakeholders (Annex 1, Communication list, in Russian) and problems. The role-players from other areas (Pechora, Sosnogorsk, Ukhta, Syktyvkar) will be invited to the following public meetings and other PCDP events.



Plate 1. Public meeting in Emva: (a) the question suggested by the Head of Chin'avoryk A. Volkunovitch; (b) the answer of the General Director of Bauxite Timan, Alexan Karapetyan.

The key issues of public concern are:

- The potential impact on the Vym'sk' Reserve and the rivers Vym' and Vorykva (associated with the mining extension);
- The railway extension and potential impact on the settlement area;
- "Red dust" on the settlement area;
- Rehabilitation of sand carriers associated with roads construction.
- Job opportunities;
- Social development issues.

The agenda of the two meetings is shown in Annex 2, in Russian.

The next stage requires further information dissemination. A Public Visitor Center has been established in Knyazhpogost District Administration (Emva) in early September (Dzerzhinskogo, 71, Emva). The centre is currently dormant but will be resumed in late November/early December when consultation starts for Phase 1b.

A 'hot-line' telephone number [(82139) 92-595]²⁴ has been announced in the local newspaper "Knyazhpogost News" and on local radio²⁵, as well as being posted on the streets. Timan Bauxite also plan to establish a hot line in their Ukhta offices and this will be operational from late November 2003 prior to the start of consultation for Phase 1b.

The next step will be to prepare terms of reference for specialist studies and public discussion. The "lighter forms" of public consultation are considered as the most appropriate at this stage of the process, e.g. roundtables, public meetings, and individual consultations. Public involvement activities will be accompanied by a series of educational events (short seminars, training etc.) to increase the capacity of local stakeholders in the field of environmental assessment and balanced solutions for sustainable development. This part of Public Involvement Strategy is especially important to provide the reliable basis for public participation for future developments. It will also facilitate the process of community development contributing to the sustainable development of the whole region and should be developed through an environmental management and social partnership plan.

Stage 1 of public involvement will result in preliminary assessment materials including OVOS/EIA Terms of Reference and a detailed Public Involvement Plan (PIP) or (Public Consultation and Disclosure Plan (PCDP)).

The following activities will be undertaken during the Preliminary Assessment stage.

3.1.1 Stakeholder identification, registration and the creation of an electronic data base

The identification and registration of Interested and Affected Parties (I&APs) is ongoing for the duration of the study. As described previously, stakeholders from a variety of sectors, geographical locations (local, provincial, national, international) and/or interest groups can be expected to show an interest in the Aluminium Program. All stakeholder details should be captured and automatically updated as and when information is distributed to or received from stakeholders and must include the telephone numbers of those stakeholders. This ongoing and up-to-date record of communication is an important requirement of the authorities for public involvement.

An important way of identifying stakeholders is to use referral from other stakeholders during the course of networking for the compilation of a comprehensive database. Stakeholders will receive all project documentation (whether they request it or not) and special efforts will be made to encourage their attendance of meetings and public open days including telephonic contact.

²⁴ In early October the telephone numbers in the Emva area were changed. A new hot line number will be established with the onset of the public participation for Phase 1b.

²⁵ The local radio station is referred to as 'local broadcasting' and does not have a specific station identity.

3.1.2 Project announcement

The development proposal and associated environmental assessment process will be widely announced, with an invitation to the general public to register as I&APs and to actively participate in the PIP. This will be achieved via the following:

- A letter of invitation personally addressed to I&APs captured on the data base;
- Print media advertisements in local and regional newspapers (e.g. Komi News; Knyazhpogost News etc.);
- Radio announcements on Knyazhpogost and Komi radio stations;
- A media release to local, regional and national newspapers and radio stations. SUAL Komi PR department has start a series of media publications;
- The dissemination of a Background Information Document (BID) covering:
 - A simplified rationale for and description of the development proposal.
 - A description of the environmental assessment process, including public involvement and, importantly, milestones where stakeholder input is critical.
 - A description of potential issues and impacts (as understood at this time in the study).
 - An open invitation to stakeholders to participate, especially to attend public open days; and
 - The dissemination of BIDs at selected public places, including libraries, administration offices, schools, community centres, etc.

In addition, to announcing the project it will be necessary to create mechanisms whereby the public may receive information and/or provide comment and raise concerns. The following mechanisms will be created:

3.1.3 Stakeholder Workshop(s)

A stakeholder workshop will be held to focus on the clear elucidation of issues and the process that needs to be followed. The intended product of the workshop is the identification of key issues and associated impacts. As such, the workshop will assist in assessing the environmental viability of the proposed project by focusing environmental and social specialists who will be required to investigate and assess potential issues and impacts. Importantly, the proceedings of the workshop will be produced immediately and will serve as a basis for the compilation of an Issues Report.

The proceedings of the stakeholder workshop will be compiled as a discussion document and distributed to registered stakeholders on the database as well as made available to the general public through the Public Visitors Centre. This will allow all registered stakeholders to gain an appreciation of the issues and concerns raised by parties and the responses provided by the project team members in attendance. Importantly, the proceedings will place issues within the context of the environment and social issues as well as proposed developments.

3.1.4 Public meetings

Public meetings devoted to the discussion of draft ToR for OVOS will be organized by the local administrators in Chin'avoryk, Emva, Syktyvkar. However, it is important that the EIA project team determines the agenda and supports the authority in arranging logistics and facilitating the meetings.

Critical requirements for a successful and useful public meeting²⁶ are as follows:

- Clear definition of the aims and objectives of the meeting and the sharing of these with the general public in advance of the actual meeting.
- Advance notification to advise stakeholders of the meeting.
- Formal advance registration procedures, including acknowledgement to stakeholders that they are registered to attend.
- Advance provision of meeting materials to registered stakeholders.
- Advance briefing of grassroots people expressing an interest in attending the public meeting.

The proceedings of the public meeting will be compiled as a discussion document and distributed to stakeholders and all other people who attended the meeting, as well as upon request.

3.2 Stage 2: Main stage. EA Investigations, EIS preparation and public involvement.

The key objectives on the stage 2 will be:

- Understanding and identifying mitigation measures for key environmental issues;
- Understanding and identifying mitigation measures negative social impacts associated with the project and developing plans to enhance social development;
- Company-community social partnership building; and
- Developing an environmental management and social partnership plan with the local community.

On the basis of the ToR (developed in the previous stage) an Environmental Impact Statement is prepared. The draft EIS is presented to stakeholders for their comment and input. All comments are collated and analysed. Reasonable suggestions resulting from public input should be taken into consideration prior to finalisation of the EIS.

The following activities will be undertaken to ensure that this Stage of the Project is achieved successfully.

3.2.1 Distribution of Draft Environmental Impact Statement (EIS)

The following activities will be undertaken:

- Prepare and produce an EIS Summary Report for those stakeholders that have neither the time nor the inclination to review the full EIS and associated Studies. The EIS Summary Report will be a non-technical abridged version of the full EIS, with emphasis on findings, conclusions and recommendations. The report will be widely distributed to all registered stakeholders who will be informed as to where they can obtain additional and more detailed information and findings.
- Announcing the availability of the Draft EIS and via:
 - Personalised letters to all stakeholders on the data base.
 - Telephonic notification of stakeholders.
 - Print media advertisements in Knyazhpogost News and regional newspapers, and a radio advertisement.
 - A media release to local and regional newspapers and radio stations.

²⁶ A “dry run” meeting for project team members to finalise presentations and to strategise for discussion sessions will be held to ensure that all messages at the public meetings are clear and consistent.

- The distribution of the Draft EIR and Specialist Study Reports as follows:
 - Mailing or direct delivery of the summary EIS to all stakeholders (including community leaders) and other I&APs who register to attend the public meeting.
 - Leaving copies available at public venues such as libraries, community centres town hall's and schools – this will include comment sheets and pens so that participants can lodge comments directly at the venue without the need to mail comments.
- Discussion of the contents of the Draft EIS with community leaders and members proactively, and upon request.
 - Receiving and processing public comments on the Draft EIS through written comments, including email.
 - Verbal comments arising from grassroots community discussions.
 - Verbal comments arising from public meetings to discuss the Draft EIS

3.2.2 Public meeting

One public meeting, in the middle of the public comment period for the Draft EIS, will be conducted. The primary purpose of the meeting will be to discuss the various reports and to obtain detailed comments from the general public. The meeting will be advertised in the local and regional press, and will be open for all members of the public to attend.

The proceedings of the public meeting will be compiled and distributed to stakeholders, as well as upon request. The arrangements for the public meeting are as per Section 5.1.4.

3.3 Stage 3: Concluding stage

Once the EIS has been prepared, feedback will be provided to the stakeholders as to how their issues have been considered and addressed in finalizing the EIS. In addition, once the final decision has been made on the proposed project by the authorities, all registered stakeholders will receive a letter conveying the outcome of that decision.

3.4 Consultation with the environmental authorities

The key objective on this stage is to provide feedback to the interested parties, strengthen the social partnership and start the implementation of the environmental management /social partnership plan. In addition to the above stage-specific activities, meetings will be held by the environmental team with the authorities at local, regional and federal level **throughout the environmental assessment and public involvement processes**, particularly when milestones are reached.

The activities outlined generally above are specified in more detail in the following Figure (2).

*Public Consultation and Disclosure Plan
Middle Timan Bauxite Mine Expansion*

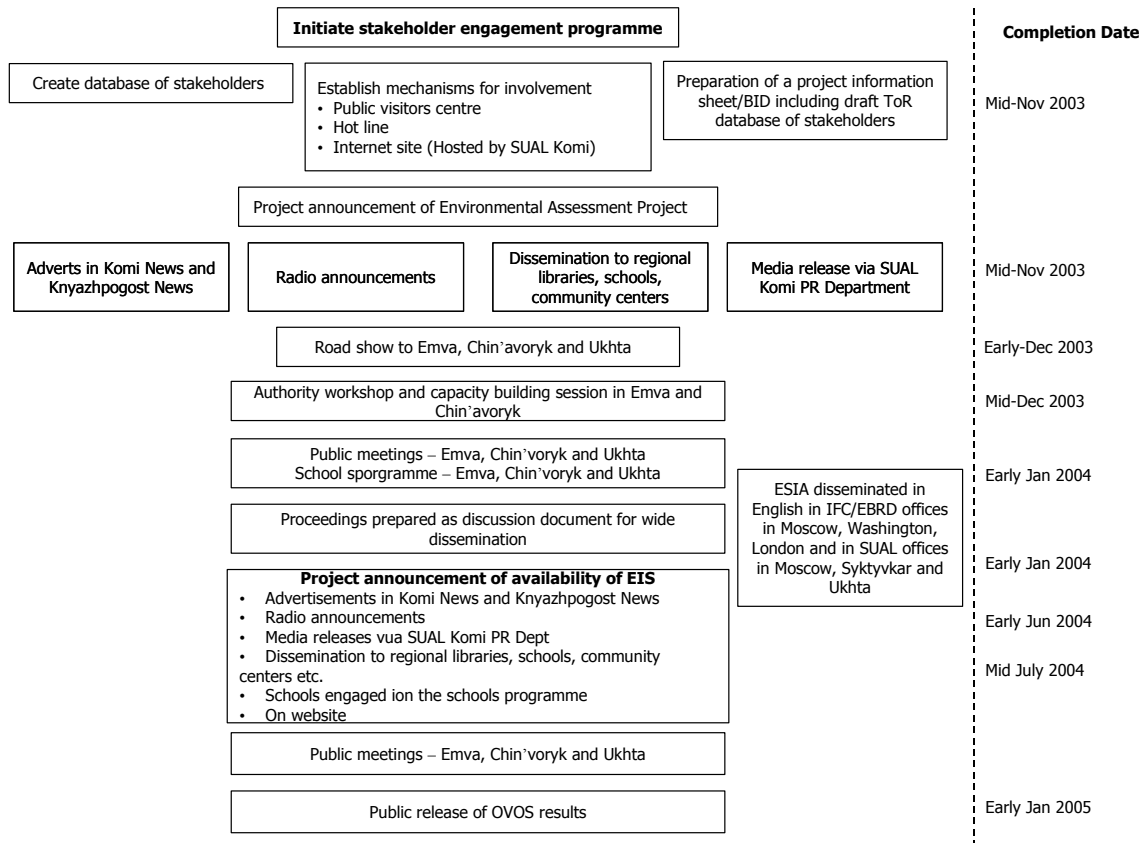


Figure 2: Middle Timan Bauxite Mine Public Consultation and Disclosure Plan

4 PUBLIC INVOLVEMENT PLAN FOR THE EXPANSION OF MIDDLE TIMAN BAUXITE MINE

Table1. Public Involvement Plan for the Expansion of Middle Timan Bauxite Mine

Activity	Objective	Target groups	Place	Responsible organization	Date
General activities					
Establish Public Visitor Centre	➤ Providing access to documentation; ➤ picking up the stakeholders' comments; ➤ Individual consultation	Local community and local NGOs	Knyazhpogost District Administration	Knyazhpogost District Administration and SUAL Komi BV	Sep.,
"Hot line"	➤ Picking up the stakeholders' comments; ➤ Individual consultation	Local community, local NGOs, regional NGOs	SUAL Komi BV offices	SUAL Komi BV	Start in Sept., 2003
Publications in mass media	➤ Providing relevant information	All stakeholders	Regional and local mass media	SUAL Komi BV	Start in Sept., 2003
On-project EIA Workshops	➤ Stakeholders' capacity building in EA/PP/conflict management	All stakeholders	Chin'avoryk, Emva, Sosnogorsk, Ukhta and Pechora	CSIR	TBA
Posting materials on the Internet	➤ Wide information dissemination	NGOs and scientific organizations, other stakeholders	Non-specific	CSIR	TBA
Preliminary assessment					
Public Meetings on ESHS findings	Stakeholders/Public concerns identification General presentation of project and strategy of public involvement	Local community and NGOs, competent authorities in Emva	Chin'avoryk, Emva, Syktyvkar	District Administration. "Bauxite Timan" and CSIR, Ecoline EA Centre	Sept., 2003
Posting draft OVOS ToR in the libraries/Administration	Providing draft project documentation for comments	Local community and local NGOs	Chin'avoryk, Emva,	Knyazhpogost Administration and "Komialuminium" (CSIR)	TBA
		General public	Syktyvkar library	"KomiAluminium"	TBA

Activity	Objective	Target groups	Place	Responsible organization	Date
Stakeholders' meeting (round table)	Discussion of the results of preliminary assessment and draft OVOS ToR	Local community, local NGOs	Chin'avoryk, Emva	Knyazhpogost Administration and "KomiAluminium" (CSIR)	TBA
Stakeholders' meeting		Regional NGOs and general public	Syktyvkar	Komi Ministry of Environmental Protection and Natural Resources	TBA
Main stage. 2004.					
Posting draft EIS ton the libraries/Administrations	Access to draft project documentation for comments	Local community, local NGOs, regional NGOs, general public	District Administration (visitor centre), Chin'avoryk, Emva, libraries	District Administration, "KomiAluminium" and CSIR	TBA
Public Hearings	Discussion of draft EIS	Regional NGOs, general public	Syktyvkar	the Komi Ministry for Natural Resources, KomiAl and CSIR	TBA
Final stage. 2004.					
Posting information on the Internet, in visitor Centre and library	Information dissemination about OVOS results and relevant project changes	Local community and NGOs	Chin'avoryk, Emva,	District Administration and "KomiAl" (CSIR)	TBA
		Regional NGOs and public concerned	Syktyvkar	District Administration and "KomiAl" (CSIR)	TBA

Supporting documents

The following documents will be produced during the course of the implementation of the PCDP.

Project phase	English Version / Name of Report	Russian Version / Name of Report	Timing
1a – Timan Bauxite Mine Audit	Audit and ESAP – Mine 1.5 Mtpa PCDP - Mine 6.0 Mtpa PCDP Strategy - Komi Aluminium Site Selection Study for the Refinery	Executive summary	Nov 03
1b - Timan Bauxite Mine Assessment	Socio-Economic Baseline Study Environmental Analysis – early works Refinery ESIA & Updated ESAP - Mine 6.0 Mtpa	Declaration of Intent – Mine Declaration of Intent – Refinery Act of Site Selection – Refinery Letter of Explanation for early works	Feb 04
		Investment OVOS Mine – 6.0 Mtpa	May 04
		Construction OVOS Mine – 6.0 Mtpa	July 04

ANNEX 1. COMMUNICATION LIST

ФИО	Место работы	Контактная информация
	(Заполняется по желанию)	
Попов В.А.	Глава МО «Княжпогостский район»	Tel. 8-239-91-7-60 fax 9-239-91-7-60
Сидорин В.И.	Зам. Главы МО «Княжпогостский район»	21-080
Лопко В.И.	Настоятель Храма Успения Пресвятой Богородицы в г. Емва	21-4-06
Козловский С.Ю.	Зам. главного редактора газеты «Княжпогостские вести»	21-3-52
Ивочкин В.И.	Зам. Главы МО «Княжпогостский район»	21-6-98
Трясова Е.Н.	Управляющая делами АМО «Княжпогостский район»	21-4-84
Буяновский Ф.И.	И.о. руководителя Комитета по ООС Княжпогостского района	24-9-77
Бабин Ю.Л.	Ст. Таможенный инспектор Сыктывкарской таможни	24-603
Щербович Д.Н.	Зам. начальника отдела внутренних дел Княжпогостского района	21-2-05
Граб А.Н.	Зам. начальника Учреждения М-222/7	94-6-59
Люосев М.В.	Зам. начальника Управления ПФР	9-18-07
Патрушева Л.В.	Директор ср. Школы №1 г. Емвы	9-11-71
Устименко Ю.Б.	Главный врач ЦНСЭН	2-10-73
Колесников С.В.	Главный врач МУ «Княжпогостская центральная районная больница»	2-14-95
Поселянинов С.В.	Нач. Железнодорожного авиаотделения Сыктывкарской авиабазы охраны лесов	21-2-63
Фотиева Е.А.	И.О. зав. Отделом культуры	21-5-98
Беляева Г.Б.	Специалист 1 категории ОВД	22-804
Григореш Г.Г.	Директор школы №3	98-434
Хлюстова А.Н.	И.о. зав. Архивным отделом	21-333
Оболдина Л.С.	Зав. Отд. Фин. И бухучета МО «Княжпогостский район»	2-14-80
Стародубец Н.С.	Зам. нач. Управления по соц. Вопросам	24-1-03
Солодова П.И.	Главный госналогинспектор ИМНС по Княжпогостскому району	21-9-32
Витязева Г.М.	Руководитель ИМНС России по Княжпогостскому району	21-8-02
Ковалева З.Б.	Сектор по труду	21-7-02
Трошев В.Л.	МОД «Коми Корыр»	2-10-90
Полев П.П.	Пенсионер	21-185
Володин В.Н.	Председатель районного совета ветеранов	22-7-78
Волкунович А.С.	Глава Администрации Чиньяворыка	94-6-62
Матвеева В.А.	Зам. директора школы Чиньяворыка (?)	94-6-37
Туркина Н.А.	Трест «Княжпогостмежро???газ»	22-373
Жданова О.П.	Депутат, ЦЗИ	21-3-40
Панченко И.В.	Директор ЦЗИ	21-7-65

Кратц Г.В.	И.о. Главы Администрации г. Емвы	21-253
Ярунгина Л.Н.	Специалист управделами	21-4-86
Дмитренко В.Н.	Депутат, М-222/35	00-488
Горетова В.П.	Руководитель райкомзема	24-8-05
Котельникова В.М.	Директор МУП «Хлебозавод»	22207
Селиверстова Н.П.	Спец. Отдела экономики	21-975
Курилова Л.В.	Зав. Отл. Администрации	
Кочетков А.Б.	Ген. Директор ООО «ДВП»	21-279
Поляков А.Н.	Минтруд РК	21-781
Добержинский В.В.	Председатель Общества инвалидов	21-5-42
Жуковский И.М.	Старший госинспектор Вымской инспекции рыбоохраны	22-570
Ковков Ю.В.	Частный предприниматель «АЯКС»	2-26-37
Кирияк О.Д.	Зав. Отделом ТКХ	22-4-85
To be invited from other areas:		
Савинцев Павел Федорович	Head of Administration of Troitsko-Pechorski District	Tel:9-12-35; fax: 9-70-84
Стромцов Валентин Андреевич	Head of Administration of Sosnogorsk District	Телефон: 7-52-90 Факс: 7-21-99
	Head of Ukhta Administration	
В. Семяшкина	Комитет спасения Печоры	8-82142-5-40-10 savepechora@mail.ru
Игорь Сажин	«Мемориал» (подразделение в Коми)	Em-vibori@yandex.ru 8-8212-21-58-09
Чупров Владимир	Гринпис России	vladimir.tchouprov@ru.greenpeace.org

Annex 2. Initial information for public meeting (published in “Knyazhpogost News” and posted)

ОАО «Боксит Тимана» приглашает к диалогу

В связи с планируемым расширением Средне-Тиманского бокситового рудника и развитием проекта строительства глиноземно-алюминиевого комплекса в Республике Коми, ОАО «Боксит Тимана» и ЗАО «Коми Алюминий» начинают серию общественных слушаний. Публичные обсуждения пройдут в период с сентября 2003 г. по середину 2004 г. в городах Емве, Чиньяворыке и Сыктывкаре и будут посвящены вопросам развития рудника, его вкладу в экономику района, а также экологическим аспектам проекта.

Первая из серии встреч с общественностью, на которой будет представлена общая информация о проекте и программа дальнейших обсуждений, состоится 15 сентября в 17.00 в Администрации Княжпогостского района.

Организаторами встречи выступают Администрация Княжпогостского района и «Коми Алюминий». В обсуждениях примут участие представители Европейского банка реконструкции и развития (ЕБРР), Международной финансовой корпорации (МФК), руководство проекта «Коми Алюминий», специалисты «Боксит Тимана», российские и зарубежные консультанты по вопросам оценки воздействия на окружающую среду.

Мы надеемся, что эта встреча положит начало большому и серьезному диалогу о перспективах развития Средне-Тиманского месторождения и строительства глиноземно-алюминиевого комплекса в Республике Коми.

Мы приглашаем всех жителей принять активное участие в нашей встрече. Ваши вопросы, предложения, пожелания помогут нам точно спланировать нашу работу и, в конечном итоге, найти оптимальные решения, отвечающие духу и принципам устойчивого развития, на благо жителям Республики Коми.

С обсуждаемыми документами можно ознакомиться в Администрации Княжпогостского района по адресу Емва, уд. Дзержинского, 71 и в Администрации Чиньяворыка.

Мы ждем Вас в 17.00 в актовом зале Администрации.

Администрация Княжпогостского района
Руководство проекта «Коми Алюминий»

APPENDIX D:
ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AUDIT: MIDDLE
TIMAN BAUXITE MINE

Terms of Reference

TERMS OF REFERENCE

ENVIRONMENTAL AND SOCIAL DUE DILIGENCE

**RUSSIAN FEDERATION
SUAL KOMI BV, TIMAN BAUXITE MINE AND ALUMINA REFINERY**

1. BACKGROUND

1.1 General Background

The European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC) (the “Lenders”) have been requested by SUAL Komi BV (“SUAL Komi” or the “Company”) to extend a loan for a phased project. SUAL Komi is a member of the SUAL group of companies, a major Russian integrated aluminium producer (“SUAL Group”) currently controlled by SUAL International Ltd. SUAL Komi’s Timan Aluminium Project in the Komi Republic (North Urals, Russian Federation) will include the following three phases:

- Phase 1 - Expansion of the Middle Timan Bauxite Mine and other related infrastructure and utility work, with ore production increasing from 750,000 to 2.5 million tons/year (Mtpa), with the possibility of a direct increase to 6.5 Mtpa.
- Phase 2 - Construction of an Alumina Refinery at Ukhta or Sosnogorsk with proposed capacity of 1.4 Mtpa. The refinery location is still subject to an internal review by SUAL Komi.
- Phase 3 – Construction of an Aluminium Smelter with proposed capacity of 300-500 ktpa. The timing of the smelter and its proposed location is still subject to an internal review by SUAL Komi.

A Pre-Feasibility Study Report (PFS) was prepared by Hatch in September 2002, and a Bankable Feasibility Study (BFS) was commissioned in June 2003 to be undertaken by Hatch and SNC Lavalin. The BFS for the mine expansion is expected to be available in January 2004, while the BFS for the refinery will be completed by June 2004. Preliminary information on the refinery will be available prior to that.

Phase 1 (cost of about US\$90 million) will start in the first quarter of 2004 while decisions on phase 2 and phase 3 (probably in excess of US\$2 billion) could be made at the earliest mid-2004 with first production scheduled in late 2007 or early 2008.

Phase 1 of the Timan Project is expected to be undertaken by SUAL Komi through a wholly-owned subsidiary OAO Bauxite Timan (the “Company”), which holds the mining licence. Phase 2 and 3 would be developed by SUAL Komi in a joint venture with an aluminium industry major.

1.2 Project Description

Only Phase 1 of the Timan Aluminium Project is currently being firmly considered (with the possibility of expanding the mine directly to 6.5 Mtpa). The proposal should cover Phase 1 in details and conceptual plans for Phase 2 for the refinery should be included on an indicative basis as an optional future assignment. The formal go-ahead for Phase 2 will remain subject to additional information being available and to a formal investment decision on Phase 2 being made.

The Lenders’ US\$90 million loan for Phase 1 would assist SUAL Komi in financing the development and

expansion of its Middle Timan bauxite open pit mine, possible further development of the railway; and related infrastructure and utility work. The bauxite mine and an adjacent railway line, owned by SUAL Komi as well, were built between 1998 and 2002. SUAL Komi and the SUAL Group have already invested US\$120 million on the development of the bauxite mine and on the construction of Russia's first private railway and connects the mine to the national railway network. The 157km railway spur will be subject to additional construction work to connect it to all mining facilities. Also, the nearby Pechora gas fired power plant is expected to have a new turbine (6th) commissioned to provide electricity for the project.

Phase 2 includes an Alumina Refinery being contemplated near Ukhta in the Komi Republic to process 3,85 Mtpa of Bayer Grade Bauxite and generate 1,4 Mtpa of Alumina. Two sites for the refinery were considered during the Pre-Feasibility; Ukhta and Sosnogorsk which are 15 km apart. Both locations have well developed housing, social infrastructure and are equidistant to the River Izhma, existing rail track and overhead power transmission lines. The refinery is likely to require just over 41 MW of power and 1000 GJ/hour of steam. Process water for the refinery will be supplied from the River Izmha.

The SUAL Group includes inter alia a mining division (which, in addition to the Middle Timan bauxite mine also operates the North-Ural bauxite and South-Ural bauxite mines), an alumina refining division (notably the Bogoslovsk, Uralsk and Boksitogorsk refineries) and an aluminium smelting division (notably the Irkutsk, Bogoslovsk, Volgograd, Uralsk, Nadvoitsy, Kandalaksha and Volkhov smelters). While none of these operations are part of this Project the review and assessment of the SUAL Group's environmental management policies, which will require visits to one or two of these operations, are an important part of this due diligence exercise.

1.3 Due Diligence Context

As the implementation of the subject project may result in environmental and social impacts, prior to making a funding decision, the EBRD and IFC have to be satisfied that:

- The elements of the investment programme which they have been asked to help finance would meet Russian Federation and existing European Union (EU) environmental standards or, where EU standards do not exist, national and World Bank Group (WBG) environmental and social policies and guidelines and other pertinent international standards; and
- The project would not result in significant adverse environmental and social impacts; and that the project would include all necessary management, mitigation and monitoring measures to address any adverse impacts which cannot be avoided.

The basic EU/WBG documents to consider include (but are not limited to):

- Directive 85/337/EEC as amended by Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment;
- IFC Safeguard Policy OP 4.01 dated October 1998 on Environmental Assessment;
- IFC Safeguard Policy OP 4.36 on Forestry dated November 1998 to be complemented by the World Bank Operational Policies OP 4.36 dated November 2002;
- IFC Safeguard Policy OP 4.04 dated November 1998 on Natural Habitats;
- World Bank Operational Policy OP 4.30 dated June 1990 on Involuntary Resettlement; and
- IFC Policy Statement on Child Labor and Forced Labor.

SUAL has agreed to prepare a number of reports to form the basis for an Environmental Assessment (EA) to satisfy lender requirements. It includes audits, action plans, impact assessments and a number of

management plans.

All information related to the EBRD and IFC procedures for the environmental and social review of projects, including details on audit and environmental and social impact assessment approaches, procedures and reporting requirements and additional details on environmental and social policies and guidelines can be found through the World Wide Web at <http://www.ifc.org/enviro> and <http://www.ebrd.com/enviro>.

The documentation must comply with the requirements of the Komi Republic Ministry of Environment. Special attention should be given on Komi environment, including the sensitivity of the local Northern flora, fauna and water resources, which are of prime concern.

In addition there are at least 3 on-going programs which deal with the Environmental impacts of existing and proposed Industrial enterprises in the Komi Republic:

- A UNIDO program;
- A TACIS program (European Countries support to Russian Environment);
- Canada/Komi Republic CIDA Cooperation Agreement.

The consultant will need to ensure proper attention to these on-going parallel programs for coordination and reference.

1.4 Previous and Related Studies

Reportedly SUAL Komi and the SUAL Group have undertaken studies for the mine expansion required by the Russian regulatory authorities. These studies should contain a reasonable amount of environmental information and should be fully utilised by the Consultant. For example, recently an environmental permit was granted for the 2.5 Mtpa Project.

In the context of possible use of political risk insurance facility for the mine expansion, the World Bank has requested the SUAL Group to carry out an Environmental Impact Assessment (EIA), based on the information already submitted to the Regional Environmental Expertisa and prepared in accordance with the procedures agreed under the Coal and Forest Guarantee Facility provided by the World Bank. The Federal Center for Project Finance (FCPF) has rated the proposed project Category A. The final EIA report was published in early 2003 based on work undertaken by a joint team of SUAL Group staff and experts from the FCPF. It will be made available to the selected consultant.

The Consultant will be provided with all available study data and draft and/or final reports, including the PFS and the BFS when available. Additional information will be presented in the BFS for the 6.5 Mtpa expansion project.

II. OBJECTIVES

The main objective of the Consultant is to assist SUAL Komi and the Lenders to carry out the environmental and social due diligence to satisfy the requirements of the EBRD and IFC. This project is classified as a Category A/1 project under IFC and EBRD requirements. A full Environmental and Social Impact Assessment (ESIA) will be required to identify and assess potential environmental and social impacts associated with the planned Phase 1 mine expansion. Further a detailed environmental and social audit will be required to assess the environmental and social status of the ongoing mining operations. Further, any future development (such as Phase 2 and 3) that will be performed utilizing Bank proceeds will require a separate full ESIA. At this time, we are requesting a firm proposal for the environmental and social work covering Phase 1, and only conceptual information relating to Phase 2, as the project design details for this phase are not yet available.

The main objectives of the Phase 1 work are as follows:

1. Review by means of a detailed audit (ESHS Audit) all existing environmental, social, health and safety information on mine development and expansion, as well as related infrastructure and utility work to assess the effects and impacts of the existing Middle Timan Mine. This audit must be completed in accordance with EBRD and IFC policies and procedures.
2. Preparation of a Public Consultation and Disclosure Plan (PCDP) as per IFC and EBRD requirements, for the mine expansion and related infrastructure and utility work. The PCDP should include initial consultation activities for the refinery.
3. Assessment of the SUAL Group's environmental, social, health and safety management in the context of the SUAL Group sponsoring with new partners the Timan Aluminium Project in the Komi Republic. This will include a review of the SUAL Group's corporate environmental policy, its environmental management systems and the adequacy of its Environmental Action Programmes. At the Company level an assessment of its management capacity is needed.
4. Perform a gap analysis between the work completed to date covering the Phase 1 mine expansion, and the EBRD and IFC environmental requirements. Upon completion of the gap analysis, the consultant will need to collect any outstanding information to allow development of the full ESIA for Phase 1. This document will need to include an Environmental and Social Action Plan (ESAP), and provisions for mine abandonment/reclamation at closure.

The Phase 1 work (including the ESHSA, EIA, PCDP and ESAP) will aim at preventing and mitigating potential adverse environmental and social impacts during the construction and operation of the Project, providing environmental benefits and improving environmental quality, improving information flow with the community, enhancing surrounding communities livelihood and opportunities, and establishing an environmental and social management plan, including a monitoring plan.

The other objectives of the environmental and social due diligence documentation include (but are not restricted to) the following:

- To review legal, regulatory and institutional framework in the context of this major phased investment;
- To identify relevant Russian, European Union and World Bank Group environmental, social, health and safety laws and regulations, applicable within the framework of the proposed investment programme;
- To identify and determine the potential environmental and social impacts (both positive and negative) associated with the proposed Phase 1 Project (and potentially identify in advance critical issues and significant impacts for phase 2 and 3); and
- To assist SUAL Komi and the Lenders to structure the Project so that Russian, EU and WBG environmental, social, health and safety standards will be met.

III. SCOPE OF WORK AND TASKS

3.1 Scope of Work for Phase 1 (Confirmed)

The consultant is expected to work closely with SUAL Komi to carry out an environmental and social impact assessment of the proposed Phase 1 project. It should be recognised that there is a significant amount of information available from previous environmental investigations. It will be crucial to maximise utilization of this information. In addition to the objectives outlined previously the Consultant will assist SUAL Komi and the Lenders in the scoping of the requirements for further environmental investigations

and social studies if required. Finally the Consultant will assist SUAL Komi in the consultation process with the public on the concerns of the project including liaison with appropriate agencies responsible for regulating environmental, social, health and safety issues as well as with other relevant parties.

As outlined for the due diligence objectives presented in section 2, the Consultant will need to prepare the following reports:

1. A comprehensive Environmental, Social, Health and Safety (ESHS) Audit. This should include the audit of the Company's existing and proposed mining developments and other related infrastructure and utility work, evaluating ESHS compliance status with regard to applicable EBRD, WBG/IFC and Russian requirements; identifying past and present liabilities and potential environmental and safety risks and concerns associated with SUAL Komi's existing and planned operations. In addition, present occupational health and safety concerns should also be investigated.
2. An Environmental and Social Impact Assessment Report (ESIA). This report will focus on the proposed mine expansion, and potential environmental impacts. As such, this document should discuss the environmental setting of the site, and provide a qualitative assessment of impacts, along with a discussion of all environmental protection measures and a social mitigation plan. This report must be completed in accordance with EBRD and IFC policies and procedures.
3. An Environmental and Social Action Plan (ESAP) for the Company's existing and proposed operations. This will include the preparation of a comprehensive action plan which will be cleared by EBRD and IFC, designed to bring the operations into compliance with national regulations, EBRD requirements, IFC/WBG policies and guidelines within a specified timeframe. The ESAP should analyze and propose risk mitigation measures, cost estimates and the schedule for environmental remediation and social mitigation measures. The ESAP will include a Public Consultation and Disclosure Plan (PCDP) and a Mine Reclamation and Closure Plan (MRCP).
4. A review of the SUAL Group's environmental, social, health and safety management capacity and its environmental/social staff to assure adequate implementation of environmental and social actions, including training and support to the Company's management effort in implementing the ESAP for the mine and developing the smelter and refinery projects. The Company's environmental and social practices should be assessed in detail.

3.2 Scope of Work for Phase 2 (Indicative)

At this time, we are asking for a detailed proposal for the environmental and social work to address the Phase 1 project. It is likely that additional phases of the project will be initiated in the future. Clearly, it will be in the best interest of SUAL Komi to retain one consultant who can do the Phase 1 work, as well as the environmental and social work for any future phases of work to be completed. Therefore, we are asking for a conceptual proposal for the Phase 2 aspect of the project. This conceptual proposal will be considered when evaluating the consultants for the Phase 1 work, as the intention is to hire one consultant for all phases of work. To allow preparation of the Phase 2 conceptual proposal, we have included pertinent known details below.

The concept for the alumina refinery design reflects standard western world Bayer practice. The Bayer process is a mature technology that remains the most cost effective commercial method known for producing metallurgical grade alumina. The Bayer process comprises the following major steps:

- Bauxite Handling
- Wet grinding
- Digestion Circuit
- Clarification & Cuastification
- Mud washing & Disposal
- Filtration

- Precipitation
- Filtration & Classification
- Calcination
- Alumina Handling

Raw Materials & Utilities will include:

- Bauxite
- Caustic Soda
- Lime
- Flocculants
- Acid
- Natural Gas
- Saturated Steam
- Water
- Electricity

The primary environmental issues relate to potential emissions of dust, metal compounds, noise, oxide compounds of carbon, nitrogen, and sulphur, storage and ground water contamination with caustic soda.

From the refinery perspective the BFS will generate a flow sheet for this new refinery, which is tailored to the Timan Bauxite deposit and its Life of Mine Plan based on the most appropriate process arrangement and equipment and considering the climatic and local conditions. The capital and operating costs will be developed to BFS levels and an execution plan assembled.

The scope of work required by EBRD and IFC for phase 2 will include a full ESIA, PCDP and ESAP. It should be stressed that the Phase II project will need to comply with current Russian and EU legislation. The requirements for the ESIA, PCDP and ESAP are set forth above and presented in detail in EBRD and IFC policies and procedures.

3.3 Tasks of the Consultant

3.3.1 Environmental, Social, Health and Safety Audit (ESHSA)

IFC's requirements for an audit are outlined in OP 4.01 – Environmental Assessment (EA) dated October 1998 as well as the EBRD policies and procedures covering an Environmental Audit, and Environmental Impact Assessment. The focus of the consultant's work shall be to:

1. Review the available information, update the data according to the Company final business plan and/or BFS and verify the various hypotheses made;
2. Evaluate current and future (based on review of the project development plans) ESHS compliance status at the facility with regard to applicable EU requirements, WBG/IFC environmental and social policies and guidelines²⁷ and Russian requirements;
3. Understand whether past liabilities due to previous contamination or presence of hazardous substances are present on the site at levels of concern to public health and the environment;
4. Carry out a social audit of the Company including an inventory of the social assets, an assessment of the social impacts of the expansion (including potential retrenchment) and modernization, social

²⁷ World Bank Pollution Prevention and Abatement Handbook (PPAH) *General Environmental Guidelines* (July 1998); WB PPAH *Coal Mining and Production* (July 1998), International Finance Corporation, *General Health and Safety Guidelines* (July 1998), International Finance Corporation, *Draft Hazardous Materials Management Guidelines* (May 2001).

mitigation measures, and community development issues and programs; and

5. Develop an Environmental and Social Action Plan (ESAP) that identifies the cost-effective measures to remediate past contamination (or any potential liability), carry out mine reclamation activities, and manage any environmental, social, health and safety concerns in the context of the proposed investment plan.

Detailed information on the ESHS audit's scope of work is provided in Attachment 1. The suggested audit report format is provided in Attachment 2, and the proposed audit protocol is presented in Attachment 3, including critical environmental and social issues that may need attention during the audit.

3.3.2 Public Consultation and Disclosure Requirements (PCDP)

The Lenders attach particular importance to public consultation in pre-investment activities. The project will need to meet public consultation requirements in line with the EBRD's and IFC's Public Disclosure and Information Policies. The Consultant will advise SUAL and the Lenders in conducting a public consultation process in accordance with the Russian EIA (OVOS) legislation, the EBRD's Environmental Procedures and Public Information Policy and WBG/IFC policies and guidelines. This will entail the following:

- SUAL Komi must ensure identification of all key issues, in particular by consulting with the public, including interest groups, on the project. The required public comment period must conform to national legislation and the Lenders' requirements, which include consultation on the draft reports.
- The Lenders will require a minimum of 60 days comment period between the publication of the final ESHS Audit, ESAP and Board consideration.
- SUAL Komi must make the ESHS Audit and the PCDP/ESAP publicly available for comment, including at or near the project site, and are expected to keep all EIA-related documentation in the public domain at least until Project Completion (when the project has been fully implemented and the loan repaid or cancelled).

The Consultant will assist SUAL Komi to organise and undertake public consultation based on the results of the assessment of the environmental and social impacts. The final form of consultation will be dependent upon the views of the Lenders, SUAL Komi, the Russian regulatory authorities and the Consultant. However, it is anticipated that the consultation will include presenting the results in public meetings.

IV. STAFFING, DELIVERABLES AND REPORTING REQUIREMENTS

4.1.1 Timetable

Work is anticipated to start in late July 2003. The target is to have all phase 1 work reports finalized by mid-October 2003.

The Consultant is expected to present their statement of qualifications, team composition, methodology and approach during a 30 minutes-presentation schedule for the first week of July in London. In addition and after awarding the contract a kick-off meeting in country will take place with representatives from the SUAL Group, the Company and appropriate EBRD and IFC staff.

The draft ESHS audit report should be submitted within a maximum of five weeks of beginning work for the Company. Additional reports should be submitted thereafter.

Final report incorporating SUAL Komi's and EBRD-IFC's comments should be submitted within one week after receiving comments on the draft report.

The final report should formally be approved by SUAL Komi and a copy sent to IFC and EBRD.

An IFC/EBRD staff site visit, the preferred alternative to a conference call, may be necessary to discuss the draft reports. It is anticipated that it will take place in the second half of September 2003. The final Executive Summary should highlight the key findings of the ESHS Audit, the remaining unknowns, and the detailed ESAP.

As the mining plan to be developed as part of the BFS for the staged mine expansion to 6.5 Mtpa will be available at a later date from the BFS, the Consultant will need to consult closely with SNC Lavalin and Hatch as they prepare the BFS. The geology resources/reserves calculations and the Mining Plan are presently scheduled to be available only December 1st, 2003 in draft format, and the formal BFS report for the mine expansion is due January 15th, 2004. The Consultant will need to review the Mining Plan and BFS when they are issued and amend the EIA if required; this could take the form of an addendum containing any important changes. Alternatively, any updated information could be included in Phase 2 documents.

The Consultant will submit an Inception Report for Phase 2 (four copies to SUAL Komi and four copies to each of the Lenders) along with the Final Reports (or earlier if sufficient information is made available), describing the work undertaken initially and setting out a detailed work plan for the execution of the remainder of the services. In particular, the Consultant will comment on the quality of environmental and social investigations carried out to-date and to what extent they address the Lenders requirements. The proposed format and content of the Environmental and Social Impact Assessment (ESIA) is provided in Attachment 4.

All reports should be prepared in English with an Executive Summary in English and Russian, and delivered in five (5) copies to all parties. An electronic version (pdf format) on a CD is required for all final versions. Reports required under Russian Federation regulations (namely OVOS) will have to be prepared in Russian as they will be submitted to authorities for formal approval by SUAL Komi.

At this time, we anticipate receiving detailed information for the Phase 2 project in November 2003. At this time we are asking for firm fixed prices for the completion of the Phase 1 work, and for a conceptual proposal and estimates for Phase 2 to be finalised.

4.1.2 Staffing

The audit team needs to have a detailed understanding of the Russian environmental permitting system and must also show a detailed understanding of EBRD and IFC procedures, with at least 10 years of experience for each staff, a good knowledge of the Russian context, the bauxite industry and proper technical background on environmental, social, health and safety issues.

The audit team should include at least an experienced environmental engineer having broad and extensive industrial experience in the areas of environment and occupational health and safety. Comprehensive and long term practical experience in the mining industry, with working experience in similar facilities in the Russian Federation is an asset. In addition, the team should have direct working experience in soil contamination, air emission and water pollution control and waste management in the bauxite mining industry. The team should be aware of state-of-the-art performance requirements and objectives in the bauxite industry with particular focus on future sustainability requirements for that industry. It may be advantageous for the international consultant to team-up with a local environmental consulting company for assistance with field sampling, laboratory analysis and liaison, and consultation with local and national agencies and groups. The audit team should also include an individual with broad knowledge of local social and community development issues.

4.1.3 Periodic Reporting Requirements

A weekly report consisting of a short email (distribution list will be provided) must be submitted weekly by the Consultant to provide a list of ongoing activities.

A monthly report to be supplied no later than the 7th calendar day of the following month, covering at least the following:

- Highlights of current activities;
- Activities scheduled for next month;
- Problem areas;
- Progress report; measured progress by task; and
- Cost Report(Billings).

V. COST AND EXPENSES

5.1 Phase 1 – Lump Sum Fixed Price

A total lump sum fixed price in US dollars must be submitted for the above required scope of work for Phase 1 with a breakdown by task, direct labor costs (number of hours or days per staff assigned and the corresponding unit cost) and indirect cost (travel, per-diem, sub-contractors, etc.). If any additional tasks are recommended by the consultant, then a separate fixed price must be presented.

While this Phase 1 environmental and social due diligence assignment is primarily intended for EBRD's, IFC's, SUAL Komi's and the SUAL Group's use and reliance ("Basic Use and Reliance"), the SUAL Group may also need this Phase 1 environmental and social due diligence for the use and reliance of other potential lenders or partners to the Project or in the context of an initial public offering of the SUAL Group ("Extended Use and Reliance"). In the event that the total lump sum fixed price charged by the Consultant were to be different in case of the Extended Use and Reliance, the Consultant's submission should offer the Extended Use and Reliance as an option and specify the difference in the total lump sum fixed price.

5.2 Phase 2 – Indicative Price Estimate

An indicative price estimate in US dollars must be submitted for the above conceptual scope of work for Phase 2. This indicative price estimate would be refined at a later stage when project design details are available and the exact scope of work is known.

Similarly as for Phase 1, in the event that the indicative price estimate were to be different in case of an Extended Use and Reliance, the Consultant's submission should specify the difference in the indicative price estimate in case of an Extended Use and Reliance.

Finally the Consultant is requested to provide a table of rates (by employee grade) for all key staff members, that would applied to extra work requested by the Lenders and the Company.

APPENDIX E:
ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AUDIT: MIDDLE
TIMAN BAUXITE MINE

Monitoring data summary

Air quality within work area (mostly for excavator units)

Parameter	Standards, limitation, guidelines		Maximum recorded value**
	WBG	Russian standard*	
NO ₂	1 ppm***	2 mg/m ³	<2 mg/m ³
CO	35 ppm***	20 mg/m ³	<10 mg/m ³
Hydrocarbons		900/300 mg/m ³	<100 mg/m ³ (average) 133 and 167 mg/m ³ (max on few units)

* In Russia air quality within work area is regulated by GN 2.2.5.1313-03 "Maximum permissible concentrations (MPC) of hazardous substances in the air within work area".

** The data are the results of direct measurements conducted in the process of routine work place attestation (April 2003).

*** NIOSH guidelines NO₂ 15 mins, CO 8 hr TWA

Work environmental quality (physical – levels of noise and vibration) and chemical (pollutant concentrations) parameters)

Work places located nearby/at...	Parameter	Standards, limitation, guidelines		Maximum recorded value**
		WBG	Russian standards*	
Camp (residential area)	Noise level		80 dBA	79 dBA
Excavator	Vibration		101	99
	NOx	1 ppm***	5 mg/m ³	<2 mg/m ³
	CO	35 ppm***	20 mg/m ³	<10 mg/m ³
	Noise level	85 dB(A)	70 dBA	73 dBA
Lorry	Vibration		116	107
	NOx	1 ppm***	5 mg/m ³	<2 mg/m ³
	CO	35 ppm***	20 mg/m ³	10 mg/m ³
	Hydrocarbons		300 mg/m ³	<100 mg/m ³
	Noise level	85 dB(A)	80 dBA	81 dBA
Diesel Generator, Central Blending Yard	Vibration		116	107
	Infrasound		100	102
	NOx	1 ppm***	5 mg/m ³	<2 mg/m ³
	CO	35 ppm***	20 mg/m ³	10 mg/m ³
	Hydrocarbons		300 mg/m ³	<100 mg/m ³

* Maximum permissible concentrations (MPC) for chemical and Maximum Permissible Limits (MPL) for physical impacts

** Noise level at work place is regulated by SN 2.2.4/2.1.8.562-96 "Noise at workplace, at public places, living quarters and residential area"

*** Air quality within work area is regulated by GN 2.2.5.1313-03 "Maximum permissible concentrations (MPC) of hazardous substances in the air within work area". It is required to conduct monitoring of air quality within work area nearby boiler and diesel generators on a quarterly basis. In addition, environmental services are required to carry out regular attestation of workplaces (checking whether they comply with normatives) every 5 years. All other undertakings are not mandatory and can be conducted at their own choosing. These data were obtained in the process of routine work place attestation conducted in April 2003.

Drinking Water Quality (monitored on a quarterly basis)

Parameter	Standards, limitation, guidelines		Maximum recorded value
	WBG	Russian drinking water quality standard – MPC(SanPiN 2.1.4.1074-01)	
Chemical parameters			
pH		6-9	8.02 mg/l
BOD		—	2.4 mg/l
COD		—	24 mg/l
TSS		—	—
Oil		0,1 mg/l	<0,005 mg/l
Total N		—	0,43 mg/l
Total P		—	<0,002 mg/l
As		0,05 mg/l	< 0,00001 mg/l
Cd		0,001 mg/l	< 0,0001 mg/l
Cr ⁶⁺		0,05 mg/l	—
Cu		1 mg/l	0,0033 mg/l
Pb		0,03 mg/l	0,0002 mg/l
Hg		0,0005 mg/l	—
Ni		0,1 mg/l	0,001 mg/l
Se		0,01 mg/l	-
Ag ⁺		0,05 mg/l	<0,001 mg/l
Zn ²⁺		5 mg/l	<0,005 mg/l
CN ⁻		0,035 mg/l	-
Cl (total and free)		0.3-0.5 and 350 mg/l	Not required**
(F)		1,2-1,5***	0,476 mg/l
Phenols		0.25 mg/l	Not measured
Sulfides		—	Not measured
Al		0,5 mg/l	<0,04 mg/l
Co		0,1mg/l	< 0,01 mg/l
Pb		0,03 mg/l	<0,0002 mg/l
Mo		0,25 mg/l	<0,04 mg/l
Mn		0,1 mg/l	<0,01 mg/l

Parameter	Standards, limitation, guidelines		Maximum recorded value
	WBG	Russian drinking water quality standard – MPC(SanPiN 2.1.4.1074-01)	
Ca		–	27,25 mg/l
Mg		–	15,8 mg/l
Na+K		200 mg/l (for Na only, K is not regulated)	8,43 mg/l
NH ₄ ⁺		2 mg/l	0,05 mg/l
Fe		0,3 mg/l	<0,1 mg/l
CO ₃ ²⁻		–	Not detected
HCO ₃ ⁻		–	173 mg/l
Cl ⁻		350 mg/l	1,1 mg/l
SO ₄ ²⁻		500 mg/l	5,31 mg/l
NO ₂ ⁻		3 mg/l	<0,02 mg/l
NO ₃ ⁻		45 mg/l	0,90 mg/l
Hygienic (microbiological and parasitological) parameters			
Thermotolerant coli	400 MPN/100 ml	Not allowed in 100 ml	Not detected in 100 ml
Total coli	400 MPN/100 ml	Not allowed in 100 ml	Not detected in 100 ml
Total microbe number****		<50 CFU in 1 ml	0 CFU in 1 ml

*This parameter is not analyzed in Russian environmental monitoring practice.

** Monitoring of Cl content in drinking water is required only if it is chlorinated in the process of water treatment. Since chlorine is not used at the mine water supply system, environmental services do not monitor this parameter.

*** The parameter is different for various climatic zones.

**** Total microbe number is measured by a total number of bacterial cells forming separate bacterial colonies in a specific volume of water (1 ml); measurement unit is named *colony forming unit* (CFU).

Russian standards for drinking water quality are regulated by SanPiN 2.1.4.1074-01. Drinking water. Hygienic water quality standards for centralized drinking water supply systems, Quality control. The water quality data for the mine water supply well were compared against Drinking Water quality standards.