Comparison of the Russian and International Approaches to Mining Project Design and Permitting

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Abstract

Requirements of both local permitting and international fundraising are forcing increasing numbers of projects in Russia and CIS to carry out dual technical studies. The principal focus of Russian mining project design is to satisfy local regulatory requirements. However, the technical documents are not generally accepted by international banks for project finance outside Russia. Similarly, international study documents are not accepted for permitting in Russia. The purpose of this paper is to compare and contrast Russian and international approaches to mine technical studies and draw conclusions from this. The Russian design and permitting system is centered around two key statutory technical documents termed the TEO Konditsy and the TEO Project. These documents are subject to regulatory approval and are broadly equivalent to the international prefeasibility study and the feasibility study respectively.

A comparison of study criteria suggests similar approaches are used for the main technical disciplines in project design by the time projects are at the point of construction, but there is divergence on environmental matters where the OVOS (Russian ESIA equivalent) differs from an ESIA in some significant areas. The key differences relate to project footprint, level of technical detailed required for baseline studies, level of public consultation, consideration and disclosure of information, labour, coverage of community and social issues and the preparation of a Social and Environmental Management System (SEMS). It has been noted that the Russian Design Institutes often leave the detailed economic analysis until after the TEO Konditsy. A common problem is design teams tend to look for 'technological solutions' without due concern for project economics. The end result of this can be mines that are overcapitalized and hence sub-optimal.

It can be concluded that Design Institutes have the monopoly on Russian permitting reports and this is likely to continue. Similarly, Russian institutes generally do not prepare feasibility studies to international standards and this is likely to continue to be the case. Therefore to achieve the requirement of dual technical studies, the international consultants and Russian Design Institutes will need to cooperate on a joint work program. Key issues will be to ensure the most appropriate option studies are carried out at the right stages, that project economics are considered throughout the study, and that the environmental work program covers the additional studies necessary for the ESIA.

Introduction

Increasing numbers of projects in Russia and CIS require dual technical studies in order to satisfy the requirements of both local permitting and international fundraising. The principal focus of Russian mining project design is to satisfy local regulatory requirements. However, the technical documents are not generally accepted by international banks for project finance outside Russia. Similarly, international study documents are not accepted for permitting in Russia. This is mainly because they have not been prepared in the appropriate way by a licensed institute.

Objectives

The purpose of this paper is to compare and contrast Russian and international approaches to mine technical studies and draw conclusions that can be applied to projects in Russia that require an international reporting or funding component.

Regulatory Background

Technical and environmental project controls in Russia arise from three sources:

- Host country laws – this involves preparation of statutory technical documents. These are based on various Federal Laws including the law on Environment Protection (2002 and amended in 2008) which requires 'an assessment of environmental impacts' for any project. Subsidiary laws provide permitting procedures and other procedural details for example, Water Code and Forestry Code;

- Company policies – these could require preparation of non-statutory technical documents Typically these would be used for internal decision making and for investors in the project; and

- International requirements – often this involves preparation of a feasibility study including an Environmental and Social Impact Assessment (ESIA) in accordance with World Bank Group Environmental, Health and Safety Guidelines and the International Finance Corporation (IFC) Performance Standards to achieve Equator Principle compliance..

This paper focuses on technical documentation for mine planning and environmental regulation. Permitting requirements for equipment or specific operating practices, for example, communications equipment or use of explosives have been ignored.

With regard to environmental matters it is noted that although primary legislation is recent, the mindset of the regulators is rooted in legislation and regulation of the 1980s. The legal and regulatory framework has undergone considerable change in recent years and there are signs that this process is still not complete. It has been observed that in some instances even the authorities are not fully aware of how environmental legislation should be applied. Further complexity results from Russia's federal state system where considerable power is devolved to regional governments that determine local regulatory requirements and how they are applied. The conclusion is that the regulatory environment is neither stable, transparent or consistently applied to projects. The recommended approach for project permitting is to get to know the requirements of the local regulators on a project specific basis and to place the same importance to local precedent and expectations as strict adherence to legal procedures.

Project Development Stages in Russia - Mining

Historically, there are four distinct phases of project development in Russia: exploration, project design, construction and project operation. A project would typically commence with a TEP (Techniko-Economicheskoe Predlozhenye) which translates as a Technical and Economic Proposal. This preliminary economic assessment of the project is required to obtain exploration & mining licenses. This document describes the project and contains indicative estimates of capital and operating expenditures for the deposit development, mineral processing, and construction. This document can in some instances be replaced by a similar document called a TED (Techniko-Economichesky Doklad), which translates as a Technical and Economic Report. These documents are prepared to a scoping or conceptual level of accuracy and are considered analogous to an international scoping study.

The next phase in the Russian system is the TEO Konditsy (Techniko-Ekonomicheskoe Obosnovanie Konditsy), which translates as the Technical and Economic Justification of Conditions. This is a key milestone in the design phase because it is the point at which Reserves are formally approved by the GKZ (State Committee of Reserves). This report is a mandatory legal requirement and must be prepared by a licensed Design Institute.

Asides from the formal Reserve reporting, the TEO Konditsy focuses mainly on issues related to mining and processing. The quantity of hydrogeological and geotechnical investigation carried out at this stage varies widely from project to project, and depends on the scale and type of project; in some technical disciplines, studies to the level of a western Preliminary Feasibility Study (PFS) are completed and in other cases studies are completed to an international scoping level. For example, process plant capital costs in a TEO Konditsy could be based on Government set tables with indexed cost adjustments applied, whereas the hydrogeological testwork in the same study may be so extensive and thorough that it goes well beyond the criteria necessary for a western Feasibility Study (FS).

The scope of work for a TEO Konditsy is specified by various Russian standards but in reality can vary widely depending on how the Design Institute interprets the guidelines in relation to a specific project. Generally, it can be concluded that the TEO Konditsy is strong on scientific work and does include some option studies similar to a PFS. However, these studies do not generally consider economic factors to the same detail as would be addressed in a PFS. This could be explained by the slow adoption of computer based modeling techniques by many Design Institutes. In summary, a TEO Konditsy is generally a more technical and scientifically based document than a typical PFS. The PFS places greater emphasis on achieving a similar level of study over the entire project with economic analyses keeping pace with the scientific disciplines. The TEO Konditsy tends to advance technical issues further without assessing the detail of financial context.

After the TEO Konditsy is completed and approved, the project would advance with a series of internal studies to reduce knowledge gaps and to justify recommendations to the board and shareholders for project financing and commencement. These are described as follows:

- TER – (Techniko-economicheskie Rasschety) Technical and Economic Assessment
- OBIN - (Obosnovanye Investitsiy) Investments Justification
- TES (Techniko-economicheskie Soobrazheniya) Technical and Economic Considerations

The TER and OBIN are performed to assess the deposit's mining economics and would be expected to take the economic level of understanding and analysis up to the PFS level. The OBIN was a statutory

requirement in Russia until 2007, when the regulations were changed. Despite this, the OBIN remains an important milestone document in a project's development and they continue to be widely produced.

The TES is also part of the project design stage, its purpose being to identify key technological solutions and the volume of investment required. Again, this study would be expected to fill knowledge gaps from arising from the results of the TEO Konditsy and that expected from a PFS.

In addition to the above, there are other business plans and work program documents that would be prepared in parallel with the TEO Konditsy or at any point before or after. These would assist in advancing the project in various ways. The business plans could comprise abridged sections of the TEP, TEO Kondisty, TER, TES or any other pre-project studies undertaken and used to justify schedules and investment volumes, and to further evaluate project economics. The work programs made would specify priorities and dates for the pre-project preparation works. This would include:

- Obtaining licenses;
- Mining and land leases;
- Technical conditions for utility connection;
- Environmental protection;
- Development of TEP, TEO Konditsy, TES and business plan; and
- Seeking investors and letting contracts for both technical and field work.

The next key milestone in project development is the completion of Proyekt Stroitelstva (Techniko-Ekonomicheskoe Obosnovanie Proyekta). This translates as Technical & Economic Justification of the Project and is often referred to as the TEO Project. This report is a mandatory requirement assessed and approved by the State body GosExpertiza. Mine construction works can commence upon receiving approval from this state body. Part of the construction project documentation would include a detailed plan for the first year of construction (development period, mining works etc.). The TEO Project documentation is considered to be very close in many aspects to a western FS and even includes the Russian equivalent of an international Environmental and Social Impact Assessment (ESIA) process called the OVOS which stands for Otzenka Vozdeistvyia na Okruzaushuyu Sredu in Russian.

In a direct analogy with the Detailed Design and Engineering and Procurement Management (EPCM) phases in an international study, the Russian approach would enter a similar phase termed the Rabochaya Dokumentatsiya after the TEO Project is approved. Design Institutes would continue to develop the working plans and documentation often after construction works have commenced.

Project Development Stages in Russia - Environmental

This section discusses the relationship that environmental regulation has with approval of the Technical Project. The environmental process was integral to the review and approval of a project's technical design and economics. However, the current permitting system has changed this historical approach but nevertheless still embodies the same principal elements.

The key environmental document during the design phase is an OOS which translates to mean 'environmental protection'. This is a statement of technical protection measures based on the findings

of an approved OVOS (Russian ESIA) document. During 2007, the statutory requirement for an OVOS was removed. However, it is still required to support the permitting process because:

- In practice it is difficult to prepare and defend an OOS without an underlying OVOS technical study to support it;
- Project approval by regional authorities (in addition to federal approval for project design) is required and an OVOS is the document most likely to achieve this; and
- Other stakeholders require information about the project and an OVOS document provides this means.

Often the preparation of an OVOS will require extensive consultation with regional authorities. In some cases a document such as a pre-OVOS (equivalent to an environmental scoping study) will be prepared to assist development of appropriate regulatory controls for the project. A key part of a TEO Project is that it contains the OOS statement of environmental protection measures, which has been based on an OVOS that has also been approved by the regulators.

A comparison of Russian and international study criteria suggests similar approaches are used for the main technical disciplines in project design by the time projects are at the point of construction, but there is divergence on environmental matters as outlined below:

- ESIA – this document has an international focus prepared for financiers, Non Governmental Organizations (NGOs), shareholders and the public in most cases. It is typically written in non-technical language for a varied audience. The ESIA itself or parts of it would be used for permit applications in the jurisdiction of the project;
- OVOS – this document is prepared almost solely for the Russian permitting process and is prepared for a select group of independent experts. It is often written with a large amount of technical jargon in elaborate language;
- The key variations in scope between the two studies are generally:
    - An OVOS does not address impacts associated with off-site infrastructure, an ESIA typically would include impacts associated with the entire footprint of the project which could include roads, railways, power and water supply components;
    - Estimation of greenhouse gas emissions are not normally included in an OVOS;
    - OVOS focuses on the environmental protection process with little coverage on social issues and closure planning;
    - Health, safety and labour conditions are addressed in ESIA and not in an OVOS;
    - An OVOS is typically focused on technical solutions rather than management measures. As a result, Environmental Management Plans are not part of the deliverables; and
    - In an ESIA, international ambient and emissions standards are considered in a site specific local context. An OVOS does not consider a wider environmental context and focuses primarily on compliance with set emission standards.

A summary of the Russian project design and approval process is given in Table 1.

Project Approval and Construction Permits

The norm in Russia is to permit on-site and off-site infrastructure separately, which explains why the OVOS is limited to the on-site aspects of the project. For the on-site facilities OVOS and TEO Project documentation is submitted to GosExpertiza which is the Federal body who can approve the project for construction. The duration of the permitting process is defined in statutes with six months being the norm, but in reality this depends on resources available and quality of the submission. Recent experience suggests that some approvals can take up to 1.5 to 2 times the statutory timeframe. Regional and Federal authorities will also require submissions to consider aspects such as emergency preparedness (Ministry of Emergency Situations) and the buffer zones (Ministry of Public Health and Social Development). After approval by GosExpertiza , some Ministries will provide some other inputs, for example, the Forestry Department may provide a revised management plan for the area.

Federal approval is not required for the off-site facilities. Submission to relevant Regional authorities is the key obligation. The State Energy Distributing company would permit the power lines and the Ministry of Public Health regulate buffer zones with the Regional Directive of State Expertise (RDSE). Some items like roads only require approval from Regional Directive of State Expertise (RDSE).

Land is generally leased from the state and is part of the permitting process during the OVOS process and in the subsequent detailed engineering phase for mine site and off-site infrastructure. Negotiation with relevant government department (for example, forestry) is required to secure the land. Issues such as long term land use and ownership must be considered for items such as power lines and roads.

TEO Project approval stipulates certain requirements for annual reporting of production in accordance with statutory obligations. The mine would then submit annual return forms such as the 5GR and others in order to inform the GKZ of changes to resource and reserve status from new information and depletion for example.

As the construction phase concludes and mine operation commences, separate licences and permits are required which cover water use and discharge, waste management and atmospheric emissions. Volumetric and quality limits may be applied. Licences are granted for between 3 and 5 years and are based on the OOS, submitted for approval with the TEO Project documentation. Annual licence fees are based on the use of natural resources (use of air, water and land). Typical licences required are:

- Waste management – one licence for all infrastructure;
- Waste generation and disposal permits (separate construction and operation permits);
- Air emissions permits (separate construction and operation permits)
- Water use licence – one licence for operation and construction covering both phases
- Water discharge permits (separate construction and operation permits)
- Closure plan – this must be submitted to the Regional authorities one year before cessation of mining for approval.

Table 1 – Project Design and Technical Approval Process

No	Description	DOCUMENT'S NAME (RUS Pronunciation)	English translation	Types of work involved	International equivalent
1	Preliminary economic assessment of the project required for obtaining exploration & mining licenses.	**TEP** (Techniko-Economicheskoe Predlozhenye)	Technical and Economic Proposal	Indicative estimates of capital & operating expenditures for the project.	**Scoping / Conceptual Study**
		TED (Techniko-Economichesky Doklad)	Technical and Economic Report		
2	Technical and economic studies to determine the conditions at which the project will be profitable. The report presents Reserves for approval by GKZ. Cut-off grades and quality are addressed. It can be done without reserve estimation on cut-off grades only.	**TEO Konditsy** (Techniko-Ekonomicheskoe Obosnovanie Konditsy) *to be approved by GKZ (MANDATORY REQUIREMENT)*	Technical and Economic Justification of Conditions -	Technical work relating mainly to mining processing and other technical disciplines, option studies and economics are less detailed	**Partly Scoping & partly Pre-feasibility Study** *(Depending on the project)*
3	Performed to assess the deposit's mining cost effectiveness.	**TER** – (Techniko-economicheskie Rasschety)	Technical and Economic Assessment		**Pre-feasibility Study**
		also **OBIN** - (Obosnovanye Investitsiy)	Investments Justification	Often becomes part of the project's ToR	
	Russian equivalent of an Environmental and Social Impact Assessment (ESIA**)**	**OVOS**	Performed to obtain environmental permits	Environmental studies relating to on site facilities	
	Part of pre-TEO Project stage, identifies technology and capital investment required.	**TES** (Techniko-economicheskie Soobrazheniya)	Technical and Economic Considerations		
4	The abridged part of TEP, TEO (conditions), TER, TES or any other pre-project studies undertaken for justification of schedules and investment volumes as well as project cost effectiveness		Business plan		**Internal Documents Prepared at company's discretion at any stage**
5	Client's internal document which is mainly designed to specify priorities and dates for the pre-project preparation works, including: obtaining license, mining and land leases; technical conditions for utilities connection, environmental protection, etc. development of TEP, TEO Konditsiy, TES and business plan; seeking investors; drawing contract for design works		Work programme		
6	Construction Project / TEO Project - undergoes an expertise & approval assessment at a state body - GosExpertiza. Mine construction works commence upon receiving an approval.	**Proyekt Stroitelstva** (Techniko-Ekonomicheskoe Obosnovanie Proyekta *to be approved by GosExpertiza (MANDATORY REQUIREMENT)*	Technical & Economic Justification of the Project (sometimes referred to as **TEO Project**)	Multi disciplinary technical work covering all the disciplines. Documentation will include an **OOS** (environmental protection statement)	**Feasibility Study**
	Internal document specifying the project construction works. Based and regulated by norms that are developed by "Gos Stroy Rossei" (State Construction Regulatory Authority).	**Rabochaya dokumentatsiya**	Detailed Design	Design Institutes develop the working documentation and plans for construction.	**Detailed Design**

Conclusions

- The Russian mine design process is centred on two key reporting requirements for permitting of the project. These are the TEO Konditsy and the TEO Project reports, which broadly correspond to a PFS and FS in accordance with international norms;
- The TEO Konditsy and the TEO Project are both approved by state bodies and are key milestones in the project development. The TEO Konditsy is approved by GKZ and mainly focuses on mining technical issues and mineral resources, with less focus on option studies and economics than a PFS. Typically, a project undertaking studies for a TEO Project will have been carried out additional studies such as an OBIN to fill gaps in the project understanding. The scope of work for a TEO Project and an FS are very similar with the exception of environmental matters;
- The Russian OVOS differs from the ESIA in some significant areas, which prevent the OVOS document being directly included in a western FS. The key differences relate to project footprint, level of technical detailed required for baseline studies, level of public consultation, consideration and disclosure of information, labour, coverage of community and social issues and the preparation of a Social and Environmental Management System (SEMS) which includes a framework for environmental management and monitoring plans. An ESIA is prepared for a wider audience, whereas an OVOS is to inform a selected group of experts;
- An audit trail is generally a pre-requisite for an international study because an independent review is usually considered a certainty. The work of institutes is more succinct in many cases and they are not generally used to having to defend their work to an independent engineer appointed by a bank or investor;
- In many cases Russian studies use manual Reserve estimating techniques. Many of the Design Institutes make less use of computer spreadsheets and mine planning software than their international counterparts, however, this is not always the case and some Institutes have closed the gap in this regard. Traditionally, Russian Reserve estimates are required to be produced by manual sectional methods. However, this is changing and computer block modelling is gaining acceptance in many Institutes. The GKZ has recently indicated that it is ready to accept computer models provided they are supported with manual check calculations.
- It has been noted that the Russian Design Institutes often leave the detailed economic analysis until after the TEO Konditsy. A common impact is recommendations that over capitalize a project with large amounts of technology and infrastructure; design teams tend to look for ‘technological solutions’ without due concern for project economics. The end result of this can be mines that are sub-optimal. This approach is obviously a legacy from a centrally planned economy where obtaining raw materials and providing jobs is the main focus. Many underground mines in Russia are good evidence of this point; these mines typically have a production shaft, a service shaft and a decline. If the same mine were in Australia it would have a decline and some ventilation raises.
- Internationally, some non-independent consulting companies seek Feasibility Study work so that they can position them selves for the subsequent EPCM contract. Russian Institutes are often involved in detailed design but are not associated with the management of the construction. This is normally left to the construction company.
- Russian Design Institutes are licensed in Russia to produce the statutory documents required for project approval. Western consultancies are not licenced in this way, and in most cases would lack the necessary experience to do this work. Therefore it can be concluded that Design Institutes have the monopoly on Russian permitting reports and this is likely to

continue. Similarly, Russian institutes generally do not prepare feasibility studies to international standards and this is likely to continue to be the case.

- Russian projects that have requirements for international funding and reporting will continue to require dual technical studies. To achieve this, the international consultants and Russian Design Institutes will need to cooperate on a joint work program. Key issues to address in the joint work program will be to ensure the most appropriate option studies are carried out at the right stages, that capital expenditure is planned, that project economics are considered throughout the study, and that the environmental work program covers the additional studies necessary for the ESIA.

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