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REPUBLIC OF KAZAKHSTAN

MINISTRY OF EDUCATION AND SCIENCE

FOSTERING PRODUCTIVE INNOVATION PROJECT

ENVIRONMENTAL MANAGEMENT FRAMEWORK

Astana, August 2014

ABBREVIATIONS AND ACRONYMS

Bank, IBRD	International Bank for Reconstruction and Development
PMU	Project Management Unit
SB	Sub-borrower
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESF	Environmental Screening Form
MSDS	Material Safety Data Sheet
MoES	Ministry of Education and Science
SPB	Sub-project Beneficiary
SP	Sub-Project
IC	Instrumentation Contractor
IMSC	International Materials Science Center
IP	Intellectual Property
ISCB	International Science and Commercialization Board
MoEWR	Ministry of Environment and Water Resources
RPF	Resettlement Policy Framework
S&T	Science and Technology
TCO	Technology Commercialization Office

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ENVIRONMENTAL REVIEW PROCEDURES

1 Background

This section of the project Operation Manual presents the Environmental Management Framework that serves as a tool to screen the sub projects to be financed, and based on the screening, guides the client on the environmental due diligence procedures.

All sub-loans/grants to be provided under the FPIP and project preparation, as well as envisaged smaller rehabilitations, should be subjected by Ministry of Education and Science of the Republic of Kazakhstan (MoES), more specifically Project Management Unit (PMU) to an environmental review process incorporating the procedures described in this section. The Science Fund in MoES will host PMU. The PMU should use these procedures in reviewing and appraising Sub-Projects, and to inform Sub-Project Beneficiaries (SPB) of environmental requirements for sub-loan/grant appraisal, so that Sub-Projects can be implemented in an environmentally sound manner. These procedures and requirements incorporate the Republic of Kazakhstan's regulatory requirements for environmental legislation and the World Bank's safeguard policies.

Several types of sub-projects will be considered under the project:

(a) grants for young researchers and internationally recognized researchers ($30 million),

(b) matching innovation grants to provide early stage support for commercialization of R&D results ($10 million)

(c) Early Stage VC Fund for (i) Concept Development Grants and (ii) Equity Investment ($13 million)

(d) Rehabilitations of laboratories, technology transfer offices, etc.

The procedures essentially consist of Environmental Screening, Environmental Assessment, and Environmental Mitigation where necessary. The Environmental Screening will be carried out by the PMU at an early stage in their Sub-Project review procedures to determine the appropriate environmental risk category for the Sub-Project, and may require the contracting of external expertise. Following screening, an Environmental Assessment (EA) in line with the environmental classification of the Sub-Project will be recommended. The Sub-Project Beneficiary (SPB) will be responsible for carrying out any environmental assessment and for confirming that the proposed Sub-Project (SP) comply with national environmental guidelines, and for obtaining the necessary clearance from the appropriate licensing authorities. Once the analysis is performed and recommendations incorporated into the sub-project, the PMU will appraise the proposed Sub-Project package which would include, where appropriate, an environmental due diligence document, i.e. environmental management plan (EMP). The implementation of the environmental management plan will be monitored by the PMU, as well as the overall review process together with Science Fund. The environmental screening process and responsibilities of key parties are described in detail in the following chapters.

2. The project and the components

Project development objective

The Project development objective is to promote high-quality, nationally relevant research and commercialization of technologies. The project is strongly linked with the Technology Commercialization Project, also being implemented by MO ES.

Key Components

Component 1 - Development of the Knowledge Base for Innovation ($40 million): The objective of the component is to assure appropriate R&D and advanced human capital for the Innovation Consortia Component (2) and Technology Commercialization Cycle Component (3). This component will finance:

Grants to research teams ($30 million). Based on the TCP, the sub-component will finance two types of grant instruments for eligible R&D ideas: one for young researchers (a continuation of the Junior Researcher Group, JRG, Program) up to $0.6 million each and one for internationally recognized researchers up to $1.5 million each (a continuation of the Senior Scientist Group, SSG, Program). The eligibility criteria would include new features, such as emphasis on proven interest/partnership of private/corporate sector in the proposed research, researcher/company co-financing. The grant could finance laboratory equipment, workshops, visiting scholars, etc. Grantees must incorporate themselves as companies. Semiannual research progress will be monitored by the ISCB through field visits. The PMU will organize regular trainings for researchers on how to fill in applications, grant payment requests, etc., which will help avoid implementation delays. The outputs include grants approved for SSGs and JRGs and their outcomes will be measured through two PDO indicators: (i) "International publications from Senior and Junior Research Groups in peer reviewed journals" which measures output of Component 1 against international peer standards and improvement of scientific performance; and (ii) "Share of enterprise sector financing of R&D in Senior Scientist & Junior Research Groups".

PhD training abroad in technical areas strategic for Kazakhstan's economy ($10 million). This may include expansion of the Bolashak education program supporting PhD-level training and/or a pilot higher education consortium between Kazakhstan and a relevant Western university of excellence, such as Imperial College in London or Colorado School of Mines. The Bolashak program was established to provide educational grants for Kazakhstani students to pursue Master's, PhD, residency and internships in foreign universities based on an approved list of priority education areas/specialties. The proposed project will support joint international research activities for PhD candidates, post-doctoral students, and researchers who are already abroad. The project will finance tuition fees, insurance, travel, and accommodation. The outputs include the number of PhD students trained abroad.

This component is a repeated activity of the TCP, and the reasons for its selection are the following. With regards to linking science to markets, Kazakhstani science and related government support policies still build on a linear model of R&D results' commercialization that does not consider market needs until a prototype is developed. Such approach bears an intrinsic risk of developing products and applications that might be brilliant from a scientific point of view, but useless to general consumer. In fact, this risk has already realized in several Kazakhstani research institutes that now virtually sit on inventions that are of no interest to the market. Some of the current technology commercialization support policies try to build on this "collection of prototypes" and find market for them, obviously, with little success. This project aims to change this obsolete technology commercialization concept suggesting that research should be based on a preliminary market analysis and carried out using regular feedback loops which help to maintain the right focus throughout entire process. Such change cannot be achieved easily and requires specialized expertise and skills. The country needs more specialists in technology commercialization, especially among policy makers, to make this happen. The TCP is gradually addressing this challenge but the effort needs to be broadened.

With regards to R&D finance, Kazakhstan has recently introduced a competitive grant process with a good selection mechanism based on international expertise. However, while addressing quality of research, this system does not set any requirements regarding commercialization of research results. As a consequence, the blind development of prototypes continues. The grant financing suggested by this project will be strictly oriented to commercialization of research results through competition conditions and the requirement to submit an initial commercialization plan together with the grant application.

Component 2 – Technology Consortia for Inclusive Innovation ($35 million): The objective of this component is to promote collaboration among local research institutes, design bureaus, and scientific and engineering laboratories, as well as between these research centers and world's innovation leaders through R&D and technology consortia, and to provide a demonstration effect of private-public collaboration. This component includes two windows of Calls for Proposals:

Productive sector consortia: consortia in productive sectors of the economy - agriculture, extractive industries, manufacturing; and

Inclusive innovation consortia: long-term collaborative effort to improve delivery of social services (health, education, water, urban and rural infrastructure) to increase livelihood of urban and rural population.

Following an established global good practice (EU, technology platforms, long-term consortia in UK, Australia and Russia), the consortia projects will be established through a competitive two-stage facilitated selection process which mandates international collaboration and co-funding from users and clients. In the first stage of the process, industry- and R&D-led applications will be assessed against the selection criteria by the International Science and Commercialization Board (ISCB). The ISCB will recommend which applicants proceed to stage two. At stage two, the Board can identify synergies between applicants to ensure that the best combination of participants and support is identified for each consortium application. This process may involve an independent facilitator to broker between applicants to negotiate arrangements for the establishment of a single project consortium. In each case, the implementing ministry will select, with advice from the Board, an independent facilitator based on the following criteria:

- the facilitator is independent from any potential project consortia partners or associated parties;

- the facilitator has sufficient understanding of and has a demonstrated connection to the selected industry; and

- the facilitator has the organizational, communication, and negotiation skills required to broker the development of the project consortia agreement.

The winner would receive a MOES grant for upgrading to international standards while pursuing the declared R&D goals. The grant conditions would allow purchase of additional equipment, renovation, and would require adoption of good laboratory practices, international certification. It is expected that up to 10 user-driven innovation clusters would be developed between major Kazakh and global companies, including multinationals involved in oil and gas drilling in the country. The IMSC is one example of such consortium in the current project, although institutional configurations of consortia are expected to vary.

This component would be monitored in terms of applications for financing consortia created based on a cooperation agreement and its results would be measured through the PDO indicator "total turnover of the consortia" that measures the size, scale, and output of consortia. With regards to the risks related to the character of the corporate sector in Kazakhstan (mainly SOEs) and lack of interest

from international laboratories, it is assumed that the SOEs motivation and behavior are not radically different from the behavior of private sector firms, and that the ISCB as advisors of the MOES will provide necessary assurance that the agreed procedures, transparency of process, and feedback mechanism are in place. At the same time, while the component design is based on implementation of consortia in other countries, it is novelty in Kazakhstan and there are uncertainties about how the project will be received by various stakeholders, and what obstacles to implementation may appear. The function of the Innovation Council (Component 4) will be to facilitate horizontal linkages and collaboration between agents of the NIS, and this will contribute to encouraging the development of consortia. Additionally, the PMU will organize regular trainings for researchers on how to fill in applications, grant payment requests, etc., which will help avoid implementation delays. The proposed two-stage application procedure (e.g. innovation consortia/technological platforms) is designed to be the most important risk mitigation measure for the new instrument of consortia.

Component 2 is a complementary commercialization activity to Component 3 built on the successes of the TCP. The reasons for selecting the component are the following. The Government of Kazakhstan has invested significant resources into national infrastructure. It has built twenty modern laboratory facilities. Although of predictably variable quality, twenty national laboratories are active in various fields of scientific enquiry. It is critically important to promote collaboration between these laboratories and to link them to leading innovation centers in the world, though, for instance, R&D and technology consortia. The present system of R&D laboratories is characterized by large internal diversity but it is also quite fragmented. (This is not an issue specific to Kazakhstan or even to post-socialist economies; all middle-income economies suffer from this problem.) Two problems are central, though. The first one is fragmentation: high quality research is done in small teams distributed around the system each lacking critical mass to sustain a significant program of international quality research. There is successful experience of overcoming the fragmentation problem in various countries, and the proposed project uses this extensively. The second problem is lack of focus on national priorities: the research agenda is often influenced by the interests of individual researchers in centers that do not coordinate with each other. The project would finance grants only for national priorities.

The second window is of particular relevance for Kazakhstan, given its need to find new solutions to improve social services, particularly to the rural population in remote regions of the country. This would require particularly intense promotion and coordination efforts. Role of the proposed Innovation Council (Component 4) will be central both in generating awareness of the domain of inclusive innovation and in helping relevant ministries (Health, Regional Development, and others) to collaborate for establishment of inclusive innovation agenda for Kazakhstan.

Component 3 – Consolidation of the Technology Commercialization Cycle ($24million): The objective of this component is to complement the existing financial instruments and solutions suitable to different stages of startup company development. It would include four sub-components and finance the following activities:

Public Support to a Funding Facility for technology-based enterprises (early stage venture capital (ESVC) fund for technology-based companies) (US$10 million): Although a limited number of VC- funds exist in Kazakhstan, there have been minimal transactions for early stage and technology-based companies. Availability of early stage finance remains problematic. The sub-component attempts to make early stage financing available for technology start-ups and provide a demonstration effect of commercial viability of these investments. This demonstration effect is expected to attract other VC companies and therefore would allow a critical mass of early stage and venture capital to evolve.

This component would pilot an ESVC-fund (the Fund) that would comprise a limited public contribution - up to US$ 10 million or up to one half of the total fund equity. The project will also provide an up to 50% subsidy towards the management fee of the fund. While the exact management

structure is to be further explored, the management fee is estimated at approximately US$250,000 for four years of operation. It will be provided on a sliding scale basis (from 50% in year 1 to 10% in year 4). This pilot fund would provide a demonstration effect of the commercial viability of early stage funds for technology and high value-added start-ups helping to attract other VC companies and creating a critical mass of early stage investments and market agents. The legal framework for technology VC funds is sound.

Innovation Brokerage to Generate Deal Flow (US$ 2.0 million): This sub-component would seek to catalyze a market for specialized business development services that are able to transform technology and innovation ideas into commercial projects acceptable for early stage venture capital or other investors. The key lesson from other countries that have attempted to introduce early stage funding pinpoints to the need for additional assistance that will facilitate the availability of "deal flow" i.e., investment ready projects. Recognizing this, the sub-component would support the formation of innovation brokerage team that would assist an entrepreneur in all stages of the incubation cycle. More specifically, the functions of the "deal flow" promoters would comprise (i) assessing the technological viability of the project; (ii) estimating the commercial potential of the innovation; and (iii) generating, presenting and marketing new information about the project.

Technology Acceleration Office Abroad ($2 million) to enhance capabilities of a technology and marketing office located at one of the recognized centers of excellence in technological innovation in the USA (Silicon Valley, CA, Austin, TX) or Russia (Moscow, Skolkovo).

Network of Technology Transfer Offices ((TTO) at major Kazakh universities ($10 mln). This sub-component will enhance capabilities of existing TTOs with an objective to reach a critical mass technology commercialization and transfer capabilities within a coherent network of 5-6 capable TTOs. Operating in concert with innovation matching grants (sub-component 3a), this sub-component will facilitate an adequate deal flow for the venture fund (sub-component 3b). It will finance goods and services (training, study tours) to upgrade capabilities of TTOs.

This component would be monitored in terms of innovation matching grants applications/ approved and total value of the venture capital fund created and its outcomes would be measured in terms of Patent Cooperation Treaty agreements approved for project beneficiaries and license agreements signed. With regards to the risk that experienced companies would lack interest to assume management of the venture funds, it is anticipated that the activities of the Innovation Council will foster long-term interests of companies and hence their contributions to the VC fund. It is anticipated that the risk of limited supply of commercially relevant ideas is mitigated by the TCP performance (10 out of 21 research groups' projects have commercial value) and the strong focus of the proposed project on commercial relevance as the eligibility criteria for R&D. In the case of this component, as well, the PMU will organize regular training to applying scientists on applications and payment requests to mitigate the risk the beneficiaries do not know how to fill out the requests for grant payments and thus contribute to implementation delays. As this is a novelty in Kazakhstan.

This component draws on the activities of the TCP, utilizing results of the technology audit, technology commercialization grants program and comprehensive R&D regulatory framework review, and of technology commercialization support programs developed by the Ministry of Industry and New Technology (MINT) and other government agencies. The specific reasons for selecting this component are as follows. Similarly to the situation with underdeveloped financial markets, Kazakhstan lacks such important elements of providing financial instruments and solutions suitable to different stages of startup company development. As a result, many technology startups fall below the radar of few venture capitalists present in Kazakhstan. Building such comprehensive system is a difficult task that requires maturity of market players. At the same time, there is evidence that appetite for risky investments is gradually growing and creation of proper vehicle would potentially bridge several financing gaps described earlier. For example, a public-private fund providing seed funding and comprehensive management and business support could grow the promising innovative startups

through equity financing, with buyout option at later stages when those young companies become more sustainable and attractive for venture capital.

Component 4 - Innovation Council ($6 million): The objective of this component is to ensure better coordination between key stakeholders of National Innovation System, including Ministry of Education & Science, Ministry of Industry & New Technologies, Ministry of Agriculture, and Ministry of Oil & Gas. The component will finance TA to set up the Council and build-up its capabilities, and cover operating costs of running the Council. This TA will be focused, inter alia, on the following functions/capabilities of the Council:

Innovation Observatory - a permanent framework to monitor innovation performance both in productive and public sector; and

Awareness raising and coordination - to articulate and disseminate inclusive innovation agenda for Kazakhstan.

The Council would benefit from collaboration and advice from the International Science and Commercialization Board under the TCP. The TCO established under the TCP could serve as the secretariat of the Innovation Council. This component draws on the experience of inter-agency Innovation Councils in such countries as Chile and Finland. The reason for selecting this component is the following. As already noted, the government's effort of the past 20 years and the current TCP created a complex set of organizations. The priority at this stage is consolidation, coordination, and achievement of synergy between these organizations in order to re-focus the country's research and development sector to goods and services valued by market. The Innovation Council will contribute to the high-level objectives of the project, namely to the cultural change in the NIS, development of the NIS in line with international standards, and streamlining the functioning of the NIS. This would mitigate the potential future risk that, due to growing interest in the innovation system and because innovation is a cross-cutting area, various institutions in different sectors will take actions that negatively affect the NIS and undermine the reform efforts of the project. The results of the ongoing Technology Commercialization Project (TCP) are already having a demonstration effect that will contribute to changing the culture to be more supportive of innovation.

Component 5 - Project management, monitoring and evaluation, awareness raising and capacity development ($5 million): This component will finance the day-to-day PMU functions (project administration, procurement, financial management, disbursement, M&E, safeguards, program management, public awareness raising) and assessments of the legal and regulatory framework. It will finance PMU staff, consultant services for strengthening the legal and regulatory framework and project awareness raising, as well as operational costs.

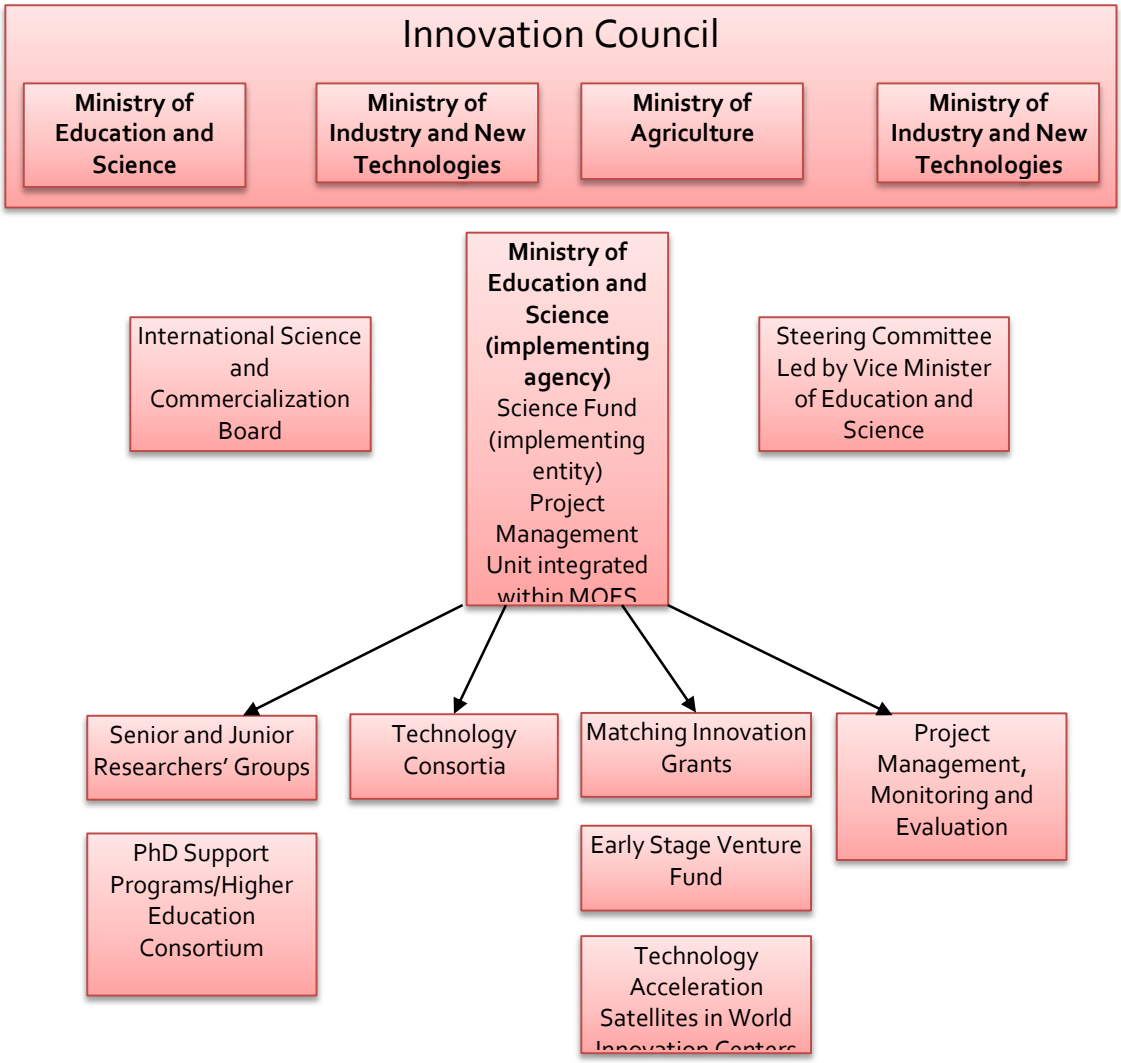
Project implementation structure

The proposed Project will be implemented by the **Ministry of Education and Science (MoES)** (Implementing Agency). The **Science Fund (SF) (Implementing Entity)** created by the Ministry of Education and Science as an independent legal entity and chaired by the Minister of Science will be responsible for supervising overall project implementation and providing strategic oversight of the implementation of key Project activities on behalf of the MoES. The Science Fund will host PMU.

A **Project Steering Committee** to be chaired by the Vice-Minister within MES will be established for strategic project management by the Ministry.

3. The existing Project Management Unit (PMU) of the MoES for the TCP will be responsible for day-to-day project administration, including procurement, financial management, disbursement, M&E and environmental and social safeguards. The PMU will also be responsible for M&E, safeguards, procurement and financial management administration for research and other grant programs.

4. The **International Science and Commercialization Board** (ISCB) will provide scientific guidance related to all scientific matters associated with the project, including the selection of the Groups, participating in the two-stage selection of consortia, monitoring of their scientific progress and achievements.



3 Safeguard Policies That Might Apply and national legislation

Environmental Category B, with B and C sub-projects would be applied.

OP/BP 4.01, (Environmental Assessment) is triggered. An overall EMF will be prepared, following World Bank policies on consultation and disclosure, in advance of appraisal. EAs/EMPs would be prepared for the sub-projects to be financed that would be classed as category B.

OP 17.50, (Disclosure Policy) is triggered with reference to the EMF and EAs/EMPs for the Sub-projects to be financed.

This policy requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the research projects supported by the Kazakhstan FPIP. The EA process takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property) and trans boundary and global environmental aspects.

The environmental and social impacts will come from the activities of the research projects that the Kazakhstan project will be financing as well as from the civil works associated with the rehabilitation of the existing building that will host the new lab(s), and other science institutions. The EA process calls for the Government of Kazakhstan to prepare an EMP, which will establish a mechanism to determine and assess potential environmental and social impacts of the research projects under the proposed Groups, and then to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the research projects and the rehabilitation works to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

OP 4.01 further requires that the EMP be disclosed as a separate and stand-alone document by the Government of Kazakhstan and the World Bank as a condition for Bank Appraisal of the project. The disclosure should be both in Kazakhstan where it can be accessed by the general public and local communities and at the Infoshop of the World Bank.

The policy additionally calls for the project as a whole to be environmentally screened to determine the extent and type of the EA process. The project has thus been screened and assigned a Category B status.

Category B projects have the potential to cause adverse environmental impacts on human populations or environmentally important areas – including wetlands, forests, grasslands, and other natural habitats – and are less adverse than Category A projects. These impacts are site specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. The EA for Category B subprojects examines the potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

Therefore, this EMP sets out the EA process to be undertaken particularly for those research projects under the proposed Groups which, after they are being identified, will have an environmental impact according to the completed Environmental Screening form (annex A).

4 Environmental Screening Categories

Environmental Screening is the first step in the environmental due diligence process of reviewing the sub-loan application.

In the FPIP two distinctive types of applications will be provided:

I Applications for rehabilitation works, i.e. rehabilitation of laboratories and other science and technical institutions; and

II Applications for Sub-Project financing – grants or sub loans

The purpose of environmental screening is to determine the environment risk associated with the proposed sub-borrower/sub-project, reject applications which are unacceptable due to the nature of the proposed activities, classify acceptable applications by environmental categories and identify the type of environmental due diligence document that will be required.

I Applications for rehabilitation work

Some minor construction work, including rehabilitation and expansion of laboratories, classrooms and other science facilities might be financed under the project and as such might have an impact on the physical and social environment. However, the scope of the potential impact will be modest and will most likely only involve minor modifications to existing buildings.

Possible environmental issues might arise during the proposed rehabilitation activities of the building that will host the new lab. Environmental effects of the project, if any will be minor and short-term.

The site specific screening and review would carefully assess the following issues:

- Dust, noise and vibration due to the demolition and construction;
- Risk of damage to unknown historical and archaeological sites;
- Dumping of construction wastes and accidental spillage of machine oil, lubricants, etc.
- Risk from inadequate handling of waste; and
- Potential requirements, if any, for involuntary resettlement or temporary relocation of a limited number of affected persons during construction activities.

There will be no special screening form provided for rehabilitation works. The Sub-Project Beneficiary will have to fill in directly EMP checklist where basic information about the Sub-Project will be provided. The project will not finance land acquisition or construction of new buildings on new sites. For the operation phase, the laboratories will implement a good international practices and follow state standards and requirements of The resolution of the government of the Republic of Kazakhstan of January 10, 2012 No. 13 About the statement of Health regulations "Sanitary and epidemiologic requirements to laboratories".

II Applications for Sub-Project financing – grants or sub loans

Results of the Environmental Screening shall be reflected in the Environmental Category Form (Annex B), completed by PMU and submitted the Sub-Project Beneficiary. Through the Environmental Screening Form (Annex A), the Sub-Project Beneficiary will provide sufficient information for PMU to determine the environmental category of proposed sub project. Environmental Screening form described in annex **A** will be a part of a Sub-Project application package.

The filled screening form should describe relevant aspects to be addressed in the course of assessment, especially when dealing with radioactive trace materials, animal testing and use of cancerogenic and mutagenic substances. In form provided in annex B, PMU will define the type of environmental due diligence report to be prepared and request additional information if needed.

The examples provided of Sub-Project and their suggested categorization, are indicative only and will need to be reviewed throughout FPIP implementation to assess their appropriateness concerning the types of Sub-Projects which are actually submitted to the PMU. As it would be impossible for this list to be exhaustive, Sub-Projects which cannot be identified as belonging to one of the categories below should be brought to the attention of the PMU to transmit to the WB environmental specialist for further guidance.

Activities Generally Ineligible for IBRD financing

1. Trade in wildlife and wildlife products prohibited under the CITES convention,
2. Release of genetically altered organisms into the natural environment,
3. Manufacturing, distribution and sale of banned pesticides and herbicides,
4. Drift seine netting in the marine environment,
5. Manufacturing, handling and disposal of radioactive products,
6. Hazardous waste storage, treatment and disposal,
7. Manufacturing of equipment and appliances containing CFCs, halons and other substances regulated under the Montreal Protocol,
8. Manufacturing of electrical equipment containing polychlorinated biphenyls (PCBs) in excess of 0,005 % by weight,
9. Manufacturing of asbestos containing products,
10. Nuclear reactors and parts thereof,
11. Tobacco, unmanufactured or manufactured,
12. Tobacco processing machinery, and
13. Manufacturing of firearms.

For the purpose of the project in licensed research laboratories, the use small amount of radioactive trace materials will be allowed for use following the due diligence described.

Category A activities which will not be financed through the sub-lending scheme

A proposed sub-project is classified in this category, if it is likely to have highly significant, diverse, and/or long-term adverse impacts on human health and natural environment, the magnitude of which is difficult to determine at the sub-project identification stage. These impacts may also affect an area broader than the sub-project sites. Measures for mitigating such environmental risks may be complex and costly.

These projects would also coincide with those requiring full EIA, more specifically category I projects, according to article 40 of the RoK Ecological Code. In addition, if the project would according to filled Environmental Screening Form, be characterized by environmental sensitivity of the planned location and surroundings and nature and magnitude of impacts might be of high magnitude shell also

be excluded. For that reason, sub-projects that fall under Category II, IIIII or IV according to article 40 of the RoK Ecological Code, could also be considered category A, on a case by case basis.

Category B+ activities which may be supported, subject to positive EIA conclusion by the Ministry of Environmental or include projects with short term environmental impacts (EIA report and/or EMPs required)

These would include sub-projects which may have significant, negative and/or short-term environmental impacts, the magnitude of which are difficult to determine at the sub-project identification stage. An EIA (if recommended by the MEN or local executive authorities of provinces or cities) (see annex C), otherwise EMP (see annex D) would be prepared by the Sub-Project Beneficiary. The costs of the mitigation measures would be included in the EIA / EMP and incorporated in the tendering documentation if applicable. If PMU determines that it is not easy to classify the project, it will advise the World Bank environmental specialist. The environmental due diligence documents would as well describe and assess testing phase of the product if applicable.

Category B- activities which may be financed (EA report and EMPs required)

This category includes Sub-Projects which may have intermediate levels of regular and accidental emissions and typical simple construction related impacts. There might include:

a) all construction of buildings or any infrastructure for which full EMPs would be prepared (except those which would require EIA according to national legislation).

b) all physical investments (rehabilitation, refurbishing, etc.) on existing buildings for which EMP checklist would be applicable

c) all projects involving assembling for which Material Environmental Management Plan (MEMP) would be prepared. This MEMP includes identification of materials and processes used (mechanical, chemical, etc.), and good laboratory and engineering practices. The checklist should be accompanied with MSDS (Material safety data sheets) for all identified materials used. The environmental due diligence documents would as well describe and assess testing phase if applicable.

If the radioactive trace material will be used for medical or pharmaceutical research for example, or cancerogenic, mutagenic and teratogenic, the handling practices will be in detail explained together with supplying and disposal techniques. The requirements are described in more details in annex H – Guidance on radioactive trace materials, biological agents and ethical issues. In addition, all licenses for handing these materials and accreditation of the laboratories should be submitted with the MEMP checklist. Same practice would be followed when testing is done on laboratory animals.

Category C activities which may be financed through the sub-lending scheme

These would include sub-projects whose environmental impacts are expected to be negligible, for which no EA would be required. Example of these is IT software development and other non-physical intellectual work.

5 Environmental Assessment – Environmental due diligence documents

An Environmental Assessment (EA) is a process conducted by the Sub-Project Beneficiary to identify, predict, evaluate, and mitigate the environmental impacts and risks which may arise from the proposed Sub-Project. The purpose of the EA is to recognize environmental impacts/consequences early in the sub-project preparation process, so that they can be incorporated into the sub-project design. The scope of Environmental Assessment will depend on the type of activities and the environmental category attached to each Sub-Project, though the purpose of any type of assessment is to identify ways of environmental improving the proposed activities by minimizing, mitigating, or compensating for their adverse impacts. An Environmental Management Plan alone will serve as environmental assessment report or should be made an integral part of an environmental assessment report, which lists environmental risks related to the specific types of sub-project activities and prescribes mitigation measures. EAs identify ways of improving sub-projects environmentally by minimizing, mitigating or compensating for adverse impacts. An EA would also describe the steps that were taken for public consultation.

I Applications for rehabilitation work related to laboratories and science buildings

For all rehabilitations, EMP checklist will be prepared (see annex E). EMP checklist should be prepared in local language and publically disclosed.

Common mitigation works associated with the rehabilitation of laboratories which should be adhered to as well as good international laboratory practices are described in annex G.

Standards of the Kazakhstan national legislation and regulatory bodies will be used to follow environmental compliance the rehabilitation projects. Where Kazakhstan legislation and standards would deviate substantively from practices and standards as described in the World Bank's Pollution Prevention and Abatement Handbook, the World Bank's provisions and standards will prevail.

Modernization, laboratory rehabilitation or extensions, etc. would be implemented through the MoES based on designs adhering to international best practice and standards. The modifications will be done by local contractors, funded by the project, supervised by MoES and the World Bank.

The MoES and the World Bank will review plans for all subprojects, along with any comments from the ISCB, the International Materials Science Center Contractor, and any relevant research review committees.

If views diverge on the adequacy of the plans, the MoES and the World Bank shall seek to resolve these through the ISCB.

All costs of refurbishments and rehabilitations will be covered by project. The PMU will designate a construction supervisor that would work closely with the research team for the project. Responsibility for observance of ESMF procedures lie with the MoES. Any consequences of untruthfully stating that no involuntary resettlement, or loss of assets or rights of access to land, or an impact on livelihood are involved, will equally fall fully to the MoES. Compliance of construction with the ESMF mitigation measures will be a routine part of subproject supervision. The MoES will make provision for occasional extraordinary supervision visits focused on rehabilitation compliance.

II Applications for Sub-Project financing – grants or sub loans

For Category B +

One type of documents might be required:

a) A full EIA would be required for Category B+ if the proposed project falls under Classification Category II, III, or IV of RoK Ecological code, article 40 and if not considered category A by the WB. The EIA will be prepared according to national regulation and will undergo national approval system. If gaps in the content of EIA are noticed, the EIA will be updated to fit WB standards. In addition to EIA the sub-borrower will prepare EMP. This implies two public disclosures requesting comments (first on the scope EIA and second on the final draft) followed by public consultation of both EIA and EMP. The documents will be prepared in English and Russian.

For category B – three possible types of environmental due diligence is expected

a) Material Environmental Management Plan (Annex F). This checklist includes identification of materials and processes used (mechanical, chemical, etc.), and good laboratory and engineering practices (annex G). The checklist should be accompanied with MSDS (Material safety data sheets) for all identified materials used. The environmental due diligence documents would as well describe and assess testing phase if applicable. MEMP would be prepared in local language, publically disclosed on the project website or Sub-Project website. If the radioactive trace material will be used, or cancerogenic, mutagenic and teratogenic, as well as testing animals, the handling practices will be in detail explained together with supplying, and disposal techniques. In addition, all licenses for handing these materials and accreditation of the laboratories should be submitted with the MEMP or any other environmental due diligence document required (more details on radioactive materials and ethical issues related to animal testing are described in annex H). First 5 MEMP, dealing with radioactive trace material will be used, or cancerogenic, mutagenic and teratogenic, as well as testing animals will be prepared in English and Russian.

b) EMP will be prepared for category B - subprojects which include construction of new buildings, infrastructure or research project that would require the same and that is not covered by the National EIA regulation. EMP will undergo one public disclosure and consultation. EMP will be prepared in English and local language. Content of the EMP is defined in Annex D.

c) EMP checklist will be prepared for rehabilitation of buildings of the National EIA regulation. The document will be publically disclosed requesting written comments. Sample of the EMP checklist for rehabilitation is presented in annex E. EMP checklist will be prepared in local language.

6 Environmental Review Process (Role of PMU and WB)

All Sub-Project Beneficiary will follow the environmental review process presented schematically below.

STEP 1: The Sub-Project Beneficiary prepares an initial Sub-Project application, filling, among the others the Environmental Screening Form presented in Annex A. Following informal discussion with the PMU, in which the PMU alerts the Sub-Project Beneficiary of its environmental assessment requirements, the PMU assists the sub-borrower in finalizing the Environmental Screening Form if needed. At this time, it is the responsibility of the sub-borrower to initiate discussions with the MEN or other authorized body in order to fulfill any local and national environmental review requirements (such as EIA and/or other official approval/permits). It will be the responsibility of the Sub-Project Beneficiary to obtain the appropriate permits and licenses as required by national law in order to facilitate the clearance process with the MEN. These requirements are considered separate, but parallel, to those presented here and satisfying them is the responsibility of the sub-borrower.

For rehabilitation of the laboratories or science buildings the PMU advises Sub-Project Beneficiary to proceed with the preparation of the EMP checklist.

STEP 2: The PMU screens the sub-project and informs the Sub-Project Beneficiary of the environmental category (annex B) and provides info follow-up requirements for Sub-Project processing (for example on testing or use of radioactive trace materials).

STEP 3: The Sub-Project Beneficiary, or its consultants, submits the environmental due diligence document (if applicable). The Sub-Project Beneficiary will obtain a positive EIA report, given by the MEN or authorized body, in conformity with applicable Environmental Regulations for the activities under Category B +.

STEP 4: The PMU reviews the environmental due diligence document that has been submitted and reports its findings to the Sub-Project Beneficiary. The PMU provides its clearance once the analysis is judged to be satisfactory and proceeds with the disclosure advice as described in previous sections. In case where radioactive trace materials will be used or cancerogenic, teratogenic or mutagenic substances, as well as animal testing conducted, the PMU will advise WB on quality of the environmental due diligence document.

STEP 5: The Sub-Project Beneficiary incorporates the recommendations provided in the analysis into the Sub-Project design and implementation plan, including associated estimated costs.

STEP 6: The PMU finalizes the Sub-Project application package, including the relevant environmental documentation. The EMP checklist for rehabilitation of laboratories and other science buildings will be part of the bidding documentation for contractor and supervising engineer.

STEP 7: The PMU monitors the implementation of the EMP (if necessary) and informs the PMU. PMU reports on implementation of EMF in the regular project progress reports and at the request of the WB.

Prior and Post-Review – WB/PIU. Environmental evaluations and review procedures will be subject to ad-hoc review by the PMU and WB supervision missions. WB will perform: a) prior review and clearance of all sub-projects falling in B+ requiring full EIA and EMP, as well as those involving use of radioactive materials, mutagenic, teratogenic or cancerogenic substance as well as testing animals and b) post review for all other projects. For that reason all environmental due diligence documentation for prior reviewed sub-projects will be prepared in English and local language. The review of evaluations will ensure that: the work was of satisfactory quality, community participation took place when appropriate, the appropriate recommendations were made, all documentation was

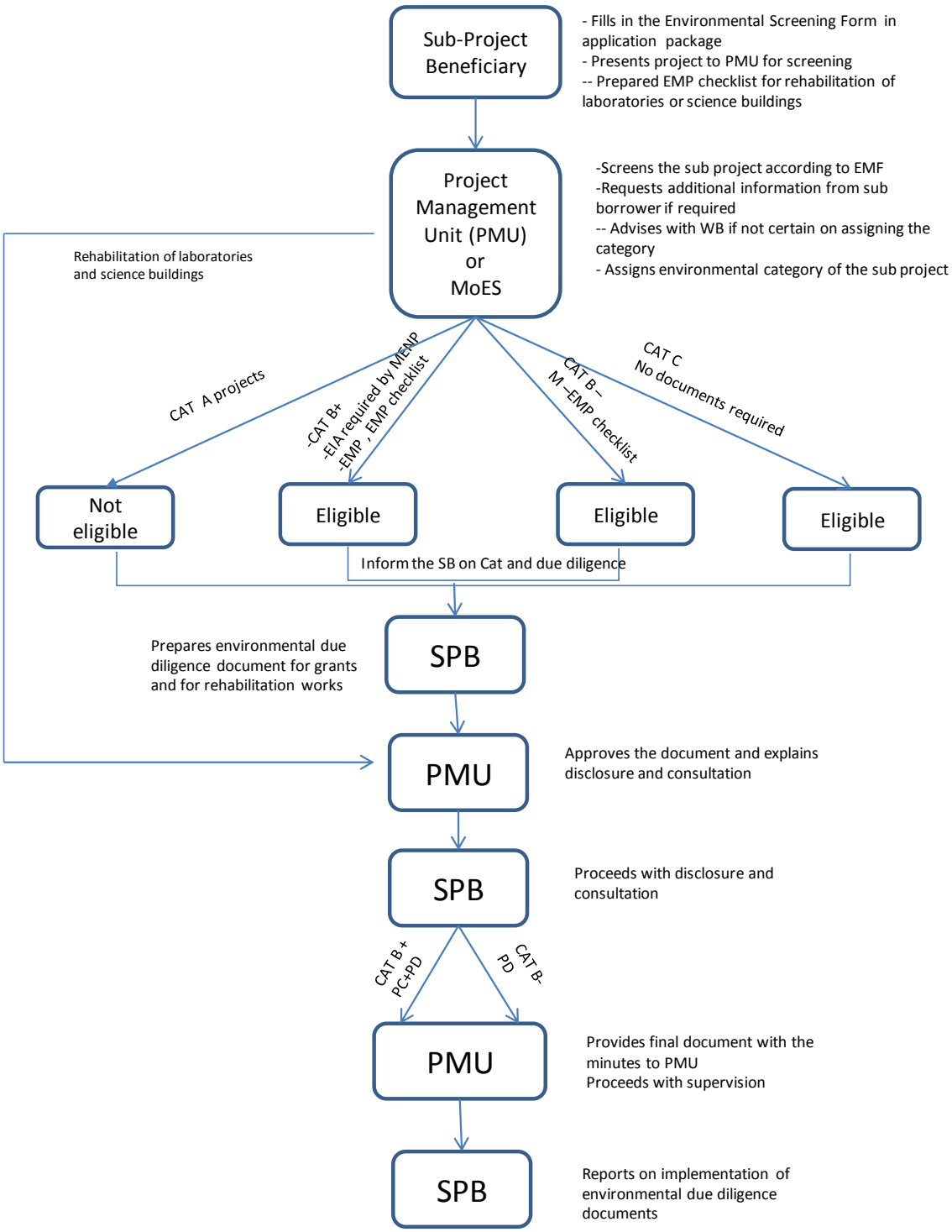
properly filed and recorded, and that the conditions of approval by the MEN were met. During FPI preparation and implementation, PMU together with WB representatives will supervise the overall screening process and implementation of environmental recommendations for selected sub-borrowers/sub-projects. PMU's and WB supervision team will also review, ad-hoc, environmental documentation. Therefore, all this documentation should be kept on file with the sub-projects beneficiaries and forwarded to the PMU as needed.

The diagram of the steps to follow is presented in the next pages as well as responsibilities of different parties.

Contracts.

Contracts and bill of quantities will include clauses for appropriate disposal of unacceptable construction material and disposal of construction waste. Procurement documents will specify that no environmentally unacceptable materials will be used. Bidding documents will include rehabilitation of adequate sanitary facilities, including appropriate disposal of wastewater and sewerage. This checklist and EMPs should be provided to contractors engaged in civil works under the Project, and should be made an integral part of the civil works contracts.

The site inspector's monitoring report would be a condition for full payment of the contractually agreed remuneration, the same as technical quality criteria or quantity surveys. To assure a degree of leverage on the Contractor's environmental performance an appropriate clause will be introduced in the works contracts, specifying penalties in case of noncompliance with the contractual environmental provisions, e.g. in the form of withholding a certain proportion of the payments, its size depending on the severity of the breach of contract.


Sub-Project Beneficiary
- Fills in the Environmental Screening Form in application package
- Presents project to PMU for screening
-- Prepared EMP checklist for rehabilitation of laboratories or science buildings
Project Management Unit (PMU) or MoES
-Screens the sub project according to EMF
-Requests additional information from sub borrower if required
-- Advises with WB if not certain on assigning the category
- Assigns environmental category of the sub project
Rehabilitation of laboratories and science buildings
CAT A projects
-CAT B+ -EIA required by MENP -EMP , EMP checklist
CAT B – M –EMP checklist
CAT C No documents required
Not eligible
Eligible
Eligible
Eligible
Inform the SB on Cat and due diligence
SPB
Prepares environmental due diligence document for grants and for rehabilitation works
PMU
Approves the document and explains disclosure and consultation
SPB
Proceeds with disclosure and consultation
CAT B+ PC+PD
CAT B- PD
PMU
Provides final document with the minutes to PMU
Proceeds with supervision
SPB
Reports on implementation of environmental due diligence documents

Responsibilities of Key Participants

Participant	Activity	Supporting Documentation
Sub-Project Beneficiary	• Submission of sub-project concept to PMU • Arrangement and financing of environmental due diligence documents • Obtain required permits/licenses • Implementing and financing of environmental due diligence	• Copies of permits, licenses • Clearance statement • Periodic reports and sub-project completion report • Environmental Due Diligence Documents
PMU (PMU)	• Distribution of Operational manual to Sub-Project Beneficiaries • Finalize the environmental screening form, assign the environmental category • Review of sub-project application package for required environmental documentation and licenses/permits from the State authorities • Maintain complete files of environmental documentation for review by the WB • Monitoring compliance with mitigation plans (if necessary) • Report on Implementation of EMF	• Include environmental information with sub-loan application • Include environmental monitoring / supervising information in regular portfolio reporting to MoES • Include in normal PMU records, environmental documentation • Periodic monitoring / supervising reports (if necessary) • Include environmental category and EIA status in normal periodic reporting activities
WB	• Organize training for PMU staff and applicants regarding environmental review procedures • Carry out prior and post reviews • Identification of problems/ issues and proposal of solutions • Carry out field supervision	• Provide assistance • Document status of project implementation in Implementation Status and Results reports and the mission Aide-Memoires

Annex A: Environmental Screening Form

PART 1: APPLICATION (filled by applicants)	
Sub-Project Beneficiary	
PROJECT TITLE	
Scope of project and activity – project description	
Institution supporting/supervising the project	
Describe the area (urban, rural), topography and vegetation at the research site	
Describe the set-up of the laboratory and/or workshop (size, amount of sinks, windows, ventilation arrangements, etc.) in which the research will take place	
What are the potential environmental impacts of the project?	
TESTING	
Will the project finance testing phase?	
Please describe testing phase	
Please specify outdoor or indoor?	

PERMITS			
What permits are required for project preparation and / or testing?			
PART 2: SCREENING (filled by applicants, checked by PMU)			
Screening category according to national Regulation on EIA	**EIA required?**	**Yes** ☐	**No** ☐
	The need for EIA needs to be assessed?	**Yes** ☐	**No** ☐
	EIA not required?	**Yes** ☐	**No** ☐
If no annex:	Does it include construction or rehabilitation of buildings or infrastructure?	**Yes** ☐	**No** ☐
	Does it include assembling?	**Yes** ☐	**No** ☐
	Does this sub project include software development or similar IT work?	**Yes** ☐	**No** ☐
	Does the project include use of radioactive material?	**Yes** ☐	**No** ☐
	• If so what and for what purposes?		
	• What quantities for the project purpose?		
	• What accreditation laboratory has for use of such materials?		
	Does the project include use of cancerogenic, theratogenic or mutagenic substances?	**Yes** ☐	**No** ☐
	• If so what substances and for what purposes?		
	• What quantities?		
	• What accreditation laboratory has for use of such materials?		
	Does the project predict testing on animals?	**Yes** ☐	**No** ☐
	• If so what substances and for		

	what purposes?	
	• What animals?	
	• What accreditation laboratory has for testing?	
	Does the project include Activities Generally Ineligible for IBRD financing?	**Yes** ☐ **No** ☐
Signature Confirming truthfulness of the provided in the table		

Annex B: Environmental Category Form

PART 1: SCREENING RESULTS (filled by PMU)				
Screening category according to the project framework	**A**	**B +**	**B -**	**C**
EXPLANATION				
DUE DILIGENCE				
Category A				
	Will not be financed by the project			
Category B +				
	EIA if MEN or authorized body asks for EIA			
Category B -				
	Material EMP together with the necessary licenses and MSDSs **EMP or EMP checklist**			
Category C				
	No due diligence			
Final decision on EA due diligence				
Additional explanation required				

Annex C: EIA scope for projects that would require full EIA according to decision of MOE or authorized body

The EA report should include the following items (not necessarily in the order shown):

(a) *Executive summary*. Concisely discusses significant findings and recommended actions.

(b) *Policy, legal, and administrative framework*. Discusses the policy, legal, and administrative framework within which the EA is carried out. Explains the environmental requirements of any cofinanciers. Identifies relevant international environmental agreements to which the country is a party.

(c) *Project description*. Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power plants, water supply, housing, and raw material and product storage facilities). Indicates the need for any resettlement plan or indigenous people's development plan. Normally includes a map showing the project site and the project's area of influence.

(d) *Baseline data*. Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. The section indicates the accuracy, reliability, and sources of the data.

(e) *Environmental impacts*. Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.

(f) *Analysis of alternatives*.[3] Systematically compares feasible alternatives to the proposed project site, technology, design, and operation--including the "without project" situation--in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

(g) *Environmental management plan (EMP)*. Covers mitigation measures, monitoring, and institutional strengthening;

(h) *Appendixes*

(i) List of EA report preparers--individuals and organizations.

(ii) References--written materials both published and unpublished, used in study preparation.

(iii) Record of interagency and consultation meetings, including consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs.

(iv) Tables presenting the relevant data referred to or summarized in the main text.

(v) List of associated reports (e.g., resettlement plan or indigenous people's development plan).

Annex D: Template for Environmental Management Plan

1. A project's environmental management plan (EMP) consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.[1] Management plans are essential elements of EA reports for Category A projects; for many Category B projects, the EA may result in a management plan only. To prepare a management plan, the borrower and its EA design team (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.[2] More specifically, the EMP includes the following components.

Mitigation

2. The EMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient. Specifically, the EMP

(a) identifies and summarizes all anticipated significant adverse environmental impacts (including those involving indigenous people or involuntary resettlement);

(b) describes--with technical details--each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;

(c) estimates any potential environmental impacts of these measures; and

(d) provides linkage with any other mitigation plans (e.g., for involuntary resettlement, indigenous peoples, or cultural property) required for the project.

Monitoring

3. Environmental monitoring during project implementation provides information about key environmental aspects of the project, particularly the environmental impacts of the project and the effectiveness of mitigation measures. Such information enables the borrower and the Bank to evaluate the success of mitigation as part of project supervision, and allows corrective action to be taken when needed. Therefore, the EMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP. Specifically, the monitoring section of the EMP provides(a) a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

Capacity Development and Training

4. To support timely and effective implementation of environmental project components and mitigation measures, the EMP draws on the EA's assessment of the existence, role, and capability of environmental units on site or at the agency and ministry level.[3] If necessary, the EMP recommends the establishment or expansion of such units, and the training of staff, to allow implementation of EA recommendations. Specifically, the EMP provides a specific description of institutional arrangements--who is responsible for carrying out the mitigatory and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training). To strengthen environmental management capability in the agencies responsible for implementation, most EMPs cover one or more of the following additional topics: (a) technical assistance programs, (b) procurement of equipment and supplies, and (c) organizational changes.

Implementation Schedule and Cost Estimates

5. For all three aspects (mitigation, monitoring, and capacity development), the EMP provides (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the EMP. These figures are also integrated into the total project cost tables.

Integration of EMP with Project

6. The borrower's decision to proceed with a project, and the Bank's decision to support it, are predicated in part on the expectation that the EMP will be executed effectively. Consequently, the Bank expects the plan to be specific in its description of the individual mitigation and monitoring measures and its assignment of institutional responsibilities, and it must be integrated into the project's overall planning, design, budget, and implementation. Such integration is achieved by establishing the EMP within the project so that the plan will receive funding and supervision along with the other components.

The EMP will contain following chapters:

1. GENERAL PROJECT AND SITE INFORMATION
1.1. DESCRIPTION OF THE PROJECT
    Project title
    Project location
    Project purpose
    Scope of project and activity
1.2. LEGISLATION and ADMINISTRATION
    National legislation
1.3. STATUS OF PROJECT DESIGN DOCUMENTATION AND PERMITS

Ownership of the land or the object
Type of document or permit

2. DESCRIPTION OF THE ENVIRONMENT (BASELINE CONDITIONS)
General description of project site environment
Physical environment
Socio-cultural environment

3. DETERMINATION OF THE POTENTIAL IMPACTS

4. MITIGATION AND MONITORING PLAN

Mitigation Plan

Construction Phase				
Activity	Expected Environmental Impact	Proposed Measure for Mitigation	Responsibility for Implementing Mitigation Measure	Period of Implementing Mitigation Measure
1.				
2.				
…				
Operation Phase				
1.				
2.				
…				

Monitoring Plan

Construction Phase				
What *parameter is to be monitored?*	**Where** *is the parameter to be monitored?*	**How** *is the parameter to be monitored (what should be measured and how)?*	**When** *is the parameter to be monitored (timing and frequency)?*	**By Whom** *is the parameter to be monitored– (responsibility)?*
1.				
2.				
…				
Operation Phase				
1.				
2.				
…				

Annex E: EMP checklist for rehabilitation

CHECKLIST ENVIRONMENTAL MANAGEMENT PLAN (EMP)

for the small reconstructions and rehabilitations

Potential Environmental Impacts

The environmental impacts of the sub project are expected to be of manageable, temporary and of local impact as they are related to the general construction activities on already known and previously used locations. These impacts most commonly include: a) Dust and noise due to excavation, demolition and construction; b) Management of demolition construction wastes and accidental spillage of machine oil, lubricants, etc., c) Encroachment to a private property; d) damage to historical or cultural property or unknown archaeological sites; e) Traffic disturbance; (f) surface or ground water and g) soil pollution or erosion.

CHECKLIST EMP

Checklist EMP is applied for minor rehabilitation or small-scale building construction. It provides "pragmatic good practice" and it is designed to be user friendly and compatible with WB safeguard requirements. The checklist-type format attempts to cover typical mitigation approaches to common civil works contracts with localized impacts.

The checklist has one introduction section and three main parts:

- Introduction or foreword part in which the project is introduced, environmental category defined, and checklist EMP concept explained.
- **Part 1** constitutes a descriptive part ("*site passport*") that describes the project specifics in terms of physical location, the institutional and legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process.
- **Part 2** includes the environmental and social screening in a simple Yes/No format followed by mitigation measures for any given activity.

- **Part 3** is a monitoring plan for activities during project construction and implementation. It retains the same format required for standard World Bank EMPs. It is the intention of this checklist that Part 2 and Part 3 be included as bidding documents for contractors.

Application of the EMP-Checklist

The design process for the envisaged civil works in the Education Excellence and Equity Project will be conducted in three phases:

1) *General identification and scoping phase*, in which the objects (e.g. schools) for rehabilitation, extension and/or construction are selected and an approximate program for the potential work typologies elaborated. At this stage, Part 1, 2 and 3 of the Checklist EMP are filled. Part 2 of the Checklist EMP can be used to select typical activities from a "menu" and relate them to the typical environmental issues and mitigation measures.
2) *Detailed design and tendering phase*, including specifications and bills of quantities for individual objects. Checklist EMP is revised according to the detailed design at this stage. As such, the Checklist is presented to the public, prior to the tendering procedure. This phase also includes the tender and award of the works contracts. The whole filled in tabular EMP (Part 1, 2 and 3) should be additionally attached as integral part to the works contract as well as supervision contract, analogous to all technical and commercial terms, has to be signed by the contract parties.
3) *During the works implementation phase* environmental compliance is checked on the respective site by the site certified inspector(s) / supervisor(s), which include the site supervisory engineer or supervisor of the project. The mitigation measures in Part 2 and monitoring plan in Part 3 are the basis to verify the Contractor's or project investor compliance with the required environmental provisions.

MONITORING AND REPORTING

For the monitoring of the safeguards due diligence, the site supervisor works with **Part 3** of the EMP Checklist, *i.e.* with the monitoring plan. Part 3 is developed site specifically and in necessary detail, defining clear mitigation measures and monitoring which can be included in the works contracts, which reflect the status of environmental practice on the construction site and which can be observed/measured/ quantified/verified by the inspector during the construction works.

Such mitigation measures include the use of Personal Protective Equipment (PPE) by workers on the site, dust generation and prevention, amount of water used and discharged by site, presence of proper sanitary facilities for workers, waste collection of separate types (mineral waste, wood, metals, plastic, hazardous waste, e.g. asbestos, paint residues, spent engine oil), waste quantities, proper organization of disposal pathways and facilities, or reuse and recycling wherever possible.

Reporting on implementation of practices should be described in the regular report toward PIU.

PART 1: INSTITUTIONAL & ADMINISTRATIVE				
Country	Kazakhstan			
Project title	Fostering Productive Innovation Project			
Scope of project and activity				
Institutional arrangements Name & Contacts	Team Leader	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements Name & Contacts	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contactor
SITE DESCRIPTION				
Name of site				
Describe site location			Attachment 1: Site Map [ ]Y [ ] N	
Who owns the land?				
Geographic description				
LEGISLATION				

Identify national & local legislation & permits that apply to project activity	
PUBLIC CONSULTATION	
Identify when / where the public consultation process took place	
INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	[ ] N or [ ]Y if Yes, Attachment 2 includes the capacity building program

PART 2: ENVIRONMENTAL /SOCIAL SCREENING

Will the site activity include/involve any of the following:	**Activity**	**Status**	**Additional references**
	A. Building rehabilitation	[ ] Yes [] No	See Section **B** below
	B. New construction	[ ] Yes [ ] No	See Section **B** below
	C. Individual wastewater treatment system	[ ] Yes [ ] No	See Section **C** below
	D. Historic building(s) and districts	[ ] Yes [ ] No [ ] Possible	See Section **D** below
	E. Acquisition of land[1]	[ ] Yes [] No	See Section **E** below
	F. Hazardous or toxic materials[2]	[ ] Yes [ ] No	See Section **F** below
	G. Impacts on forests and/or protected areas	[ ] Yes [ ] No	See Section **G** below
	H. Handling / management of medical waste	[ ] Yes [ ] No	See Section **H** below
	I. Traffic and Pedestrian Safety	[ ] Yes [ ] No	See Section **I** below

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
A. General	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of

[1] Land acquisitions includes displacement of people, change of livelihood encroachment on private property this is to land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired.

[2] Toxic / hazardous material includes and is not limited to asbestos, toxic paints, removal of lead paint, etc.

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
Conditions		upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits have been acquired for construction and/or rehabilitation (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition use debris-chutes above the first floor (b) Keep demolition debris in controlled area and spray with water mist to reduce debris dust (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
C. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		(c) Monitoring of new wastewater systems (before/after) will be carried out
D. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and address all construction activities in line with local and national legislation (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds.
E. Acquisition of land	Land Acquisition Plan/Framework	(a) If expropriation of land was not expected and is required, or if loss of access to income of legal or illegal users of land was not expected but may occur, that the bank task Team Leader is consulted. (b) The approved Land Acquisition Plan/Framework (if required by the project) will be implemented
F. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
G. Affects forests and/or protected areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees (c) Adjacent wetlands and streams will be protected, from construction site run-off, with appropriate erosion and sediment control feature to include by not limited to hay bales, silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
H. Disposal of	Infrastructure for medical waste	(a) In compliance with national regulations the contractor will insure that newly constructed and/or

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
medical waste (not applicable)	management	rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ▪ Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal; and ▪ Appropriate storage facilities for medical waste are in place; and ▪ If the activity includes facility-based treatment, appropriate disposal options are in place and operational

PART 3 : MONITORING PLAN							
Phase	**What** (Will the parameter be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)	**When** (Define the frequency / or continuity?)	**Why** (Is the parameter being monitored?)	**Cost** (if not included in project budget)	**Who** (Is responsible for monitoring?)
During activity **preparation**							
During activity **implementation**							
During activity **supervision**							

Annex F: Material EMP

MATERIAL EMP

Sub-beneficiary	
PROJECT TITLE	
Scope of project and activity – project description	
Institution supporting/ supervising the project	
What are the potential environmental impacts of the project?	
TESTING / RESEARCH / ASSEMMBLING	
Please describe testing phase	
Is there any kind of special waste (specify below) that would be produced by the research project?	
Yes_____ No_____	
Sharps [all sharp objects that could cause a cut or puncture (whether infectious or not) including hypodermic needles, suture needles, injector tips, scalpels, lancets, knives, blades, razors, pipettes, and broken glass, etc.].	
Yes_____ No_____	
Hazardous Biological Waste [body fluids, blood, organs, body tissue, culture dishes, microbiological slides and cover slips, etc.]	
Yes_____ No_____	
Radioactive Waste [Solids, liquids and gaseous waste contaminated with radionuclides and all radioisotopes]	
Yes_____ No_____	
Hazardous Chemical Waste [Any substance, liquid or solid, with at least one of the following properties: explosive, flammable, toxic, corrosive, locally chafing, reactive or genotoxic (carcinogenic, mutagenic, teratogenic) including cytotoxic drugs. Also, all containers contaminated	

by these substances.]	
Yes_____ No_____	
Use of testing animals	
Yes_____ No_____	
Water Discharges	
Yes_____ No_____	
Toxic Substances	
Yes_____ No_____	
Air emissions	
Yes_____ No_____	
Others (describe).	
Yes_____ No_____	
PERMITS	
What permits are required for project preparation and / or testing?[3]	

List all materials that will be used in the process, hazardous material should be identified according to legislation on chemicals (Annex F). The MSDS sheets and all the permits should be attached to the final document

The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. This objective can be achieved by:

- Where practicable, avoiding or minimizing the use of hazardous materials.
- Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion;
- Using engineering controls commensurate with the nature of hazard;
- Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures.

[3] All permits should be attached to the final document

List of materials / chemicals that are going to be used	If possible assign CAS[4] number to material / chemicals[5]	According to the Law on chemicals is this material hazardous	Please assign category according to the Law on chemicals (flammable, toxic, etc…)
		Y/N	

[4] Chemical Abstracts Service Number
[5] MSDS sheets should be attached to the final document

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
	Waste management	(f) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (g) Assembling waste will be collected and disposed properly by licensed collectors (h) The records of waste disposal will be maintained as proof for proper management as designed. (i) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
	Toxic / hazardous waste / materials management	(e) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information according to MSDS sheets (f) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (g) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (h) Paints with toxic ingredients or solvents or lead-based paints will not be used (i) All materials used should be identified and MSDS sheets printed out

Assembling and Testing Phase				
What *parameter is to be monitored?*	Where *is the parameter to be monitored?*	How *is the parameter to be monitored (what should be measured and how)?*	When *is the parameter to be monitored (timing and frequency)?*	By Whom *is the parameter to be monitored– (responsibility)?*
1.				

2.				
…				

Annex G: Mitigation measured for laboratories rehabilitations and good international practice for laboratories

Mitigation measures

Short-term impact from noise, dust, and vibration during the execution of civil works is inevitable. Noise levels will increase significantly due to movement of construction machinery. This impact will be minimized under the project by (i) specifying in the project contract(s) the responsibility of contractor to undertake appropriate work site mitigation actions as a part of their management of work sites, and (ii) the supervision of compliance of contractor by the Supervision Engineer/PMU. Mitigation measures may include the following actions: use of sprinklers to wash down roads and suppress dust emissions during soil transport; cover vehicles to prevent spills and transport borrow materials during daytime only; reduce noise by using noise absorbing/protecting building materials, provide workers with ear plugs and helmets and generally prevented from prolonged exposure to high noise levels, etc.

Construction related waste - Technical specifications should require the collection and containment of all waste materials with bituminous content in specific landfills. The contractor would be required to conform to local environmental regulations and practice relating to proper waste disposal. The identification of the disposal site to be used and the appropriate quantities for each site are to be included as part of the documentation of the rehabilitated building. All valuable materials (doors, windows, sanitary fixtures, etc) should be carefully dismantled and transported to the storage area assigned for the purpose. Valuable materials should be recycled within the project or sold. Wood waste will be stored separately and arranged to be recycled instead of disposing it. Open burning and illegal dumping will not be permitted. Proper sites for earth/clay and sand disposal will be determined and prior approval from relevant authority for disposal will be obtained. Stockpiling of construction debris on site will be avoided and waste will be disposed of on a regular basis at the authorized government dumping ground.

Groundwater pollution - It is also required to create necessary conditions for safe removal of sewage during the rehabilitation and renovation and observe the ecological and sanitary regulations during the rehabilitation of sanitary and technical equipment, sewage pipes and purifying constructions.

Cultural Property Resources - Rehabilitation may uncover archaeologically or culturally significant findings. Consideration of such concerns is provided in the works contracts that will include requirements that the contractor is obliged to look for chance finds and immediately stop the construction work at the contested location and alert the MEST Specialist and the responsible authorities in case of chance finds.

Use of proper construction materials - All materials should have appropriate permissions on quality and safety (appropriateness certificate and sanitary-epidemiologic conclusion). Priority should be given to products meeting standards for recognized international or national symbols. Water-based interior nontoxic, no allergenic paint for drywall or plaster surfaces is preferable to latex or oil-based paints from a respiratory standpoint.

Safety of construction site - Construction sites should be fenced off in order to prevent entry of public, and general safety measures will be imposed. Temporary inconveniences due to construction works should be minimized through planning and coordination with contractors, neighbors and authorities.

Good international Practice

Possible Environmental Issues	**Mitigation Measures**	**Monitoring Strategy and Contingency Measures**

1. Air Emissions	• Lab staff will be provided with information and training on methods to minimize air emissions. • Procurement of equipment which is ODS free (refrigerator, A/C, fire extinguisher, etc.) and proper servicing of ODS containing equipment. • List of hazardous air pollutant sources and emissions and category will be provided to the laboratory. • A list of actual and potential emissions in the lab (fumes foods, stacks vents, etc.) will be prepared.	• Biannual exposure assessment of air pollutants will be developed. • Periodic verification of control systems will be undertaken • Records of emissions will be kept and reviewed periodically by Bank supervision team and any other relevant authorities. It will be responsibility of EMS In charge for annual certification. • Regular inspection and maintenance of ventilation system.
2. Waste Water Discharges	• A comprehensive listing of sources and location of wastewater discharge will be prepared and maintained. • Appropriate operating procedure will be undertaken for minimization of wastewater (such as neutralizing predisposal treatment, etc.) • On-site septic tank systems or appropriate waste water treatment system depending on the waste water characteristics will be encouraged for implementation. After proper treatment waste water will be discharged in to existing municipal sewer line. • Lab personnel will be trained in minimization and management of wastewater discharges.	• Periodic maintenance will be undertaken of the sewer system. • Periodic testing of lab procedures will be carried out to ensure compliance with regulatory measures. • Regular training will be provided to ensure waste minimization.
3. Hazardous and Radio Active Waste	• Different types of hazardous waste stream such as unused chemicals, spent solvents, etc. will be identified for appropriate collection, transportation and disposal system. • Special segregation and disposal method will be adopted for used lead acid batteries and alkaline batteries • Training and awareness program will be imparted to laboratory staff for safe handling of hazardous waste. • Waste minimization procedure will be developed and followed.	• Biannual assessment will be undertaken for hazardous and radioactive waste. • 4 times/year periodic medical surveillance will be conducted for all employees. • Records of waste generation and disposal will be kept and reviewed on regular basis by the laboratory.

4. Handling of Hazardous Chemicals	• Required precautionary measures (such as hand gloves, masks and apron) as per manufacturer requirements/recommendations for handling different types of chemicals to minimize potential chemical exposure when working with hazardous chemicals. • Appropriate labels for all hazardous chemicals, e.g. flammable and combustible material, oxidizing material, poisonous material, for clear identification of risks and precautionary measures to be taken. • Selection use and maintenance matrix for personal protective equipment will be developed for preventing direct contact with corrosives, carcinogens and irritants. • During reconstruction of proper ventilation/exhaust system will be designed to avoid exposure to vapors and fumes of hazardous chemical. • Appropriate radiation protection devices will be procured and used to work with radioactive chemicals. • Suitable spill containment procedure will be developed for different types of hazardous chemicals. • Training on First Aid measures will be organized to all employees. • Training on handling of hazardous chemicals will be provided to the laboratory staff. 'Train the trainers' program will be undertaken.	• Periodic personal exposure assessment will be undertaken for chemicals. Simultaneously, periodic medical surveillance program will be undertaken for all employees. • Periodic visual inspection of all labels, symbols and signs will be designed, followed and recorded by the laboratory. • Compliance with regulatory measure will be undertaken by the Laboratory in charge. • Periodic maintenance and validation schedule will be prepared for checking effectiveness of the engineering control devices mitigation measures. • Records of all incidents/events related to handling of hazardous chemicals will be kept and reviewed periodically by the lab.
5. Storage of Hazardous Chemicals	• Procedure for segregation of chemicals will be developed and followed according to chemical classes and compatibility criteria. • Minimum inventory storage procedure of every hazardous chemical will be prepared. • Proper storage criteria for flammable, combustible and volatile chemicals will be identified. Filled and empty chemical containers will be segregated accordingly. • During reconstruction proper ventilation/exhaust system will be designed to avoid exposure to vapors and fumes of hazardous chemical.	• Periodic inspection criteria and regular visual inspection schedule to be developed and implemented. • Periodic review will be carried out to procure safer alternatives for highly toxic, carcinogenic, reactive or mutagenic material. If available. • Periodic checks will be done of the ventilation system by the lab.

	• Training program will be organized on proper storage and health effect for all employees.	
6. Disposal of Hazardous Chemicals	• Hazardous chemical/waste will be segregated at source and treated appropriately and stored in separate container. • Appropriate waste management system will be defined. • Lab personnel will be trained in proper waste management procedures.	• Periodic monitoring of waste treatment and disposable procedures will be done by the local environmental protection authorities (TBC).
7. Fire and Explosion	• Proper selection and installation of fire fighting equipment in effective locations will need to be implemented. Required new technology (smoke sensors, thermocouple, and fire alarms, as required) will be installed.	• Periodic inspection of fire prevention equipment will be established. • Emergency response plan will be upgraded periodically.
8. Sustainable Practices	• Water conservation measures will be taken to reduce water consumption. • Minimum energy utilization measures will be implemented. • Laboratory employees will be education and motivated in energy and water management practices.	• An energy and water inspection will be carried out to identify current equipment use and associated cost by the laboratory in cooperation with the local authorities.

Annex H: Guidance on radioactive trace materials, biological agents and ethical issues

Handling sub projects that deal with biological and radiological hazards and those with ethical issues

Supporting projects in research might involve scientific, medical or pharmacological research that will deal with biological and radiological hazards (radiation trace materials) as well animal testing**.**

Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure. Biological hazards can be prevented most effectively by implementing the following measures:

- If the nature of the activity permits, use of any harmful biological agents should be avoided and replaced with an agent that, under normal conditions of use, is not dangerous or less dangerous to workers. If use of harmful agents cannot be avoided, precautions should be taken to keep the risk of exposure as low as possible and maintained below internationally established and recognized exposure limits.
- Work processes, engineering, and administrative controls should be designed, maintained, and operated to avoid or minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed should be kept at a minimum.
- The employer should review and assess known and suspected presence of biological agents at the place of work and implement appropriate safety measures, monitoring, training, and training verification programs.
- Measures to eliminate and control hazards from known and suspected biological agents at the place of work should be designed, implemented and maintained in close co-operation with the local health authorities and according to recognized international standards.

The employer should at all times encourage and enforce the highest level of hygiene and personal protection. Work involving agents should be restricted only to those persons who have received specific verifiable training in working with and controlling such materials.

Laboratories applying for sub project support should submit in addition to relevant due diligence document the following:

- **Type and quantity of biological agent use**
- **License for the use of the same**
- **Describe practices of handling such materials, especially disposal practices**
- **Describe storing and handling practices**
- **All other defined by the national legislation**

Radiation exposure can lead to potential discomfort, injury or serious illness to workers. Prevention and control strategies include:

- Places of work involving occupational and/or natural exposure to ionizing radiation should be established and operated in accordance with recognized international safety standards and guidelines.
- The acceptable effective dose limits

Exposure	Workers (min.19 years of age)	Apprentices and students (16-18 years of age)
Five consecutive year average – effective dose	20 mSv/year	
Single year exposure – effective dose	50 mSv/year	6 mSv/year
Equivalent dose to the lens of the eye	150 mSv/year	50 mSv/year
Equivalent dose to the extremities (hands, feet) or the skin	500 mSv/year	150 mSv/year

In the case of both ionizing and non-ionizing radiation, the preferred method for controlling exposure is shielding and limiting the radiation source

The laboratories applying for sub project support should submit in addition to relevant due diligence document the following:

- **Type and quantity of radiological trace agent use**
- **License for the use of the same**
- **Describe practices of handling such materials, especially disposal practices**
- **Describe procurement of the material**
- **Describe storing and handling practices**
- **All other defined by the national legislation**

The ethical issues faced by the pharmaceutical or biotechnology institutes are potentially complex and depend significantly on the activity of the institution. These issues may include the animal testing;

Recommended bioethics management approaches include:

- Well established ethics mechanisms including management commitment; dedicated internal ethics personnel; access and use of external expertise (e.g. consultants and advisory boards); internal training and accountability mechanisms; communications programs to engage with suppliers and external stakeholders; and evaluation and reporting mechanisms;
- Adherence to internationally accepted ethical principles applicable to genetic research, clinical trials involving human participants, and any other activities with critical bioethical issues;

The laboratories applying for sub project support should submit in addition to relevant due diligence document the following:

- **Species and number of animal used**
- **License for the use of the same**
- **Describe practices of handling animals, especially disposal practices**
- **Describe procurement of the animals**
- **Describe storing and handling practices**
- **All other defined by the national legislation**

Annex I. Excerpts from Kazakhs national legislation regarding: radioactive trace materials, mutagens, cancerogens and ethical issues

The Article 13 of the RoK Law on ***Licensing the following activities are a subject for licensing by the authorized state authorities of the Republic of Kazakhstan*** defines handling of radioactive materials, equipment and installations containing radioactive substances.

This activity includes the following sub-activities:

- the use of radioactive materials, instruments and equipment containing radioactive substances;
- storage of radioactive materials, instruments and equipment containing radioactive substances;
- implementation of radioactive materials, devices and systems containing radioactive substances; Dealing with devices and installations that generate ionizing radiation.

This activity includes the following sub-activities:

- manufacture of instruments and equipment generating ionizing radiation;
- the use of instruments and devices generating ionizing radiation;

Excerpts from Sanitary Rules "Sanitary-epidemiological requirements for laboratories" (2012)

Chapter 11. Sanitary requirements for the work in the laboratories involving radiology and radiological safety

To work with radiation sources (group A personnel) one should be at least 18 years old and should not have negative medical conditions. Personnel are admitted to work only after an induction and examination of safety rules the results of which will me recorded in the log.

Radiological labs should be located in a separate part of the building or on separate floors, in isolation from other rooms. Laboratory rooms are divided into the "dirty" and "clean" areas and there are some common facilities for registration and reception, measurements and distribution of samples.

The "dirty" area consists of: 1) space for preparation, storage and incineration of samples; 2) radiochemical studies; 3) The decontamination room for utensils, containers, equipment, Personal Protective Equipment (PPE) and other laundry.

The buffer zone should exist between "dirty" and "clean" areas.

The "clean" area consists of: 1) space for preparation, storage and incineration of samples; 2) radiochemical studies.

Working areas should be equipped with safety cabinets, sealed rooms and other leak-proof equipment.

Management of shared heating systems, gas, compressed air, water and electricity group should be removed from the working areas.

Activities associated with the possibility of radioactive contamination of air (operations with powders, evaporation of solutions, and working with volatile substances) should be conducted in a fume hood and on separate desktops.

Radionuclides are stopped from entering the work space and the environment by the use of static (equipment, walls and floors of the rooms) and dynamic (ventilation and gas cleaning) barriers.

Equipment, tools and furniture are assigned to a particular zone and labeled. Its relocation from the premises of one zone to another is allowed after radiation control was conducted and labels replaced.

Unauthorized access should be prohibited to devices that may contain radiation sources and devices that generate ionizing radiation. The laboratory must ensure safety of radiation sources.

Sources, radioactive substances, liquid solutions of radium salts, sealed in glass ampoules, alpha and beta standards of comparison are accepted in the laboratory by the assigned personnel and stored in a safe deposit.

Radiological laboratory must comply with the following safety rules: 1) when working with radioactive substances and contaminated samples manipulators should be used. It is not allowed to touch them with bare hands; 2) manipulation of radioactive substances and contaminated samples are carried out on an easily decontaminated surfaces; 3) All work with radioactive contamination of samples are carried out in gloves, shoe covers, and protective equipment; 4) when working with radioactive substances the trays made of non-absorbing materials and

covered with plastic films, filter paper and other disposable materials should be used; 5) transfusion, evaporation, pouring of radioactive substances, contaminated samples, as well as other operations that allow emission of radioactive substances into the air must be carried out in a fume hood. Ventilation in the cabinets should be switched on before the start of the activities and the air velocity in the suction hoods should be at least 1.0 m / sec; 6) at the end of the work with radioactive substances employees should thoroughly wash their hands with warm soapy water. Hands should be then checked with the dosimeter. When exiting the lab the gloves, shoes, overalls must be sent to a special laundry; 7) After the examination of radioactive samples all liquid or solid waste is collected in a special container. Used glassware is rinsed thoroughly with flowing water and treated by the decontamination solutions (5% solution of citric acid, 10% solution of hydrochloric acid or nitric acid), then washed with the flowing water again. After thorough cleaning and washing dishes are dried in the desiccator. Decontamination of glassware is performed under the radiation control; 8) All areas are a subject to a daily wet cleaning.

Radioactive substances, samples with a high content of radioactive substances, which can be released in the form of the radioactive gases, vapors and aerosols should be stored in fume cupboards and boxes inside closed vessels made of non-combustible materials.

Glass containers containing radioactive liquid, is placed in metal or plastic containers.

For the collection and transportation of waste the following should be used: 1) containers for solid radioactive waste, plastic or paper bags; 2) containers and special tanks. for liquid radioactive waste

On the outer surface of the container a radiation warning sign with a tag indicating the type of radioactive wastes, their radionuclide composition and activity should be placed and fixed.

For decontamination of containers, tools, utensils, equipment a special room must be allocated. Decontamination is performed under radiological control.

For temporary storage and tempering of radioactive waste special facilities that meet the requirements of the applicable regulations should be equipped and isolated.

Inside the “dirty” and the “clean” areas the workplace and the personal radiological monitoring is carried out results registered in the log. When working with the samples in “dirty” area three basic rules of protection should be obeyed: protection with "time", "distance", "shielding".

If deviation in health status is detected, preventing the continuation of work with radioactive substances, these persons, temporarily or permanently, should transferred to work away from the contact with sources of ionizing radiation.

The laboratory should store an emergency supply of decontamination agents.

Excerpts from the RoK State Standard ST RK 1613-2006 on Good Laboratory Practice

A research laboratory should have at least the following:

- Department for Pharmaceutical Research and Sample Preparation;
- Department for Manipulation and Maintenance of Laboratory Animals;
- Quality Assurance Department or an employee who controls the quality of the pre-clinical (non-clinical) research.

Department for Pharmaceutical Research and Sample Preparation should have at least the following facilities: a room for storage of tested materials in various environments; a room for storage of control samples; a weighing room; a room for preparation of samples; a room for storage of prepared samples; a room for quality control of prepared samples; a washing room; a room for employees (paperwork); changing rooms.

This standard requires availability of appropriate facilities and equipment for testing. The conditions should prevent overcrowding with staff and equipment, combination of different types of work in the same room, overlapping of projects and ensure compliance with relevant occupational safety and health requirements.

Good laboratory practice requires a stable and adequate supply of water, electricity and ventilation.

Excerpts from the RoK Sanitary Rules No. 8.01.004.97 on the design, equipment and management of experimental and biological clinics (animal facilities)

Premises-sections for keeping animals isolated from other premises of a clinic (vivarium). The clinic (vivarium) must have the following premises: a) a section for experimental animals; b) a section for quarantine and adaptation of newly arrived animals; c) isolation boxes for keeping animals suspected to be infected or infected animals destruction of which is undesirable for experimental conditions; d) an operating room with a pre-operating room for experimental work requiring special conditions (surgeries, etc.); d) manipulations for the study of metabolic processes, collection of samples for tests, etc .; e) feeding facility; f) disinfection and washing facility; h) storage of clean (disinfected) spare inventory: cells, drinkers, etc.; i) sanitary unit (shower and toilet); j) household premises for staff, including a locker room; k) a diagnostic room; l) an office; m) a freezer for storing dead animals; n) technical facility for air conditioners, ventilation, electrical technical and other special equipment in a separate building of the vivarium.

Waste management:

Excerpts from the RoK State Standard ST RK 1613-2006 on Good Laboratory Practice

Treatment of residue test material

After completion of a test, residue test material shall be utilized in an environmentally friendly way. This procedure shall be documented in a report.

Excerpts from the RoK Sanitary Rules No. 8.01.004.97 on the design, equipment and management of experimental and biological clinics (animal facilities)

During the quarantine period, cells (trays) shall be changed in a regular manner. Upon completion of the quarantine, liberated cells and equipment are transferred to a disinfection and washing compartment.

Cells and other equipment of quarantine sections can be cleaned and washed in a general disinfection and washing compartment of the vivarium only after prior decontamination. Waste must also be decontaminated or incinerated. Methods of disinfection and autoclaving regime shall be determined on a case-by-case basis depending on specific features of the institution.

Cells shall be cleaned on a daily basis. Contaminated bedding and other waste from cells shall be collected in special tanks with metal lids. Tanks shall be tightly closed and transferred to a disinfection and washing compartment.

Conditions of collection, storage, export (or utilization) of waste (bedding, manure, food residues, etc.) shall be determined on a case-by-case method in consultation with local authorities and institutions of sanitary-epidemiological service. When working with infectious material, waste shall be disinfected by autoclaving or treatment with disinfectant solutions.

Annex 1 Terms of humane treatment of laboratory animals

Many medical and research institutions use different types of animals for experimental work. In many cases the experiments, both acute and chronic, are performed by surgical or other methods, which cause sharp pain in laboratory animals.

This cannot be justified either from the physiological or from the humane point of view. Every painful stimulus causes profound restructuring of many functions of the endocrine, vascular systems, etc., which affects the results obtained in the experiment and is not included in the majority of cases by experimenters.

This is the ground for a mandatory application of anesthetic agents to animals before and during the experiment.

In those cases where surgical intervention or an experiment with pain stimulation are expected, anesthesia should be performed before tying an animal to the machine.

The amount of anesthetic agents shall be calculated per kilogram or gram of the animal's weight. The name of the agent and the required amount shall be documented not only in the experiment protocol but also in a special card.

During the experiment, when it turns out to be longer than the originally estimated time, additional administration of anesthetic agents shall be mandatory.

At the end of an acute experiment, in case of the death of an animal, the experimenter shall kill the animal before termination of the anesthetic agent's effect.

After the end of surgical intervention, the animal shall be transported to the post-operating room on special stretchers which excludes the possibility of tissue displacement, suture line disruption, etc.

If in the postoperative period the animal may experience pain, the experimenter shall provide…

Training and qualifications:

Excerpts from the RoK State Standard ST RK 1613-2006 on Good Laboratory Practice

The staff competence shall be proved by diplomas and training certificates.

Personnel management shall be aimed at creating comprehensive and most favorable conditions for performance of an experiment.

This standard requires appropriate staff competence (education, experience, trainings) required for the performance of their responsibilities. The staff competence shall be documented in job descriptions, training records, researchers' resumes. These documents shall be included in the Standard Operating Procedures (SOPs) that are regularly reviewed and controlled during the audit conducted by the quality assurance department.

All employees shall have written job descriptions. The job description shall include the following: minimum work experience; position held; scope of work and responsibilities

A written resume shall be made for each researcher involved in pre-clinical studies.

This documentation process ensures that: a) staff acts according to the standard agreed procedure; b) tests are performed at a state-of-the-art level; c) materials are documented in the required languages (Kazakh, Russian and, if necessary, in English); e) all data are carefully stored with the aim of quick recovery in the future.

This standard will have effect only in case of regular internal and external trainings.

A research laboratory shall be obliged to maintain records of the current situation in terms of training and work experience. The training system shall be described in the SOP.

This document provides procedures for: a) appointment of persons responsible for training with particular reference to their duties; b) approval of training courses, training programs and trainers; c) training before performing a new test; d) reviewing and updating training courses; e) preparing documentation for the training; f) permitting access of the personnel to work after the training.

Training programs shall be approved by the manager or head of a quality assurance laboratory.

Training records and requirements shall be included in job descriptions and researcher 's resume.

Annex J: National Regulation on EIA

Excerpts from RoK Environmental Code Chapter 6 on the Environmental Impact Assessment (EIA) requirements

Article 36. Obligation to Perform Environmental Impact Assessment

Environmental impact assessment is obligatory for all types of business and other activities which are likely to have direct or indirect impact on the environment and human health.

No elaboration and implementation of business and other activity projects capable of affecting the environment shall be permitted unless the environmental impact assessment is performed. Results of the environmental impact assessment shall form integral part of pre-planned, planned, pre-project and project documentation.

Long-term operation of projected and existing facilities shall be subjected to an environmental impact assessment in accordance with the requirements set out in this Code.

A customer (originator) and a project developer must consider the results of environmental impact assessment and arrange for adoption of such an option which has the least impact on the environment and human health.

Article 37. Stages of Environmental Impact Assessment

Environmental impact assessment shall be performed step-by-step, subject to the stages of urban and design planning and as regulated by the laws of the Republic of Kazakhstan.

Environmental impact assessment shall include the following stages:

Stage 1. Baseline environmental study

Stage 2. Impact assessment to ensure complete and comprehensive analysis of likely effects of project implementation or further performance of business and other activities, to substantiate alternative options and develop an environmental management plan (programme);

Stage 3. Section "Environmental Protection" as part of the detail engineering design which contains engineering solutions to prevent adverse environmental impacts;

Article 38. Procedure for Performance of Environmental Impact Assessment

Environmental impact assessment for Category I projects in accordance with article 40 of the Code shall be performed by individuals and legal entities licensed to perform environmental protection-related works and services.

Environmental impact assessment works shall be arranged and financed by an originator (initiator) of a planned activity.

Individuals and legal entities engaged in the environmental impact assessment shall be contractually liable to the customer for reliability, completeness and quality of the results of the environmental impact assessment.

The originator is liable for the fidelity of the EIA materials provided for the purposes of the State Environmental Expertise; In the course of environmental impact assessment, the environment protection authority shall control the compliance with the requirements of environmental laws of the Republic of Kazakhstan.

Article 39. Types of impacts to be accounted for in the Context of Environmental Impact Assessment are the following: 1) direct impacts, i.e. impacts caused directly by the principal and associated types of planned activities in the facility site area; 2) indirect impacts, i.e. environmental impacts caused by indirect (secondary) factors resulted from the project implementation; and 3) cumulative impacts, i.e. impacts resulting from continuously increasing changes caused by the past, present or reasonably predicted actions which accompany the project implementation.

In the course of environmental impact assessment, there shall be assessed the impact on: 1) atmospheric air; 2) surface and ground waters; 3) water body beds; 4) landscapes; 5) land resources and soil; 6) vegetation; 7) wildlife; 8) condition of ecological systems; 9) state of human health; and 10) social welfare(public employment, education, transport infrastructure).

When performing environmental impact assessment, negative and positive effects of the environmental and human health impact shall be taken into account.

Article 40. Classification of Objects of Environmental Impact Assessment According to Significance and Completeness of Assessment

By significance and completeness of the assessment, business and other activities for which an environmental impact assessment is performed can be classified by 4 categories – I, II, III, IV.

Category I shall include the types of activities graded as the 1st and 2nd classes of hazard pursuant to the sanitary classification of industrial facilities, as well as exploration and mining of natural resources, expect for commonly occurring mineral resources.

Category II shall include the types of activities graded as the 3rd class of hazard pursuant to the sanitary classification of industrial facilities, as well as mining of commonly occurring mineral resources, all types of forest exploitation and special water use.

Category III shall include the types of activities graded as the 4th class of hazard pursuant to the sanitary classification of industrial facilities.

Category IV shall include the types of activities graded as the 5th class of hazard pursuant to the sanitary classification of industrial facilities, as well as all types of use of wildlife objects, except for amateur (sport) fishing and hunting.

Types of activities not mentioned in the sanitary classification of facilities are considered as non-classified.

The environmental impact assessment directive establishes differentiated requirements to the performance of environmental impact assessment with regard to projects belonging to different categories.

Article 41. Documentation of Environmental Impact Assessment

Documentation of environmental impact assessment shall include:

1) details of the customer of business and other activities;

2) motion (application, notice of intent) substantiating the necessity of the planned activities, substantiation of the cost of a project, feasibility study (project), approvable part of the engineering project and explanatory memorandum;

3) description of the baseline environmental condition by components as existed prior to the performance of the activities or at present;

4) project description, including: a) goals and quantitative characteristics of the whole project and requirements to site area for the period of construction and operation; b) main characteristics of industrial processes, including the type and quantity of materials and equipment to be used, description of possible types of impact of the planned activities on the environmental components specifying the volume and composition of emissions, consumed raw materials and withdrawn resources;

5) analysis of applied technology for compliance with the best available technologies and technical specific standards;

6) information about alternative options and main reasons for selecting the project option;

7) description of a possible impact of activities on the environment, human health and socio-economic conditions;

8) any uncertainties regarding environmental impact of the projected business and other activities;

9) assessment of environmental and human health risks;

10) description of measures intended to prevent and mitigate the environmental impact, including proposals as to environmental monitoring;

11) project emission standards and standards of natural resource withdrawal;

12) justification for industrial environmental control programme;

13) environmental and economic assessment of the project, subject to possible risks and compensation of caused damage;

14) records of public opinion in the form of protocols which contain conclusions on the results of public discussion of environmental aspects of the planned activities;

15) indication of any difficulties and lack of information experienced when performing environmental impact assessment; and

16) main conclusions on the results of the environmental impact assessment.

Following the environmental impact assessment, the customer (originator) of the planned activities shall prepare and submit an environmental impact assessment statement for the planned or current activities, which shall serve as a basis for making a decision to allow to proceed with the analyzed activities.

Completeness of the documentation at each stage of the environmental impact assessment shall be determined in accordance with the environmental impact assessment directive.

Annex K: PUBLIC CONSULTATION MINUTES

To be updated after the consultation