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Environmental Policy

MODERNISING ENVIRONMENTAL SELF-SUPERVISION IN KAZAKHSTAN: POLICY RECOMMENDATIONS

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This document aims to: i) Summarise the strengths and weaknesses of the national environmental self-supervision system that is carried out by industrial operators; and ii) Provide policy recommendations to improve this system, within a wider environmental regulatory reform launched by the Ministry of Environmental Protection.

The document was developed in the context of the EAP Task Force work programme. Assisting transition economies to create conditions for efficient implementation of environmental policy is the core objective of the EAP Task Force Policy Programme. In this area, the role of the Task Force focuses on facilitating access to best practices and efficient environmental management tools, as well as their implementation, including by carrying out pilot projects in individual countries of Eastern Europe, Caucasus, and Central Asia (EECCA).

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INTRODUCTION

Target audience and aim of this document

1. This document is addressed to legislators and executive authorities, responsible for the development and implementation of environmental policies, managers of industrial enterprises, and other stakeholders, and aims to:

- Summarise the strengths and weaknesses of environmental self-supervision in the Republic of Kazakhstan;
- Provide policy recommendations to improve this system, within a wider environmental regulatory reform launched by the Ministry of Environmental Protection (MEP).

2. These policy recommendations respond to the demands of various stakeholders, such as:

- The Parliament and the Ministry of Environmental Protection – to establish an appropriate policy and legal framework of requirements for self-supervision by industrial enterprises that would be effective in achieving a high level of environmental protection, would improve the robustness of the decision-making process, and would involve as little expense as possible for society as a whole;
- The permitting authorities at national and sub-national level – to assess and endorse self-supervision conditions as part of the permitting process;
- State Committee for Environmental Control – to monitor compliance with environmental requirements more cost-effectively, and compensate for frequency restrictions on the access to industrial facilities and scarce resources to conduct on-site visits and reduce administrative burden for industries due to red tape, as well as better target inspections;
- Other stakeholders within the Ministry – to have better access to and use self-supervision data, *e.g.* to optimise the government's ambient monitoring network or to establish the national Pollutant Release and Transfer Register (PRTR);
- The regulated community – to develop, implement, and maintain self-supervision programmes that have added value not only for the competent authorities, but also for the enterprise itself and the general public;
- The general public – to promote consideration of public interests during the design of self-supervision programmes.

3. This document is complemented by a Guide on Organisation of Self-Supervision in the Republic of Kazakhstan. The Guide has a consultative status and should not be regarded as a legal document. The Ministry of Environmental Protection of the Republic of Kazakhstan has sole authority and responsibility to confer an official (legal) status to the provided recommendations.

Definition of “environmental self-supervision”

4. Based on international practice, “environmental self-supervision”¹ can be defined as the system of organisational and technical measures, put in place and financed by regulatees subject to environmental permitting or general binding rules in the field of environmental protection, in order to ensure their own compliance with environmental requirements, including:

- Monitoring of:
 - (i) Operations;
 - (ii) Emissions and other impacts regulated by permits or general binding rules;
 - (iii) Ambient conditions in the vicinity of the facility concerned – with a scope that would optimally balance environmental effectiveness with costs of monitoring – when necessary.
- Record-keeping of data obtained through monitoring of any unforeseen circumstances, non-compliance episodes, corrective measures, and complaints from the general public;
- Providing reports to the competent authorities – in mandated cases, with a specified regularity, and in a duly aggregate form;
- Other internal administrative measures, such as assigning environmental responsibilities throughout the whole chain of management, providing basic environmental training, performing self-inspection, and implementing self-correction actions.

5. In OECD countries, self-supervision is a mandatory requirement and should be applied by any holder of an environmental permit. Large facilities are required to have individual programmes of self-supervision that reflect their risk for the environment and their compliance history, while smaller ones can be subject to uniform requirements defined in primary and secondary legislation.

Benefits of environmental self-supervision

6. Despite a mandatory character that differentiates self-supervision from voluntary environmental management systems, this instrument combines public and private interests. Its primary goal is to ensure the earliest possible response to any environmental problem occurring because of malfunctions in production processes and, at the same time, reduce public spending on governmental compliance monitoring. Self-supervision data can provide a basis for verification of compliance with legal requirements and enforcement, and for calculation of environmental or administrative charges. They also help to optimise national, regional, and local ambient monitoring systems, and establish priorities for inspection.

7. For the regulated community, reliable data on emissions, and the environmental impact of their production, can be significant from an economic viewpoint. For example, such data can help to better identify and reduce environment-related costs (that can be as high as 30 per cent of operational costs in some branches), and minimise environmental liabilities. Disclosure of facility-specific data and their comparison between enterprises within the same industrial sector, or with international benchmarks, can further indicate where cost-savings are possible. Furthermore, access to other companies’ facility-specific data can build trust within industries that the government is targeting to ensure a level playing field.

¹ Also known as “Self-monitoring”.

8. Disclosure of facility-specific data can help citizens to take individual decisions that affect not only their health but also economic well-being, such as where to buy property. In Kazakhstan, the social relevance of self-supervision is growing due to higher public access to environmental information, in particular in light of the eventual establishment of the national Pollutant Release and Transfer Register (PRTR) following the ratification of the 2003 Kiev Protocol to the Aarhus Convention.

Box 1. Introduction to Pollutant Release and Transfer Registers (PRTRs)

PRTRs are inventories of pollution from industrial sites and other sources. The PRTR should be based on a reporting scheme that is mandatory, annual, multimedia (air, water, land), facility-specific, pollutant-specific for releases, and pollutant-specific or waste-specific for transfers. The Protocol requires each party to establish a PRTR which:

- Is publicly accessible through Internet, free of charge;
- Is searchable according to separate parameters (facility, pollutant, location, medium, etc.);
- Is user-friendly in its structure and provides links to other relevant registers;
- Presents standardized, timely data on a structured, computerized database;
- Covers releases and transfers of at least 86 pollutants covered by the Protocol, such as greenhouse gases, acid rain pollutants, ozone-depleting substances, heavy metals, and certain carcinogens, such as dioxins;
- Covers releases and transfers from certain types of major point sources (e.g. thermal power stations, mining and metallurgical industries, chemical plants, waste and waste-water treatment plants, paper and timber industries);
- Accommodates available data on releases from diffuse sources (e.g. transport and agriculture);
- Has limited confidentiality provisions;
- Allows for public participation in its development and modification.

Source: www.unece.org/env/pp/prtr.ng.htm

9. While there are many other benefits of self-supervision, they will be harnessed only if its results are actually used by stakeholders within decision-making processes. Data collection for the sake of data will lead, most likely, to an erosion of the system's value.

Context for the policy paper

10. This paper was developed in the context of the EAP Task Force work programme. Assisting transition economies to create conditions for efficient implementation of environmental policy is the core objective of the EAP Task Force Policy Programme. In this area, the role of the Task Force focuses on facilitating access to best practices and efficient environmental management tools, as well as their implementation, including carrying out pilot projects in individual countries of Eastern Europe, Caucasus, and Central Asia (EECCA). Optimisation of the self-supervision system in Kazakhstan is one of such pilot projects. This project includes know-how transfer and stakeholder consultations as key elements. It also targets regulatory changes and capacity building.

11. The environmental legislation and guidance documents from OECD Member countries were largely used to develop recommendations to improve self-supervision in Kazakhstan, including:

- European Union (EU) documents: the “Directive on Integrated Pollution Prevention and Control”, the “Reference document for Best Available Techniques on Monitoring”, and other relevant technical documents of the Impel Network;
- Experience from individual members of the EU, such as Finland, Estonia, Ireland, Norway, UK;
- North American experience: mainly that of Environment Canada and the US Environment Protection Agency;
- Other international experience (*e.g.* available through the International Network for Environmental Compliance and Enforcement).

12. The recommendations are based on a solid knowledge of the country-specific conditions and stakeholder opinion. Thus, a review of environmental laws and secondary legislation that regulate the system of environmental self-supervision in Kazakhstan was developed in 2003-2004. The content and quality of individual self-supervision programmes were analysed and a survey of industrial enterprises involved in self-supervision conducted. Furthermore, stakeholder consultations were held at workshops in November 2003 (Astana) and July 2004 (Atyrau).

Contributors

13. This document was developed by the OECD EAP Task Force Secretariat with support from local and international experts (most importantly, Mr. Andrey Korchevsky and Mr. Aare Sirendi), and was reviewed by Mr. Hans Roland Lindgren (Director, Swedish Environment Protection Agency). The high level of commitment, interest, and input provided by the staff of the Ministry of Environment Protection of Kazakhstan was greatly appreciated. Gratitude is expressed to the Ministry of Environment of Norway for providing funding to implement the project, as well as to the Finnish Environmental Institute, and the Swedish EPA for providing expert input.

KEY CHARACTERISTICS OF ENVIRONMENTAL SELF-SUPERVISION IN KAZAKHSTAN

14. In Kazakhstan, environmental self-supervision has a long history at the largest industrial facilities. Although the majority of self-supervision programmes date back only three to five years, some of the oldest enterprises reported establishing such programmes in the mid-1970s. The design of self-supervision has many positive elements corresponding to good international practice, but some of its weaknesses and its poor link to the new economic and social context largely diminish its potential benefits.

Strengths

15. The obligation for industrial operators to conduct self-supervision is clearly spelled out in the Law on Environment Protection, which is a very positive characteristic of the Kazakh regulatory framework. Also, legal stipulations exist in the Administrative and Penal Codes to minimize the possibility of fraud and negligence within self-supervision programme implementation. The secondary legislation gives further guidance on approaches and procedures of self-supervision. In conjunction with a stronger focus on the integrity and professionalism of staff who develop secondary legislation, this model of regulating self-supervision could be very effective. It provides sufficient scope to adjust in a timely manner to any new transition challenges and to gradually develop and tighten regulatory requirements without compromising the goals of social and economic development.

16. The responsibilities of the regulated community and the competent authorities are clearly spelled out in the primary and secondary legislation. The regulated community (in practice, the largest facilities) is in charge of developing individual multi-media self-supervision programmes and of presenting them for approval to the competent authorities. The obligation to conduct self-supervision applies regardless of ownership; uniform self-supervision requirements are established for public and private companies.

17. Enterprises (“natural resource users”) bear full responsibility for implementing self-supervision programmes and provide the necessary expertise, equipment, and analytical facilities. Sometimes services are obtained on a sub-contract basis. Results of self-supervision are communicated to competent authorities through regular statistical reports or immediately in the case of emergency situations or accidents. The costs of self-supervision are met by the enterprise.

18. The government of Kazakhstan regulates the functioning of these systems through certification of laboratories, annual approval of programmes, inspection, etc. Competent authorities are allowed to use self-supervision data in law enforcement against violators; this approach is widely used, in particular due to scarce resources available to competent authorities to conduct compliance monitoring.

19. There is increasing interest from industries to introduce ISO 14001 environmental management systems and automated information systems. This is happening due to an increasing understanding among industry managers of the relevance of environmental issues to reduce production costs and financial risks. At the same time, the Ministry of Environment Protection and its subdivisions are adopting new approaches in their relations with the regulated community that allow for dialogue and compromise.

20. Finally, NGOs and the general public voice demands to have access to facility-specific environmental information. This is backed up by Kazakhstan’s ratification of the Aarhus Convention and signature of the Kiev Protocol on Pollutant Release and Transfer Registers (PRTRs).

Weaknesses

21. While potentially the self-supervision system could be very effective, it is undermined by a number of problems, such as:

- Gaps and conflicts in laws and regulations, including a poor definition of basic concepts;
- Lack of clarity in the mandated scope of self-supervision;
- Insufficient attention to quality assurance and quality control as part of self-supervision;
- Assessment of self-supervision performance, based on the existence of a specific organisational form, *i.e.* of an environmental unit within an industry, rather than on the quality of self-supervision programmes and outcomes of their implementation;
- Continuing low mutual trust between public authorities and industry;
- Poor laboratory facilities of both regulated industries and competent authorities;
- Lack of mechanisms to disclose facility-specific data and take into consideration the interest of the general public while designing self-supervision programmes;
- Limited communication and very formal coordination between different departments and sub-divisions of the Ministry of Environment Protection on matters of self-supervision due to their focus on carrying out very specific functions mandated in legal acts.

22. The incoherence of the legal basis in allowing the existence of two similar terms with inadequate and blurred definition – self-supervision and self-monitoring – creates much confusion among the regulated community. Frequently, self-monitoring is understood as the instrumental measurement of emissions or ambient quality, while self-supervision means the decision-making process following self-monitoring. In addition to this interpretation, it is also common to understand self-supervision as emission monitoring and self-monitoring as ambient monitoring (*i.e.* the monitoring of soil, air, or water quality).

23. Competent authorities often consider that industries have to monitor the maximum possible number of parameters without balancing the scope of self-supervision with inherent costs. At the same time, competent authorities do not have adequate resources to keep track of, and analyze, the information received from industry. This leads to a situation when industries create a merely superficial mechanism of self-supervision disconnected from the overall management system and therefore of little value beyond mandatory reporting. Contrary to international practices, in order to verify compliance, the values of parameters monitored by operators are compared with historic (inventory) emission levels, rather than the permit conditions.

24. The quality of self-supervision data raises doubts for a number of reasons. There is no statutory procedure to ensure the integrity of sampling, sample preservation, transportation, and analysis. The robustness and reliability of calculation methods are often challenged due to a high level of uncertainty and absence of quality control and quality assurance. There is evidence of major discrepancies between the measurements made by the state analytical laboratories and enterprise laboratories. Quality problems with laboratory tests often lead to controversy, which sometimes has to be resolved in court. Consequently, both the industries and the competent authorities incur additional administrative costs.

PROPOSED ELEMENTS OF POLICY REFORM

25. The current system of self-supervision needs to be reformed. Most importantly, its obsolete legal, institutional, and technical characteristics have to be addressed and the quality and use of data for decision-making should be enhanced. The need to reform the existing system is recognised by various stakeholders, including governmental authorities, industry, and the general public.

26. It is recommended that the reform aims at the following key outcomes:

- Unambiguous definition of basic concepts and improved legal basis;
- Differentiated scope of self-supervision for large industries and Small and Medium-Sized Industries, and its link to permit conditions or general binding rules;
- Clear requirements on the content of self-supervision programmes;
- Longer validity of self-supervision programmes, with a possibility to amend them when necessary, and the introduction of post-closure requirements;
- Combined use of various types of monitoring (direct and indirect monitoring; operational, emission, and impact monitoring) within self-supervision programmes, abandoning the practice of all-encompassing impact monitoring, and acceptance of various organisational forms of self-supervision to better suit the resources available to particular categories of enterprises;
- Reliable approaches to setting regimes of monitoring and optimisation of self-supervision costs;
- Uniform requirements for quality assurance and a strategy to ensure data quality;
- Efficient data management, reporting, and a meaningful use of information in decision-making, including self-correction actions;
- Regular review and use by authorities, and public scrutiny of self-supervision data;
- Better use of self-supervision data for inspection and enforcement, in parallel with the development of the incentive framework for regulated industries to comply with self-supervision requirements.

Clarifying basic concepts

27. In addition to the definition of self-supervision, presented in the Introduction, the following key concepts need to be defined in legal acts:

- “Installation” – a stationary technical unit where one or more activities are carried out on the same site and that could have a negative environmental impact;
- “Measuring” – a set of operations to determine the value of a parameter implying that an individual quantitative result is obtained;

- “Monitoring” – a systematic surveillance of the variations of a certain chemical or physical characteristic of an emission, discharge, consumption, equivalent parameter, or technical measures, etc. In the context of self-supervision, monitoring will include:
 - Operation (process) monitoring – the surveillance of the physical and chemical parameters (*e.g.* pressure, temperature, stream flow rate) of the technological process in order to confirm that the process performance is within the range appropriate for its correct design operation;
 - Emissions monitoring – the surveillance of industrial emissions at source, *i.e.* monitoring of releases from the installation to the environment;
 - Impact monitoring – the monitoring of pollutants levels within the environs of the plant and its area of influence, and the effects on ecosystems and public health.
- “Operator” -- a natural or legal person who is the owner or the manager of the regulated installation and has the authority and ability to ensure compliance with the permit.

Identifying the scope of self-supervision

28. Self-supervision should cover, but not be limited to, the following groups of parameters:

- Raw material inputs, in particular those that are potential contaminants;
- The operating conditions (such as process temperature, pressure and flow rate);
- Use of raw materials and energy;
- Controlled emissions of waste gases and airborne particles to air via chimney stacks;
- Controlled discharges of waste water via sewers to and from effluent treatment plants, directly to receiving surface waters, and to land;
- Controlled disposal of solid waste to landfill sites, as well as controlled disposal of solid and liquid wastes, including organics, to incinerators;
- Fugitive releases to air, water, and land;
- Nuisance level of noise, vibration, and odour;
- Process/plant conditions that are relevant to the time when measurements are taken or that may affect releases, such as down-time of plant or percentage of plant utilisation in comparison with design capacity;
- Operation and maintenance of monitoring and other relevant equipment;
- Quality of receiving environments such as ambient air, water bodies, soil surface and ground waters, and ecosystems;
- Other parameters, as required by the environmental legislation of Kazakhstan.

29. The operator will be requested to monitor progress with the implementation of environmental programmes. This will help demonstrate that meaningful improvements were accomplished, and that the specific compliance targets were achieved in a timely, effective, and efficient manner.

30. It is recommended that facility-specific self-supervision programmes be mandatory for large installations. This should be done in conjunction with a better definition of the current “environmentally hazardous installations”.

31. Parameters to be monitored, frequency of monitoring, types, methods, etc. within facility-specific self-supervision programmes may vary according to the risk that different categories of industrial facilities pose for the environment and human health, individually or due to a high cumulative effect of multiple sources. The individual risk of an installation should also be considered when deciding on the comprehensiveness of a self-supervision programme based, among other things, on the following criteria:

- Past history of significant non-compliance with permit requirements;
- Past history of false or questionable self-supervision results;
- Past history of incidents or accidents that lead to substantial pollution.

32. Smaller installations can be granted with simplified sector-specific self-supervision requirements that reduce the time and cost burden on these businesses while ensuring that the benefits of self-supervision are harnessed. In their case, the competent authority will first focus on technical guidance and assistance in establishing easy to manage self-supervision programmes, including reporting of results. It is advisable that self-supervision checklists be developed for smaller installations.

33. The organisational form of self-supervision should not be prescribed by the competent authority. The operator will be able to decide independently whether a special environmental unit is necessary. At the same time, facility managers should personally review, approve, sign, and be responsible for the content and implementation of environmental self-supervision programmes.

Defining the content of self-supervision programmes and linking them to permit conditions

34. The facility-specific self-supervision programmes should describe the following:

- Monitored parameters, sampling points, and measurement locations; safe means of access to sampling points;
- Timing considerations (period, duration, and frequency) of monitoring and measurements;
- Monitoring methods, including sensibility of available measurement methods with regard to the emission limit values set in permits;
- Methods and frequency of record-keeping, data analysis, and reporting;
- Compliance assessment procedures and internal procedures of self-correction (including the internal non-compliance response tools);
- Quality assurance and quality control arrangements, including details of any accreditation or certification of analysis;

- Actions in emergency situations, such as incidents and/or accidents;
- Internal measures to ensure environmental compliance, including allocation of environmental responsibilities to the facility's personnel at all levels, the system of internal audits (self-inspection), corrective actions, and staff training;
- Institutional arrangements put in place to implement the programme.

35. As part of the regulatory reform, it is recommended that the Ministry of Environment Protection introduces integrated permitting for large facilities with high impact on the environment and make self-supervision part of the permit conditions. A simplified permitting scheme or a simple declaration of activity could be, in parallel, introduced for facilities with lower environmental impacts. In such cases, self-supervision would be directly mandated in the legislation in the form of general binding rules.

Extending the duration and validity of self-supervision programmes

36. The total duration of a self-supervision programme should be linked to the operating life of a process when the timeframe(s) for any harmful effects is short compared to the operating life. When needed, the operator should be required to carry out an assessment before a process has begun operating, *e.g.* to establish baseline ambient concentrations. Operators or owners will sometimes be required to continue monitoring certain parameters after a process has ceased to operate if its harmful effects are more durable (*e.g.* monitoring of groundwater after closure of fuel depots, landfill sites, or nuclear installations). The post-operation self-supervision should be decided for individual facilities based on the likelihood of such remote effects of their processes.

37. In order to lower the administrative burden for operators and competent authorities, it is recommended that self-supervision programmes be valid for the duration of process operation without substantial changes or for the period indicated in the permit, but not less than three years. It should be possible to review the content and conditions of these programmes as needed, *e.g.* in the case of permit review, new regulations being enacted, changed environmental conditions, or as part of non-compliance response. The regulatory framework should specify that changes to the programme can be initiated by the operator, the competent authority, or by a court order in response to citizens' actions.

Combining different methods of monitoring within self-supervision programmes

38. Within self-supervision programmes, the operator should be able to apply direct (based on measurements) and/or indirect (based on estimates) methods of monitoring. When necessary, direct monitoring may be carried out by in-house staff and/or by external accredited laboratories. Preferably, operators of large installations should be able to carry out measurements themselves. It is recommended that authorities decide on the scope and methods of monitoring based on a combination of sector-specific and individual risk of each facility. Table 1 gives an example of a possible grouping and scope of monitoring.

39. The design of operation monitoring can be defined by the operators themselves. Exceptions may apply for the monitoring of parameters that are crucial to calculating emissions indirectly or describing the conditions of emissions and impact monitoring. The competent authority may also impose special terms for operation monitoring of purification or abatement equipment.

40. The competent authorities will continue to review and endorse the proposed design of emissions and impact monitoring. They should not impose impact monitoring on all facilities and avoid a total substitution of state ambient monitoring by monitoring conducted within self-supervision programmes.

Table 1. Proposed division of the scope of monitoring according to groups of installations

Group	Operation monitoring	Emission monitoring	Impact monitoring
I	Mandatory.	Mandatory, combination of direct and indirect monitoring. Continuous automated monitoring may be required for selected parameters.	Mandatory. Can be done jointly by several neighbouring facilities.
II	Mandatory.	Mandatory, combination of direct and indirect monitoring. Continuous automated monitoring not required.	Most often recommended. Some facilities may be required to conduct limited impact monitoring.
III	Mandatory.	Mandatory, combination of direct and indirect monitoring.	Not required.
IV	Mandatory.	Indirect monitoring.	Not required.

41. Impact monitoring will be required in the following cases:

- At the design phase or during substantive changes;
- In the vicinity of sensitive ecosystems or human dwellings;
- After accidental spills;
- For “calibrating” express and bio-indication methods;
- When it is more cost-effective than emission monitoring.

42. The monitoring net and parameters will be discussed and agreed with other stakeholders, including the competent environment authorities, other government authorities, local public authorities, and representatives of the general public. The MEP should allow joint impact monitoring by several companies if their installations share the same area of impact.

43. In order to ensure the quality and integrity of impact monitoring, operators should sub-contract it to independent companies or research institutes. The latter should be required to prove their competence in impact monitoring.

Optimising monitoring regimes

44. It is recommended that the monitoring regimes within self-supervision programmes be grouped as follows:

1. Infrequent (once per month to once per year): to check the actual level of emissions with predicted or usual conditions;
2. Regular to frequent (once to three times per day to once per week): to detect unusual conditions or an incipient decrease of performance and to rapidly initiate corrective actions;

3. Intensive (continuous or high frequency sequential sampling is appropriate, three to 24 per day): to determine emissions in real time and/or at the exact period of time and at the level reached.

45. Selection of the monitoring regime should be matched with the level of potential risk of environmental damage. The risk evaluation should take local conditions into consideration. The final assessment of likelihood or consequences should be based on the combination of all items, not on a single item. Two major groups of criteria will be considered:

(i) The likelihood of exceeding the Emission Limit Values (ELVs) or not being in compliance with any other requirement set in the permit(s) and legislation;

(ii) The consequences of non-compliance.

46. Issues to be considered when assessing the likelihood of exceeding ELVs include:

- Number of sources (on the site) contributing to pollution (single, several, or numerous);
- Stability of process conditions (stable or unstable);
- Buffer capacity of effluent treatment available (sufficient to cope with upsets, limited, or none);
- Treatment capacity of the source for excess emissions (able to cope with peaks, *e.g.* by dilution, spare treatment, limited or absent capabilities);
- Potential for mechanical failure caused by corrosion (no or limited corrosion, normal corrosion, or advanced corrosion);
- Flexibility in product output (single dedicated production unit, limited number of grades, and many grades of flexibility, multipurpose plant);
- Capacity of the industrial operator to react when a failure happens, age of equipment in service, and operating regime;
- Inventory of hazardous substances that might be released during normal or abnormal conditions;
- Level of training and likelihood of human error;
- Importance of load (high concentrations, high flow rate) and fluctuations in the composition of the effluent.

47. Criteria to be considered when assessing the consequences of exceeding the ELV include:

- Duration of a potential failure;
- Acute effects of the substance, *i.e.* the hazard characteristics of the substance handled;
- Location of the installations (*e.g.* proximity to residential areas or specially protected areas);
- Dilution ratio in the receiving media;
- Meteorological conditions.

Reducing costs

48. The MEP will encourage operators and its own staff endorsing self-supervision programmes to take account of opportunities to improve the cost-effectiveness of self-supervision, including:

- Select the appropriate quality performance requirements;
- Match the monitoring frequency with the desired accuracy of the results;
- Consider only those monitoring parameters that are strictly necessary;
- Consider the use of continuous monitoring only when it provides the requested information at a lower overall monitoring cost than discontinuous monitoring;
- Consider, where possible, replacing expensive parameters with surrogates that are more economical and simpler to monitor;
- Standardize data collection techniques, use (adapt to the needs) existing procedures and tools of data management and analysis;
- Consider whether data collection matches the capacity to respond to and capitalize on the information generated;
- Consider complementing routine monitoring by special studies (such as campaign monitoring). This can provide a better understanding of the effluent and may reduce the monitoring regime, and therefore the cost as a result.

Ensuring reliability and comparability of information

49. The MEP, in cooperation with other relevant government authorities, will need to put in place regulatory requirements that will guarantee the practical value of self-supervision data. This means that data should acquire two essential features – reliability and comparability:

- Data reliability, or the degree of confidence that can be placed in the results, is a measure of the closeness of the data to their true value. It is important, among other things, to ensure the correctness of decisions as regards process operation, update of self-supervision, as well as non-compliance responses (including sanctions imposed by authorities);
- Data comparability is a measure of the confidence with which one data set can be compared to another, *e.g.* as part of comparison among different installations or sectors. In order to allow a proper comparison of data, it should be ensured that all relevant information is indicated together with the data: Data that have been derived under different conditions should not be directly compared.

50. Competent authorities should mandate that operators produce reliable and comparable data. To this end, operators should use:

- Statistical approaches to design the self-supervision programme;
- Consistent units when reporting the results;

- Skilled and continuously trained personnel;
- Comparison with sampling results obtained by competent authorities during inspections;
- Participation in collaborative studies to ascertain accuracy and precision of the results and to ensure that results are comparable to those produced elsewhere;
- Quality assurance and quality control (including accreditation of laboratories);
- Site-specific safety assurance protocols.

51. Furthermore, in order to ensure reliability and comparability of data, the competent authorities should require the operators to adopt practices that lower uncertainty and human error throughout the “data production chain” that includes the following consecutive steps: (1) Flow measurement; (2) Sampling; (3) Storage, transport, and preservation of samples; (4) Sample treatment; (5) Sample analysis; (6) Data processing; (7) Recording and reporting of data. Since the results are as inaccurate as the most inaccurate step of the chain, knowledge of the uncertainty of each step of the data production chain leads to the knowledge of the uncertainty of the whole production chain.

Improving record-keeping and reporting

52. The MEP should require that operators record the following information:

- All sampling, analyses, measurements, examinations, calibrations, and maintenance carried out in accordance with the environmental permit or the self-supervision programme;
- All planned changes (alterations or additions) to the permitted installation;
- All incidents that affect the normal operation of the activity and that may create an environmental risk;
- All non-compliance cases and self-correction measures;
- All self-inspection checklists and reports;
- All complaints of an environmental nature related to the operation of the activity. A record will also be kept of the response made in the case of each complaint.

53. The operator should submit recurrent reports that should conform to specified reporting dates and formats. It is not required for all data to be sent from the operator to the competent authorities, in particular results of operation monitoring. Self-supervision data, including data on complaints from the general public and information on any possible changes in the operation, will be reported in line with agreed schedules and criteria, or in response to requests. If the operator becomes aware that it submitted incorrect information in any report to the competent authorities, it will promptly submit the correct information.

54. The MEP should aim at reducing the frequency of regular environmental reporting but to improve its quality, clarity, and usefulness. Thus, it is recommended to introduce an Annual Report on Environmental Regulatory Compliance so that large facilities receive self-supervision data in an integrated, structured, and logical manner, rather than having several reports. This should be decided in cooperation with the Department of Statistics.

Improving other internal administrative measures

55. The MEP should require that regular self-inspections be performed by facility personnel to observe each area at the facility where environmentally sensitive activities are performed and inform the facility manager and the rest of personnel of all deficient items as soon as possible. To this end, it is advisable to use standard self-inspection checklists that cover priority environmental themes in terms of eventual concerns and conditions on-site. Besides a filled in checklist, the self-inspection report should contain comments to clarify the conditions on-site and propose corrective actions. The facility manager should ensure that all deficiencies identified in self-inspection reports are promptly corrected.

56. Adequate staff training and shared responsibility between managers and the personnel within self-supervision will need to be ensured. Company management will need to carefully consider and use incentives that would induce environmentally responsible behaviour among staff, regardless of their position within the hierarchy.

Enabling public review of self-supervision

57. Self-supervision programmes should be available for review by the general public, electronically or in hard copy, from the competent authorities, or local public administration, where feasible. Also information obtained through mandatory self-reporting should be made available to the general public. In the short term, this can be done upon request, while, with a longer-term perspective, such data will be available as part of the national PRTR. Furthermore, the PRTR could be completed with data on the compliance status of each facility and on government actions to ensure compliance and respond to non-compliance.

Ensuring the integrity of self-supervision

58. Observance of self-supervision obligations should be subject to checks alongside with verification of compliance with other environmental regulatory requirements. In order to be consistent with cost-effectiveness requirements, less frequent (or less time-consuming) inspections will be conducted at facilities with a history of compliance.

59. The State Committee for Environmental Control and its territorial units should inspect the way operators conduct self-supervision. Particular aspects requiring scrutiny include:

- The positioning and serviceability of fixed instrumentation;
- Records confirming the maintenance and calibration of fixed and portable instrumentation and sampling equipment;
- Manual sampling procedures;
- Analytical procedures;
- Record-keeping, including samples and analysis logs, data-capture arrangements, for example computers, charts, and the like for instruments;
- Data-reduction calculations;
- Self-inspection;

- The professional competency, including training, of relevant staff.

60. It is recommended to use specialist staff for checking more technical aspects of self-supervision (for instance, the correct operation of instruments, the correct application of manual stack-emission sampling and analytical procedures). Inspections should be targeted based on several criteria, such as the reliability of the operator's self-supervision regime, the hazard to the environment of normal operations, and the operator's compliance history. The competent authorities should also arrange for independent monitoring to be undertaken to provide checks on the reliability of the operator's data.

61. It will be very important for the MEP to ensure that its staff validate (or reject) self-reporting data and regularly compare the results reported by different facilities. This will help to identify differences in compliance behaviour and ensure consistency across the regulated community thus guaranteeing a level playing field. The results of such analysis should be publicly available through the MEP web site and may be included in annual reports on the state of the environment in Kazakhstan.

62. The State Committee for Environmental Control should develop and adopt a new policy of compliance assurance that will stipulate that the follow-up and the response to an assessed situation will be in proportion to the degree of compliance or non-compliance. This may involve:

- Simple routine inspections in compliant situations, where the general approach is to confirm and accept a satisfactory performance;
- Seeking improvements in the self-supervision arrangements where the quality of results does not meet quality targets and does not provide adequate evidence;
- Precautionary advice and negotiation of voluntary improvements in situations close to non-compliance (borderline situations), where the general approach is to influence the operator towards reducing the risk of an actual non-compliance occurring;
- Checking that an operator has carried out appropriate actions under self-correction arrangements;
- Revision of a permit limit where non-compliance has an unacceptable environmental impact, within the provisions of the relevant legislation and taking into account the costs and benefits;
- Administrative enforcement actions in non-compliant situations;
- Prosecution/court action where legislation requires legal action for all non-compliances or where the non-compliance episode is severe.

63. The severity of the non-compliance should be taken into account by the competent authority when deciding on enforcement action. Possible actions should form a sequence of responses, which can be escalated to match the severity of the non-compliance. Serious, including criminal response, will be reserved for the most serious cases when one or more aggravating factor is present, such as a large and sophisticated enterprise with long-established and feasible requirements not making best efforts (evasive behaviour, delayed efforts), experiencing large (intolerable) or avoidable spills, presence of environmental damage, and/or repeated nature of offence(s). To avoid misreporting in the absence of frequent inspection, it is necessary that the Penal Code provides for larger criminal penalties for fraud, negligence, falsification of data, and any other intentional misreporting. It is recommended that the State Committee for Environmental Control develops a publicly-available Non-compliance Response Policy that should elaborate what is the proportionate sanction to the range of possible violations.

64. The approaches described above should apply only to legally-required self-supervision. Different government approaches, policy considerations, and incentives should apply to voluntary self-auditing and environmental management systems that sometimes include monitoring that exceeds that which is legally required. These monitoring results will not cause any penalty; instead, the existence of initiatives beyond compliance could mitigate penalties for violations of related legal requirements.

Understanding and developing the incentive framework for self-supervision

65. Positive and negative factors affecting the operators' decision-making in the field of self-supervision, or indeed environmental management, need to be better understood and considered. First and foremost, the resource-intensity of self-supervision (for both industry and competent authorities) has to reflect economic and social realities. To this end, the MEP should require its staff to routinely consider the costs of data production, analysis, and reporting while imposing self-supervision requirements.

66. Other factors that could improve the incentive framework are as follows:

- Enforceability and feasibility of permit requirements;
- Constructive dialogue and consensus-based decision (certainly, within the regulatory field);
- Disclosure of facility-specific data and benchmarking;
- Identification, reward, and dissemination of good practice;
- Effective use of self-supervision data to develop environmental policy;
- Public ratings of industry's environmental performance.

67. It will be very important for the competent authorities to have the aim that neither the amount of information reported nor the frequency of reporting exceeds their ability to process and use the information. Since more than one department within the MEP, and also other governmental stakeholders, are involved in the administration of self-supervision, effective information-sharing and co-ordination procedures and mechanisms (*e.g.* shared access to permitting registers and inspection reports) should be established to avoid any incoherence in approaches and decrease the administrative burden on all parties concerned.

MANAGEMENT OF THE TRANSITION

68. A transition period (seven to eight years) should be envisaged for improving self-supervision, with the adoption of an intermediate model, which would facilitate the step-by-step achievement of feasible objectives and bring the system closer to international practices. This will need to be fully coordinated with the process of implementation of requirements under the Kiev Protocol on Pollutant Release and Transfer Registers (PRTR). During the transition period, internal financing of proposed measures (MEP's budget and budgetary programmes) could be matched with external technical assistance.

Improving the legal basis²

69. In the short term (one year), the MEP will need to propose amendments to the existing legal basis in order to strengthen the foundations of self-supervision. In this context, the definition of self-supervision, its elements and forms will need to be clarified, the differentiated approach towards large industry and Small and Medium-Sized Enterprises enacted, and the powers of the competent authorities stipulated more precisely. The Administrative and Penal Codes will also need to be amended, as described above. In the long term, these Codes will have to be completed with articles that permit use of active condoning of insignificant violations that are self-reported by enterprises. Good laboratory practice and other process-relevant requirements need to be mandated in secondary legislation. The quality of legal amendments will need to be monitored intensively, based on feedback from practice during a period of two to three years, with a view to further improving the legal basis, if necessary.

70. The development and approval of a thematic chapter for the Environmental Code (foreseen for 2007) should be finalised through a wide stakeholder consultation process. In this context, the MEP staff need to understand that directly mandating self-supervision and determining its elements in great detail may restrict future developments in the field concerned. It also can be a serious impediment for correcting the design of self-supervision, if the primary legislation is not exact or misleading. However, legal requirements of direct application may be more easily enforceable and have a stronger impact on compliance behaviour than requirements imposed through secondary legislation.

71. An important task is to link the reform of self-supervision with the reform of permitting and introduction of differentiated requirements for large industry and other members of the regulated community (see also the Guidance on Integrated Environmental Permitting for Eastern Europe, Caucasus, and Central Asia). A good step forward is the development of the List of Environmentally Hazardous Installations in Kazakhstan, although the categories of installations identified in the List need further definition, in particular as concerns production thresholds. To further develop this List, it is suggested that the MEP uses the list of categories in Annex I of the European Union's Directive on Integrated Pollution Prevention and Control and the Scope of the PRTR Protocol³ as a starting point. Additional support for decision-making is provided by a simple algorithm, developed within the current project (this will be published as a separate paper).

² See also the paper ECE/MP.PP/AC.1/2005/6 developed by the UNECE on institutional and legal implementation of the PRTR protocol, <http://www.unece.org/env/documents/2005/pp/ece/ac.1/ece.mp.pp.ac.1.2005.6.e.doc>

³ See also the document ECE/MP.PP/AC.1/2005/7 developed by the UNECE on the scope of the PRTR protocol, <http://www.unece.org/env/documents/2005/pp/ece/ac.1/ece.mp.pp.ac.1.2005.7.e.doc>

Addressing institutional issues

72. As a matter of immediate priority, the MEP should strengthen communication and cooperation between its departments and other sub-divisions that contribute to the reform and functioning of self-supervision. This includes, first of all, the State Committee for Environmental Control, the Department for State Environmental Review and Licensing, the Department of Environmental Policy, and the Department of Legal and International Affairs. Focus should be put on developing procedures of data sharing and joint decision-making, including:

- Coordination of any plans to develop secondary legislation and guidance for industry to conduct self-supervision;
- Mandatory review of permit requirements (or stand-alone self-supervision programmes) by other Departments and the State Committee for Environmental Control;
- Immediate feedback from inspection to permit-writers;
- Establishment of a database on compliance history of facilities (including permit applications, permit documents, reports from site visits, reports from the facility, etc.) that would be accessible for all government stakeholders and easy to use;
- Regular and *ad-hoc* coordination meetings.

73. In order to facilitate the work of regulators and inspectors, the MEP should develop general and sector-specific technical guidance that would describe the mandatory and desirable elements of self-supervision within a branch. This could be based on the consultative guidance document, developed by the EAP Task Force Secretariat within the demonstration project in Kazakhstan. Such guidance should be widely available and disseminated through all means, including through the MEP's website.

74. Training will be necessary for various stakeholders to better understand the design of modern self-supervision systems. A training course could be included in the programme delivered by the National Training Centre under MEP, based on materials developed within the demonstration project.

75. Establishing a powerful information system to share data reported by operators and make them available to the general public can greatly contribute towards increasing the value added of self-supervision. This should be done within the framework of implementation by Kazakhstan of the Kiev protocol on PRTRs. Also the MEP may want to adopt electronic reporting within the framework of the e-government introduction.

Improving laboratory infrastructure and practice

76. The government will need to promote and support the creation of reference laboratories and analytical centres, and their participation in the international inter-calibration, training, and certification of personnel. This could include the improvement of both the existing laboratories and the technical skills available with competent authorities, and at the same time, the development of independent private laboratories, this often being a more cost-effective approach. In the latter case, a legal right to sub-contract sampling and laboratory analysis should be given to competent authorities, and budgets planned for outsourcing such services.

77. It will be important to review and develop the monitoring capacity of pollutants that are specified in international agreements. For instance, the capacity to monitor dust particles of 2.5 and 10 microns (PM2.5 and PM10) in air emissions should be developed immediately.

78. International experience should be used to improve laboratory practices and techniques. In this context, a very helpful tool is the OECD's Resource Centre for PRTR Release Estimation Techniques. The Resource Centre is an Internet site that has been developed by the Task Force on PRTRs of the OECD's Environment, Health, and Safety Programme. The purpose of the site is to provide a clearing house of guidance manuals/documents of release estimation techniques for the principal pollutant release and transfer registries developed by OECD Member countries. The manuals and documents include descriptive information on the sources of pollution and the pollutants that are released, as well as information on emission factors, mass balance methods, engineering calculations, and monitoring information. The Resource Centre will be updated on a regular basis to include additional and new documents available. See <http://206.191.48.253/>

Implementing facility-specific pilot projects

79. Pilot projects can be a useful tool to assess, among other things, the benefits and costs of implementation of self-supervision, in particular as part of the transition to integrated permitting. Such pilot projects can be recommended particularly for large new investments where enterprises have sufficient capacity. Criteria for selecting installations for such pilot projects include, most importantly, the environmental impact, compliance costs, and financial performance.