# REPUBLIC OF MOLDOVA

## APA CANAL CHISINAU

# CHISINAU WATER SUPPLY & SEWAGE TREATMENT - FEASIBILITY STUDY

**Contract No: C21156/ECWC-2010-01-01**



# "Environmental and Social Action Plan" Report - DRAFT

May 2012

seureca A Subsidiary of VEOLIA ENVIRONNEMENT

In association with and Business Consulting Institute

European Bank for Reconstruction and Development and EU Neighbourhood Investment Facility

# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ACC | ApaCanal of Chisinau |
| CAPEX | Capital Expenses |
| EBRD | European Bank for Reconstruction and Development |
| EHS | Environmental, Health and Safety |
| EMS | Environmental Management System |
| ESAP | Environmental and Social Action Plan |
| KPI | Key Performance Indicators |
| LLI | Linear Leakage Index |
| O&M | Operation and Maintenance |
| OHS | Occupational Health & Safety |
| OPEX | Operation Expenses |
| PIP | Priority Investment Plant |
| PIU | Project Implementation Unit |
| SACRE | Environmental protection unit of APA Canal Chisinau |

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# EXECUTIVE SUMMARY

# 1. EHS REPORT

## 1.1. INTRODUCTION

This report is part of the Chisinau (Moldova) Water Supply and Sewage Treatment study. It provides an Environmental and Social Action Plan (ESAP). The feasibility study resulted in a Priority Investment Program (PIP), which focuses on waste water treatment (44% of investments) and the drinking water network (25%).

## 1.2. KEY RECOMMENDATIONS

The key recommendations of the ESAP are to:

- Reduce the quantity of liquid chlorine stored in the central chrlorine deposit below the Seveso II threshold of 10t (see actions 1.3.1 and 1.3.2 in ESAP)
- Review need and feasibility to use the branch minimum salary instead of the national minimum salary, which is 11% lower (action 1.4.1)
- The verification plan of cranes must be duly implemented (action 1.2.2)
- Strengthen resources for OHS controls in order to comply with regulatory requirements; similarly, set-up environmental controls (action 3.10)
- Continue ISO14001 and OHSAS18001 certifications (action 3.1)

# DETAILED REPORT

# 1. INTRODUCTION

## 1.1. BACKGROUND AND PURPOSE

As the entity ultimately responsible for the water and wastewater service, the Municipality of Chisinau (Moldova) has commenced a programme of works intended to rehabilitate the city's water supply and wastewater collection and treatment assets.

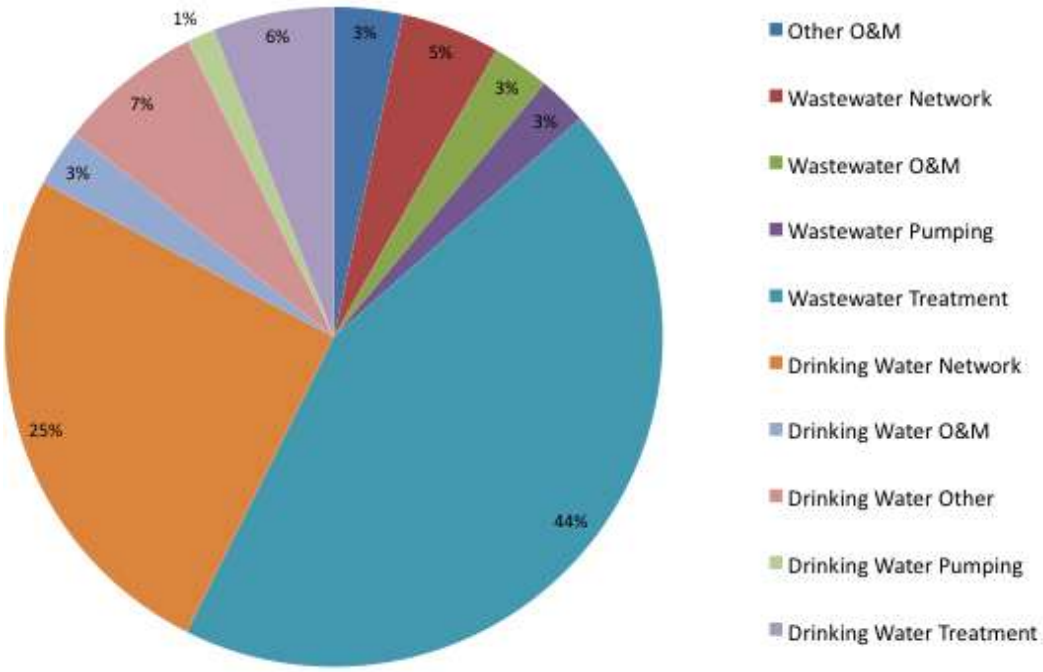
In the framework of the European Union Neighbourhood Initiative, the European Bank for Reconstruction and Development, together with co-funders: KfW Entwicklungsbank and the European Investment Bank, support the initiative through a phased investment programme, provided within the European Union Neighbourhood Investment Fund.

As Seureca Consulting Engineers, in association with our local Moldovan partners: Business Consulting Institute and SC Ingineria Apelor SRL, we have been appointed to prepare a Feasibility Study that will identify and address the issues associated with the current water and wastewater service provision in Chisinau.

This report is part of the Chisinau (Moldova) Water Supply and Sewage Treatment study. It provides an Environmental and Social Action Plan (ESAP) in appendix, according to the format required by the EBRD. The body of the report explains how each action of the ESAP was deemed necessary. It is broken down into 4 sections:

1. Environmental and Health and Safety (EHS) aspects linked to the current operations of Chisinau Apa-Canal (ACC) and to future operations, once the PIP is implemented
2. EHS aspects linked to the investment program and associated with construction works
3. EHS management aspects
4. EBRD performance requirements of the EBRD Environmental and Social Policy

The ESAP is a support to the Priority Investment Plan (PIP) and aims at optimizing the environmental and social impacts related to the PIP. **The PIP amounts to 59,676 million euros** and is spread as follows:




*Graph 1: Components of the PIP*

The components of the investment programmes ranked by priority are:

| Rank | Description |
|---|---|
| 1 | Equipment for operating the wastewater network |
| 2 | Renewal of sewers (15 km) |
| 3 | Rehabilitation of Wastewater PS |
| 4 | First phase of upgrading the WWTP for Chisinau (New pre-treatment, light rehabilitation of primary settling, biological tanks and secondary clarification, separated thickening for biological excess sludge, anaerobic digestion with energy generation, sludge dewatering) |
| 5 | Replacement of the electrical lines in STA, SAN, SESE, SSP |
| 6 | Rehabilitation of the existing water pumping stations |
| 7 | SCADA: Upgrading or renewal of the equipment for drinking & wastewater PS + Data Storage + Implement a unique tool for data processing |
| 8 | Equipment for operating the drinking water network |
| 9 | Rehabilitation of 190 km of water pipes and 3,270 block service connections+ hydraulic fittings |

| Rank | Description |
|---|---|
| 10 | Rehabilitation of reservoirs |
| 11 | Pressure reduction on the network |
| 12 | Adaptation of the water distribution system to the new production scheme: By-pass of SAN facilities, New PS from Zone 2 to Tohatin, New PS from Tohatin tanks to VdVGhidighici dilution |
| 13 | Treatment of the water produced from Ialoveni well field |
| 14 | Urgent rehabilitation works including Electro chlorination plant |
| 15 | EMERGENCY PLAN (Rehabilitation of the wells + treatment facilities + adaptation of distribution system) |
| 16 | Purchase of MIS equipment |

*Table 1: Priority Investment Program by Priority*

The main components of the PIP in value are:

1. First phase of upgrading the WWTP for Chisinau (New pre-treatment, light rehabilitation of primary settling, biological tanks and secondary clarification, separated thickening for biological excess sludge, anaerobic digestion with energy generation, sludge dewatering) – 44.6% of investments
2. Rehabilitation of 190 km of water pipes and 3,270 block service connections+ hydraulic fittings – 20.9% of investments
3. Emergency plan in case of inability to pump water from Nistru river in case of pollution (Rehabilitation of the underground water wells + treatment facilities + adaptation of distribution system) – 7.1% of investments
4. Urgent rehabilitation works including Electro chlorination plant – 5% of investments
5. Renewal of sewers (15 km) – 4.9% of investments
6. Rehabilitation of drinking water reservoirs – 3.8% of investments

The ESAP will need to be regularly updated by ACC and communicated to the EBRD, as part of its periodic reporting requirements (EHS reports).

## 1.2. SITE VISITS AND INTERFACES WITH OTHER PARTS OF THE STUDY

Two visits of Chisinau Water Supply & Sewage Treatment Apa-Canal (ACC) have been conducted by Yann Guérin, environmental management specialist for Seureca, from 15 till 18 February 2011 and from 24 till 27 April 2012.

Interviews were namely conducted with the following:

- PIU management
- Production Director
- Technical Director
- Quality control and regulation Director
- HR Director
- Health & Safety Manager
- Environmental Manager (SACRE unit) and Environmental management Specialist
- Deputy Head of the water treatment plant
- Deputy Head of the waste water treatment plant
- Head of the main laboratory
- Head of the cogeneration plant of the wastewater treatment plant
- Head of the production site ((logistics, transport and mechanical works)
- Head of the central chlorine storage
- Energy manager
- Head of the pricing and economical analysis section
- Media and communication specialist

Visited facilities included: head office and its laboratories; water treatment plant; main wastewater treatment plant; production base (logistics, transport and mechanical works); central chlorine storage.

This report also relies on the following information sources:

- review of documents provided by the client;
- output from the environmental and social analysis performed by the environmental specialist of Seureca
- output from the Stakeholder Involvement Plan performed by BCI
- more, generally, output from the phase B report of the feasibility study and of the workshop held on 12 April, 2012.

## 1.3. TRANSFER OF EXPERIENCE

Time was allocated during the two site visits to share experience with the environmental and health and safety managers of ACC, discuss European best practices and current practices of ACC.

# 2. EHS ASPECTS LINKED TO CURRENT AND FUTURE OPERATIONS

## 2.1. GENERAL

The activities of ACC have been broken down in individual processes, associated with the main environmental and health and safety aspects. A given site will be a combination of one or several processes. For instance, a water treatment plant will use the pumping station, water treatment and chlorination and boiler processes. The main environmental aspects and specific (when relevant) health and safety risks are described below for each main process.

A simplified flow diagram is provided in each section to illustrate the main environmental aspects of the activity. As mentioned in the EHS management section, ACC maintains registers of significant environmental aspects and Occupational Health and Safety (OHS) risks, as part of their ISO14001 and OHSAS18001 certification.

Remarks on the control of EHS aspects and risks stem from regulations and good practices observed in the European Union.

## 2.2. EHS ASPECTS PER PROCESS

### 2.2.1. OPERATION OF A (WASTE) WATER PUMPING STATION


*Graph 2: Environmental aspects for a water pumping station*

Water is sourced at 97% from the Nistru river, but also from wells. As mentioned in the Water section of the Feasibility study, groundwater levels have been decreasing, but apparently not below sustainable levels. The PIP will increase the reliability of water sourcing from the river, thus decreasing the reliance on groundwater.

The measures of the PIP aiming at reducing leaks (pressure reduction, water network upgrade) will also help diminish overall water use.

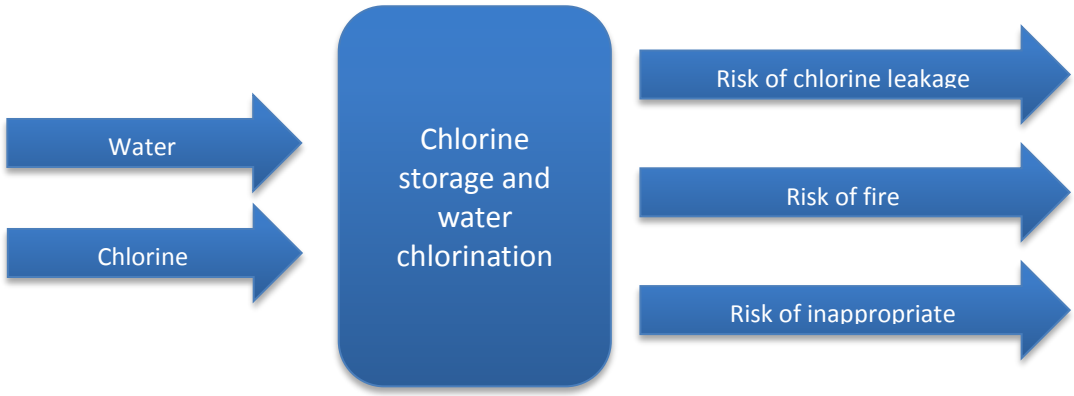
The pressure reduction program of the PIP will lead to reduced energy use, thanks to less water being pumped. Noise is generally contained within the pumping area and should not affect neighbors.

There is a risk for the oil of old transformers to contain PCB's (Poly-Chlorinated Biphenyls), which are persistent organic pollutants, toxic and mutagenic. In France, transformers containing PCB's should have been changed and safely treated by end 2010. The investment program should take into account the potential need for renewal of transformer and ensure the safe disposal of old ones. In the meantime, suitable maintenance should be put in place, in order to prevent leaks, contain them in bunds and minimize risks (fire).

For a wastewater pumping station, additional aspects will be linked to sludge from curing of wastewater settlement tanks. Those should be disposed of safely.

**Related actions of the ESAP: 1.1.4; 1.5.3**

### 2.2.2. CHLORINE STORAGE AND WATER CHLORINATION




*Graph 3: Environmental aspects for chlorine storage and water chlorination*

At the time of the first visit in 2011, the chlorination station of the water treatment plant was located in the vicinity of public buildings. It has been since then substituted by a hypochlorite station. However, chlorine is still used in some pumping stations and stored in case of emergency.

ACC operates a central chlorine storage in Chisinau, at Petricani 27 street. The storage was built using to European technology in 2000. The maximum storage capacity is of 72 t of liquid chlorine (52 t in containers, 20 t in bottles). Although chlorine needs are reduced thanks to the use of hypochlorite, at the time of the visit in April 2012, **32 t of liquid chlorine were stored**. **Such a volume qualifies the site as a high level (> 25 t of chlorine) site under the EU directive on the control of major accident hazards involving dangerous substances (Seveso II, directive 96/82/EC).**

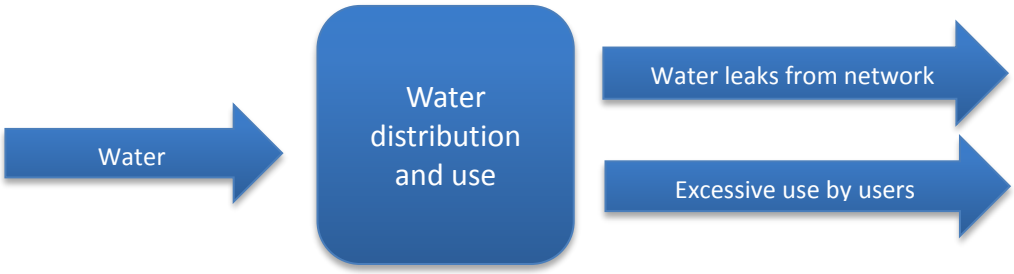
The storage is operated by 4 operators. There are always at least 2 persons on site. Overall, safety measures were found to be very satisfactory, in terms of chlorine leakage detection, reaction equipment (automatic, bunded caustic soda system), procedures and training, safety awareness and personnel protective equipment. The site is subject to 4 accident tests per year. A recording of a full test with local fire and town authorities was seen.

**The protection zone around the chlorine storage is normally of 500 meters. However, houses were observed within 150m of the storage. A food plant is also in the vicinity of the storage.**

It is recommended to evaluate solutions to reduce chlorine storage levels below 10 t (lower threshold of the Seveso II directive). In the meantime, compliance with the directive should be secured, including in terms of: major accident policy, domino effect, safety reports, emergency plans, public information, accident notification, safety management system.

**Related actions of the ESAP: 1.3.1, 1.3.2**

### 2.2.3. WATER DISTRIBUTION AND USE

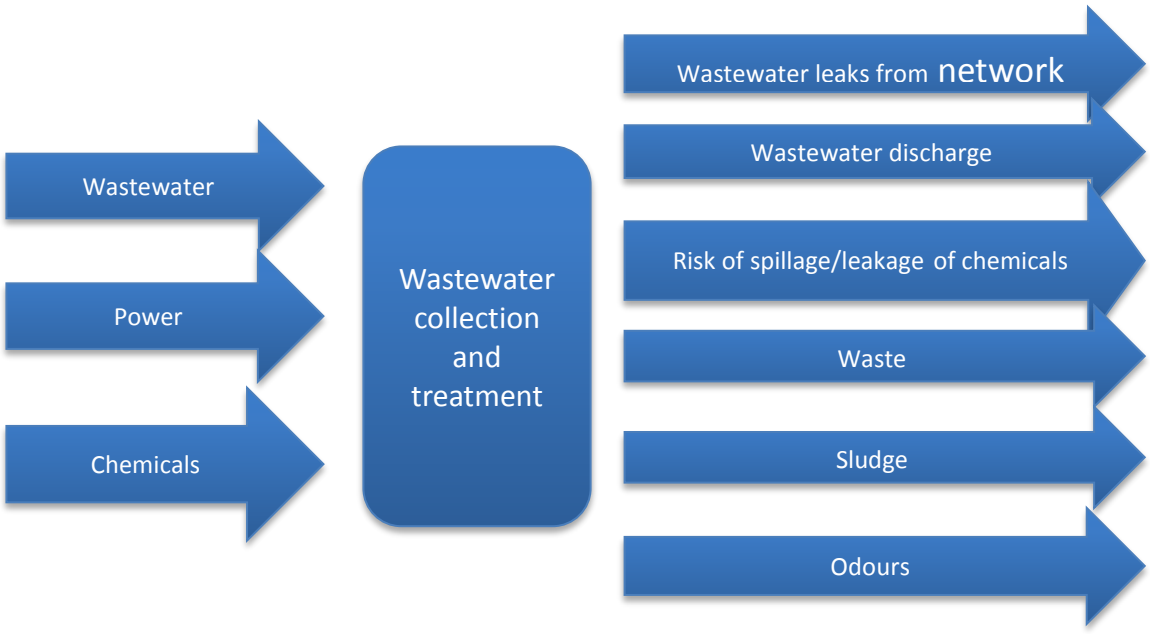



*Graph 4: Environmental aspects for water distribution and use*

Significant **leaks** (close to 45% in some cases) have been evaluated by the feasibility studyon water networks. The PIP will directly address this issue.The PIP also includes measures targeted at water consumption, through the installation of domestic meters and the review of water tariffs.

No specific actions are therefore included in the ESAP on the subject.

### 2.2.4. WASTEWATER COLLECTION AND TREATMENT



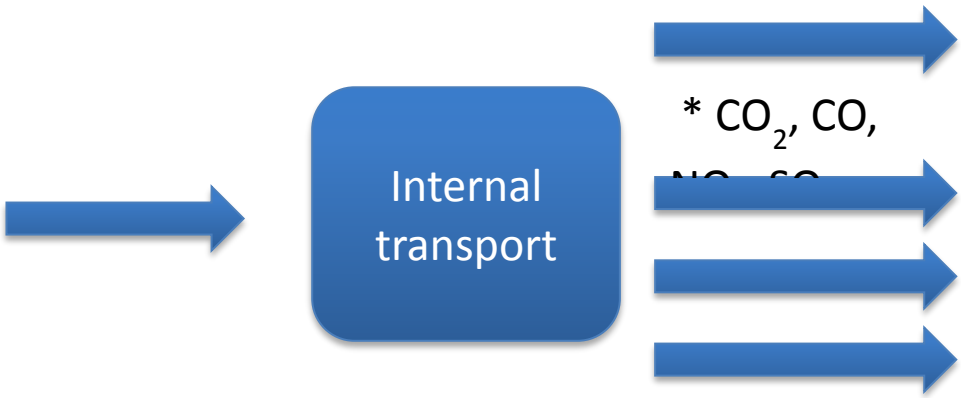

*Graph 5: Environmental aspects for wastewater collection and treatment*

This short and long term investment programs will gradually help comply with EU directive on wastewater and address the key aspects of wastewater discharges: wastewater discharge, power consumption, wastewater leaks, sludge management, odors.

Regarding odors generated by the wastewater treatment process and sludge, communication systems with affected neighborhoods could be put in place, in order to inform them of actions taken by the company to prevent nuisance and provide them with a contact point to ask questions or alert in case of unusual nuisance.

**Related actions of the ESAP: 1.1.3, 1.1.8, 1.1.9**

### 2.2.5. INTERNAL TRANSPORT




*Graph 6: Environmental aspects for internal transport*

Driving company cars and trucks entails the use of fossil fuels and the emissions of pollutants, which contribute to air pollution in towns and to traffic congestion and nuisance. Eco-driving practices could be considered to limit fuel consumption.

Oil can leak from vehicles when they are parked or driven. Drivers should be trained to react in a responsible fashion in such cases, by cleaning up the leak and disposing of oily material in a place dedicated for hazardous waste.

The PIP caters for the purchase of new, more fuel efficient and cars and trucks. Therefore, no additional actions are planned in the ESAP.

### 2.2.6. PRODUCTION BASE


*Graph 7: Environmental aspects for the production base*

Scrap metal, oily wiping cloth and other oily waste are generated by mechanical workshops in the Production base. Scrap metal are stored in a bin which is not correctly labeled (see picture). A dedicated bin should be put in place to store scrap metal.

*Graph 8: Incorrect waste disposal*

*Graph 9: Lack of use of protective glasses and gloves*

Also, operators of the machining workshops were not wearing suitable protective equipment. Management should be more stringent on this point.

The verification date of a crane in a workshop was found to be expired. The verification plan of cranes must be duly implemented.

*Graph 10: Crane in production base*

*Graph 11: Expired crane inspection label*

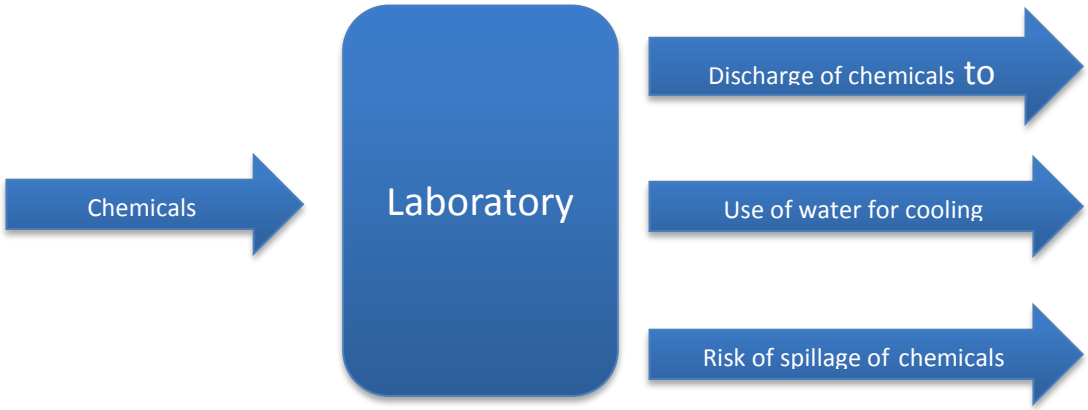
Finally, oil drums were found to be stored directly on the floor. Bunds should be use to store all chemicals, in order to contain potential leaks.

*Graph 12: Oil stored without bunds*

*Graph 13: oil storage, risk of drain contamination*

**Related actions of the ESAP: 1.1.1, 1.1.12, 1.2.1, 1.2.2**

### 2.2.7. LABORATORY ACTIVITIES




*Graph 14: Environmental aspects for a laboratory*

Due care should be brought to the management of chemicals used in laboratories and (waste) water treatment plants (alkaline and acid substances in particular). An instruction should be prepared to address the following requirements:

- Storage of chemicals on bunds of a suitable capacity, which can contain potential leaks: metallic bunds for flammable products; plastic / resin-coated ones for corrosive products
- Labeling of drums and other containers with appropriate risk signs

- Availability of absorbents nearby chemical storage in order to react in case of spillage
- Interdiction to pour chemicals in wastewater / rainwater drains
- Avoiding to store chemicals with others substances that are not compatible: acid and alkaline products must be stored separately for instance; more details can be found in the table below (+ means that products can be stored together ; - means that they must be stored separately; O means that the safety data sheet of each product must be checked to verify storage recommendations)

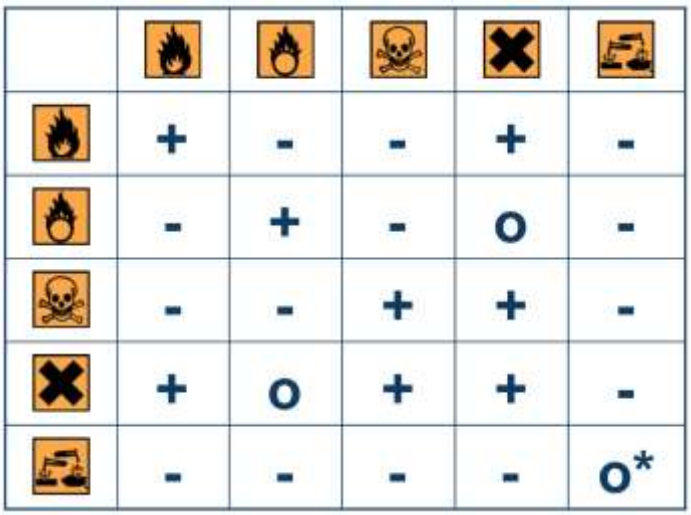


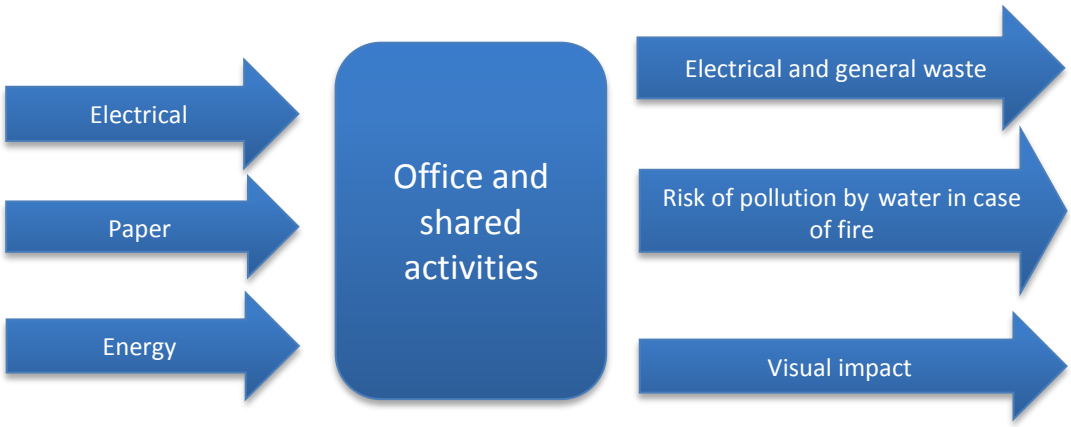

*Table 2: Compatibility between chemical product types*

A suitable waste treatment for chemicals used in the laboratory should be investigated.

Chemicals should be stored in bunded cupboards: this is a small risk, but bunds allow the containment of potential leaks and can prevent mixing products that could react together. Chemicals should be labeled according to international hazard signs. Those should be put systematically to allow for a proper identification of those products, as per EU legislation. Products that can react together (alkaline and acid products for instance) should be stored separately. The compatibility matrix (*see paragraph 4.2.4,* Table 2: Compatibility between chemical product types) should be posted in the laboratory to this effect.

**Related actions of the ESAP: 1.1.1**

### 2.2.8. OFFICE & SHARED ACTIVITIES




*Graph 15: Environmental aspects for office and shared activities*

This category comprises general office activities, as well as impact shared by most other activities, in order to simplify the analysis and have a relevant standpoint.

Aspects linked to office activities include the use of electrical equipment (phones, computers, printers, etc.), the use of paper, general and electrical waste, including toner cartridges from printers. They also involve the use of energy for electrical equipment, lighting and heating.

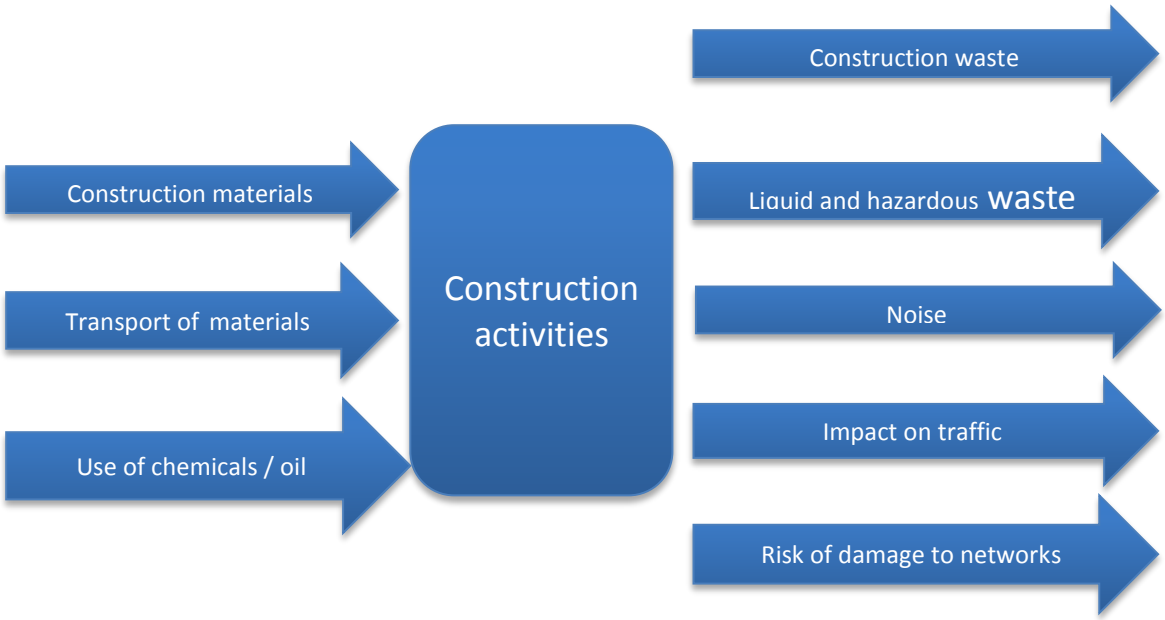
Shared impacts can comprise the visual impacts of facilities, which generally could be improved, as well as the pollution that may occur in case of a major fire due to extensive use of water.

A communication campaign could be launched to enhance awareness of the use of water and resources :

- Design and print awareness stickers: close me (water taps); switch me off (light switches); spare me (toilets); turn me off (computers)
- Place stickers in relevant places: light switches, water taps, toilets, desks equipped with computers...

**Related actions of the ESAP: 1.1.2**

# 3. EHS ASPECTS LINKED TO THE INVESTMENT PROGRAM




*Graph 16: Environmental aspects for construction activities*

The specific impacts of construction need to be catered for due to the investment program.

Construction activities will involve increased transport of materials and staff, resulting in air pollution, traffic disruption and noise. **Working hours** adapted to impacted populations should be defined and respected. Well-maintained equipment should be used to minimize noise.

The way to dispose of **construction waste** (pipes, earth…) should be defined in advance with the City and carefully planned. Hazardous waste (oil, grease for instance) should be disposed of separately. In particular, pipes contaminated with **asbestos** should be treated separately. Waiting for the availability of a economically acceptable, environmentally safe treatment facility in Moldova, equipment contaminated with asbestos should be stored safely in an enclosed warehouse.

All those provisions should be **communicated to contractors**, included as part of contractual requirements and verified through regular inspections on construction fields.

**Impacted populations should be warned** of such works and of any expected (no water provision for a certain time) or accidental disruption (damage to electrical networks for instance). An **external communication plan** could be defined to inform local populations and meetings periodically organized.

More details on the impacts linked to the investment program can be found in the environmental analysis and mitigation plan. Their conclusions are taken into account in the ESAP.

**Related actions of the ESAP: 2**

# 4. EHS MANAGEMENT

## 4.1. GENERAL

### 4.1.1. CURRENT STATUS

A number of interesting assets were identified through the site visits. First of all, the company operates a certified, integrated quality (ISO9001), environmental (ISO14001) and occupational health and safety (OHSAS18001) management system since June 2008. The renewals of those certificates was passed successfully in 2011.


*Picture 17: ISO14001 certificate of APA Canal*


*Picture 18: OHSAS18001 certificate of APA Canal*

This allows ACC to be well aware of applicable regulations and to manage compliance to their requirements. Procedures are described in details; there is ready access to information. **The level of EHS management is significantly better than what can generally be found in other Vodokanals of comparable countries of the region**.

### 4.1.2. RECOMMENDATIONS

It is recommended that the company continues operating a certified quality, environmental and health and safety management system.

- **Related action of the ESAP : 3.1**

## 4.2. EHS POLICY

### 4.2.1. CURRENT STATUS

An integrated quality, environmental and health and safety policy has been defined. Its key elements regarding Environment and occupational Health and Safety are presented below


*Table 3: Key EHS aspects of the integrated policy*

The policy sets out the broad objectives for the integrated management system. Those regarding EHS are:

- Continuous improvement
- Identify the environmental aspects on which the organisation can have an influence
- Prevent pollution
- Identify hazards, risks to health and safety and establish control methods
- Compliance with environmental regulations and other requirements to which the company subscribes
- Preparation and analysis of general and specific objectives for EHS
- Requests to suppliers to comply with OHS as well
- Set up rigorous control methods

Those objectives are quite generic and may not provide clear improvement directions.

### 4.2.2. RECOMMENDATIONS

The objectives defined in the policy could be more specific to APA-Canal. For instance, the identification of environmental aspects or OHS risks is a normal requirement of ISO14001 and OHSAS18001 and can not

constitute, as such, an objective. Examples of more specific objectives could be:

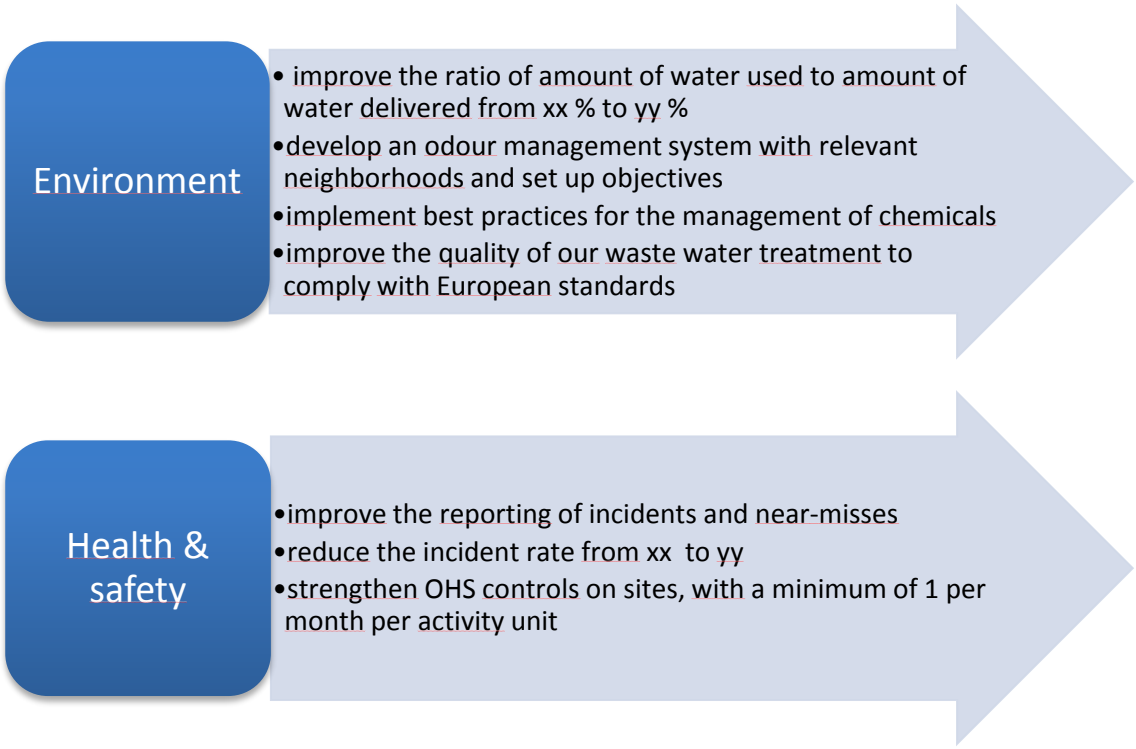



*Table 4: Examples of potential, specific objectives for the policy*

An example of an alternative QHSE policy is given in appendix 3. See also on the subject the objective setting section below.

However, further to discussions with the PIU, the environmental and safety teams in the second visit, and considering that specific objectives are now defined in the safety and environmental management plans of ACC, it was decided not to take this improvement opportunity so far. Therefore, no action in the ESAP relates to this point.

## 4.3. PLANNING

### 4.3.1. ENVIRONMENTAL ASPECTS AND OHS RISKS

#### 4.3.1.1. Current status

Procedures are in place for the identification of significant environmental aspects (procedure PG-07-01) and the risk analysis (procedure PG-13-01).

**Procedure for significant environmental aspects**

The procedure to identify significant environmental aspects takes into account the following criteria: frequency, seriousness, quantity, regulatory requirements, public opinion, legal enforcement decisions. Each criteria is quoted (1, 5 or 10), according to a generic grid. Aspects are deemed significant if the weighted sum of those criteria is above 5. Several forms are used to implement this procedure, which are unusually numerous.

A register of significant environmental aspects is in place. An overall environmental assessment was conducted in 2008. There is a good link between the environmental aspects and applicable regulatory requirements. Aspects are evaluated in both normal and abnormal conditions.

**Procedure for risk analysis**

The risk analysis procedure describes in details the various steps conducting to the quantification of risks. The one devoted to the root cause analysis of identified risk factors is quite general as compared to others.

The application of the procedure leads to detailed risk analysis per activity and to a list of global risks. Those have a low spread and range from 2.83 to 3.01, for a standard deviation of 0.067: this may infer that some data used in the method are not accurate or that the method itself is not fully adapted.

#### 4.3.1.2. Recommendations

**Procedure for significant environmental aspects**

The quotation method for the 6 criteria used to assess environmental aspects is quite broad and would need to be more precise for some aspects, especially seriousness and quantity. More precise grids may be designed, such as the one below.

| Type of aspect | Quantity | | |
|---|---|---|---|
| | 10 | 5 | 1 |
| Air emissions | > Regulatory requirements | < Regulatory requirements | < 50% Regulatory requirements |
| Waste water | > Regulatory requirements | < Regulatory requirements | < 50% Regulatory requirements |
| Waste | > 20% total waste (in weight) or hazardous waste | > 10% total waste | < 10 % total waste |
| Spillage | > 100 l | > 20 l | < 20 l |
| Water use | > 20% total consumption | > 10% total consumption | < 10 % total consumption |
| Energy use | > 20% total consumption | > 10% total consumption | < 10 % total consumption |
| Other aspects | Very significant | Quite significant | Low |

*Table 5: Example criteria for a more precise quotation of quantities for the evaluation of environmental aspects*

The procedure for identifying significant environmental aspects could be simplified through integrating some of its forms.

**Procedure for risk analysis**

The root cause analysis step of the procedure would deserve to be more detailed and to use, when necessary, standard problem solving tools (5 why's, Ishikawa diagram…). The reasons leading to very similar levels of global risks should also be analysed.

After discussion with the environmental and health and safety managers, none of the above recommendations were considered a priority and no action is related to the subject in the ESAP.

### 4.3.2. LEGAL AND OTHER REQUIREMENTS

#### 4.3.2.1. Current status

A Procedure is in place for the tracking of applicable regulations. APA Canal has permits for water use, as well as for water discharge for its four wastewater treatment plants. They also have licenses for their air emissions. New authorisations for their 8 boiler houses have been received.

#### 4.3.2.2. Recommendations

No specific recommendations have been identified on this item.

### 4.3.3. OBJECTIVES AND PROGRAMME(S)

#### 4.3.3.1. Current status

Management programmes are in place for quality, environment and health and safety; they are approved at the time of yearly management reviews. Further to the 2011 inception report, the new objectives were found to be SMART (see below).

| | |
|---|---|
| S | • **SPECIFIC**<br>• Objectives should describe precisely the scope of the goal ; for instance, does the objective concern part or all of the company ? Does it include contractors or not? |
| M | • **MEASURABLE**<br>• An objective should be associated to a target, that will allow to assess whether the objective is reached or not. Whenever possible, targets should be quantified |
| A | • **ACHIEVABLE**<br>• Objectives should be realistically achievable. This is a key assumption of management systems : over-stretched objectives are not advisable |
| R | • **RESOURCED**<br>• Considering the target, resources must be defined in the programme, whenever necessary, and allocated. They can be involve time, finances, technology., systems... |
| T | • **TIME-BOUND**<br>• The timeframe to reach the objective should be clearly defined. When an objective is long-term, it should be broken down into individual, shorter-term objectives |

*Table 6: SMART objectives and targets*

#### 4.3.3.2. Recommendations

Now that the PIP has been agreed, it seems important to draft a roadmap of how the environmental performance of ACC is going to improve the key impacts related to the PIP, for instance:

- Improvement of the network efficiency (leak reduction) from 61% in 2012 to 75% in 2017 for the whole area of supply [1]
- Reduction of energy consumption of ACC by a minimum of 16% between 2012 and 2017 [2]
- Treat sludge in order to make it suitable for agricultural purposes by 2017
- Comply with EU waste water discharge requirements by 202x
- ✍ **Related action of the ESAP : 3.2**

[1] Source: Phase B report, 3.4.4.4, Proposed future physical loss levels for ACC

[2] Source: Phase B report, 3.4.2.7, Physical losses reduction Programme

# 4.4. IMPLEMENTATION AND OPERATION

## 4.4.1. RESOURCES, ROLES, RESPONSIBILITY AND AUTHORITY

### 4.4.1.1. Current status

The environmental system is managed by an engineer from SACRE, the environmental protection unit of the Quality management, control and regulations department. The OHS system is managed by the head of Health and Safety, who runs his own department.

The key responsibilities of the environmental management specialist are to manage the ISO14010 system, secure environmental permits, prepare statistical reports to the environmental authorities and ensure action plans resulting from statutory inspections are implemented. Little time is spent on the field.

The key responsibilities of the safety department are to manage the OHSAS18001 system, perform OHS training and controls, manage statutory OHS inspections. OHS inspections in ACC (circa 1900 employees) are performed by 2 specialists; this can be compared to 4 safety specialists for another company of Chisinau, Thermocom (circa 1500 persons) according to the safety manager.

Unit heads are in charge of cascading the environmental and health and safety policy and are the local contacts to manage the system.

### 4.4.1.2. Recommendations

A network of EHS coordinators could be defined. Coordinators should be in each location associated to significant environmental aspects or risks. Typical roles and responsibilities of EHS coordinators include :

- contribution to the definition of local procedures
- explanation of procedures to their colleagues
- raising EHS awareness locally
- controlling the implementation of procedures
- collecting improvement ideas and opportunities and reporting them back to the environmental management unit
- reporting back EHS information (implementation of actions from the EHS programmes, incidents, accidents, spillage…) and performance to EHS management

Further to discussion with PIU and the environmental and health and safety managers, it was found that the current organisational set-up is sufficient close to the above-described network of EHS coordinators. Therefore, no action has been decided related to the EHS network.

However, working sessions with the environmental management specialist have shown that she did not devote enough time to visit facilities. The SACRE manager should define objectives for her environmental specialist to go “on the field”; this would allow her to:

- gain a better knowledge of facilities and their environmental aspects
- be able to be in touch with staff and communicate on environmental procedures and why it is important to comply wit them
- assess the level of implementation of environmental procedures
- alert management in case of significant breach of procedures

- **Related action of the ESAP : 3.3**

### 4.4.2. COMPETENCE, TRAINING AND AWARENESS

#### 4.4.2.1. Current status

A procedure describes training provisions in ACC (PG-10-01). It includes the evaluation of the efficiency of training (short term and long term). The training program for 2010 was reviewed. It included regulatory, professional and management training.

Generally, managers of operational areas have shown a high level of awareness of the environmental aspects and risks related to their activities.

Initial OHS induction training is provided by the safety department, as requested by law, including for contractors and consultants. Periodic training is provided for staff. The OHS induction training was found satisfactory, although more details could have been provided in case of emergency; the training could also have been more adapted to the audience (administrative, non-operational tasks).

Induction training for the environment is provided by unit heads. In case of changes in procedures, the environmental specialist trains unit heads, who are in charge of cascading the information.

#### 4.4.2.2. Recommendations

Induction training for environmental management could be delivered by the environmental management specialist, in order to provide expert advice on how to deal with environmental issues, make people aware of why it is important to comply with environmental rules and ensure that the environmental specialist is known by staff.

**Related actions of the ESAP: 3.4**

## 4.4.3. COMMUNICATION

### 4.4.3.1. Current status

A communication and consultation procedure is in place (PG-09-01). It describes internal (top-down, bottom-up, transversal) communication and external communication with interested parties.

Further to the site visit, it was found that visual management is not much developed in Apa Canal. This has a detrimental impact on HSE management. For instance, there is no information about objectives and current performance in operational areas, thus impairing staff involvement.

Similarly, there is no structured, dedicated system in place for communication with neighbourhood, despite the obvious impacts on neighbouring areas (odours namely).

### 4.4.3.2. Recommendations

Visual management standards should be defined and deployed throughout the different operational units of the company. For instance, SQCDPE boards of points could be created :

- **S**afety : information on OHS objectives and current performance, accidents, incidents, results of last internal controls
- **Q**uality: Integrated QHSE policy, information on quaility objectives and current performance, accidents, incidents, results of last internal controls
- **C**osts : Costs of operation as compared to budget
- **D**elay : Level of service, time-to-react to incidents, time keeping of maintenance and construction projects…
- **P**eople: Staff changes, improvement ideas and their status
- **E**nvironment: information on environmental objectives and current performance, accidents, incidents, results of last internal controls

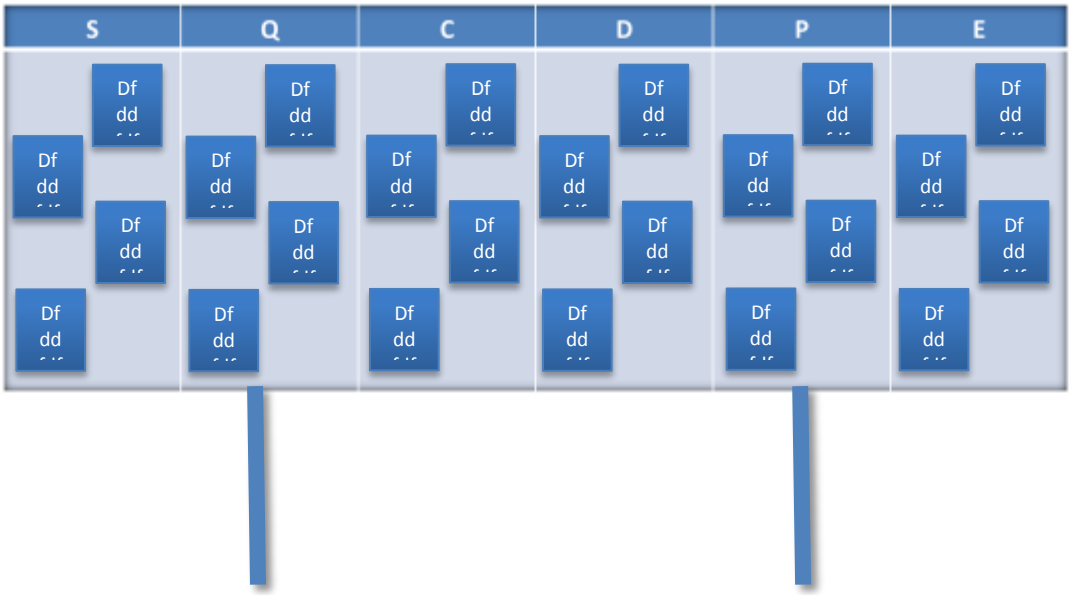



*Table 7: SQCDPE board*

**Related action of the ESAP: 3.5**

An involvement scheme with neighbours should be created to monitor odours, including:

- Definition of target zones, impacted by odours from wastewater treatment plants or pumping stations
- Definition of rules of engagement with neighbours (voluntary participation, no remuneration)
- Training of neighbours to odour detection and reporting
- Periodic meetings to share experience, discuss incidents and explain remediation actions

**Related action of the ESAP: 1.1.3**

## 4.4.4. DOCUMENTATION

### 4.4.4.1. Current status

A single manual (MMI-01) describes the integrated QHSE management system.

#### 4.4.4.2. Recommendations

Documentation could sometimes be simplified / merged, in order to reduce time to maintain it (see examples in other sections of this report, for instance environmental analysis and non-conformities). However, this is not felt to be a priority, therefore no action is associated in the ESAP.

### 4.4.5. DOCUMENT CONTROL

#### 4.4.5.1. Current status

A general procedure (PG-01-01) is in place to control documents. Another general procedure (PG-17-01) is used to elaborate documents of the integrated management system. A specific procedure (PSSSM-02-01) has been defined to elaborate safety instructions.

#### 4.4.5.2. Recommendations

No specific recommendations have been identified on this item.

### 4.4.6. OPERATIONAL CONTROL

#### 4.4.6.1. Current status

The status of current EHS operational controls is assessed for each process in section 2 of this ESAP report.

Reported accidents statistics since 2008 are as follows:

| Year | Severity | | | Total |
|---|---|---|---|---|
| | Death | Severe | Temporary inability of working | |
| **2008** | | | 4 | 4 |
| **2009** | | | 1 | 1 |
| **2010** | | | 5 | 4 |
| **2011** | 2 | 1 | 3 | 6 |

**2 deaths are to be reported in 2011.**

- 11 January 2011: fall of an electrical maintenance operator from a crane at Jaloveni pumping station; the operator was not secured and had drunk alcohol;

- 21 March 2011: an employee was run over when crossing the street

An analysis of those accidents was performed and communicated to locat authorities. Each time, the person who died was faulted.

Smoking ban regulations were not always respected, and some managers were seen smoking in buildings during the visit.

#### 4.4.6.2. Recommendations

Recommendations regarding EHS operational controls are defined for each process in section 2 of this ESAP report.

Accidents should be considered as managerial faults. It is not appropriate to consider that an accident is solely due to the mistake of an operator. Root cause analysis and related corrective actions linked to accidents should show which managerial actions are taken to prevent future accidents.

**Related action of the ESAP: 3.10**

Smoking ban regulations should be strictly enforced. Managers and directors must show leadership and set the example on this respect.

**Related action of the ESAP: 1.3.3**

### 4.4.7. EMERGENCY PREPAREDNESS AND RESPONSE

#### 4.4.7.1. Current status

The general procedure PG-12-01 specifies the way emergency instructions are defined and tested. A general plan of reaction in case of emergency is also in place: it defines the potential emergency situations and the way to prevent and react to them. The significance of each situation is quoted from an environmental and OHS point of view. The highest-ranking risk is linked to the emission of chlorine gaz. Industrial risks are discussed in section 2 of this report.

Safety tests are performed regularly. A movie showing a major chlorine test was seen. A test involving a chlorine leak of 16 March 2011 was reviewed. No improvement opportunity was identified by ACC further to the test, which is very unusual. The report did not allow to assess the adequacy of means and training, since little detail was available.

#### 4.4.7.2. Recommendations

Safety tests are a very important component of an emergency prevention and reaction system. Therefore, they should be much more thoroughly recorded and analyzed. It is paramount that reports include the following:

- Time record of actions (eg : 15h07: identification of the leak by the sensor; 15h09: equipment of the operator; 15h15: inspection of the operator….), in order to assess how fast was the reaction chain, if it was in the right order and whether there was any impediment
- Pictures of key events ; movies when relevant
- Critical assessment of accident reaction against planned procedures
- Critical assessment of procedures, detection features, mitigation equipment, human resources, internal and external communication
- Identification of improvement needs
- Monitoring of the implementation of improvement needs

- ✎ **Related action of the ESAP: 3.6**

As discussed with safety, SACRE and PIU, it would be useful to design 1-page long emergency instruction sheets for key emergency scenarios (chlorine leak, fire, spillage of chemicals), with pictures and flowcharts and post them in relevant places:

- Chlorine leak instruction: pumping stations still using chlorine (chlorine reaction procedures in the main storage are already in place and well known by local staff)
- Fire instruction: corridors at each floor of head office; boiler houses; pumping houses; water and wastewater treatment plants
- Spillage of chemicals: laboratories; storage building and oil storage of Production Base; chemical storages of water and wastewater treatment plants

Templates of emergency reaction sheets for chlorine leak and fire are provided in annex 2.

- ✎ **Related action of the ESAP: 3.7**

## 4.5. CHECKING

### 4.5.1. MONITORING AND MEASUREMENT

#### 4.5.1.1. Current status

A generic monitoring procedure is in place (PG-11-01).

A specific procedure (PSSSM-01-01) defines OHS controls. They are performed by the personnel of the OHS department every three months. However, regulatory requirements require those controls monthly. They cannot achieve those because of a lack of resources.

A register of monitoring equipment is maintained, in order to check their status. The register specifies the verification periods.

A licensed contractor is used for air emissions measurements. Their report does not include information about the measurement campaign: limitations, validity of results, measuring equipment that has been used and its calibration.

#### 4.5.1.2. Recommendations

The environmental management specialist of SACRE should accompany the air measurement contractor, in order to gain a better knowledge of air emission sources, treatment and measurement method and verify work from the contractor. Once a better level of knowledge and confidence is gained, such practices may be done on a sampling basis.

**Related action of the ESAP: 3.3**

The feasibility of creating a network of neighbours of the wastewater treatment plant could be investigated. This network of volunteers would be trained to detect odours from the plant and register and report odour levels. Alerts could be raised through this mean. This would allow APA Canal to set up a monitoring programme on this environmental aspect.

**Related action of the ESAP: 1.1.3**

An indicator related to waste could be defined. In general, 2 types of indicators are found:

- Indicator on the quality of waste segregation, which shows the level of compliance of waste segregation practices with the waste management plan. This is generally measured through the involvement of waste contractors and/or through internal controls (internal operational audits)
- Indicator on the level of valorisation, as a % of waste which are valorised (material or energy) as compared to total waste (including general waste)

**Related action of the ESAP: 3.8**

OHS controls must be strengthened, in order to comply with the required monthly frequency. An environmental dimension could be added to those controls, in order to check compliance with provisions such as:

- waste segregation plan (do paper containers contain only papers or also metals or plastics…)
- chemical control (are chemicals properly labelled / stored on bunds…)
- availability and accessibility of fire extinguishers
- knowledge by staff of environmental objectives and of the way they can contribute to those objectives

  Checklists are often designed to that effect, including simple questions such as: “is waste segregation appropriate”, guiding assessors through their evaluation.

  The purposes of controls and audits are different, as controls are really targeted at operational activities and awareness levels, allowing to be closer to actual operations. Controls must be frequent, brief (1 hour maximum), simple, and can hence be performed by staff who do not have auditing qualifications, thanks to the control checklist.

**Related action of the ESAP: 3.9**

## 4.5.2. EVALUATION OF COMPLIANCE

### 4.5.2.1. Current status

The general procedure PG-16-01 describes the provisions for compliance evaluation with regulatory requirements. The auditing process is used to that purpose.

The company is regularly inspected by local environmental authorities: 9 inspections were performed in 2011. Inspection protocols are duly filed by ACC. The potential findings of those inspections result in action plans submitted by the company to the authorities. For instance, the action plan resulting from the inspection nr 031388 of 8 February 2011 was presented. It included 5 actions, with timetable and responsible:

| Nr | Action | Resp. | Target |
|---|---|---|---|
| 1 | Finalise 2010 actions and include them in the 2011 action plan | M.Mazurean | 20/02/2011 |
| 2 | Secure a positive opinion from the Environmental Expert of the authorities for the operation of the sludge deposit nr 2 of the WWTP of Chisinau | M.Mazurean | 28/02/2011 |
| 3 | Find a solution to the issue linked to the use of “Geotube” | G.Vozian<br>V.Cepurenco | 31/10/2011 |
| 4 | Evacuate waste from the construction of the sludge platform in a compliant way | G.Vozian<br>M.Mazurean<br>V.Cepurenco | As per contractual deadlines |
| 5 | Define an environmental action plan for 2011 and agree it with the Environmental Agency of Chisinau | M.Mazurean<br>A.Rusnac | 15/03/2011 |

*Table 8: Environmental enforcement actions, 2011*

#### 4.5.2.2. Recommendations

In order to enhance the assurance of the company in its compliance level, compliance checklists are sometimes developed for each identified regulation: those checklists are then used in periodic conformity assessments. While this is initially time-consuming to prepare checklists, the level of assurance is far greater than through an audit. Such an approach also allows for the generation of a compliance indicator: number of compliant requirements / total number of requirements.

So far, no action is deemed to be worth including in the ESAP.

### 4.5.3. INCIDENT INVESTIGATION, NON-CONFORMITY, CORRECTIVE & PREVENTIVE ACTION

#### 4.5.3.1. Current status

4 general procedures deal with the subject of non-conformity, corrective and preventive actions :

- PG-04-01 on the treatment of non-conformities linked to products, processes and environment
- PG-05-01 on corrective actions
- PG-06-01 on preventive actions
- PG-15-01 on the accidents, incidents, noncompliance in the field of OHS

Accident investigations were found to be too oriented towards identifying who is “guilty”.

#### 4.5.3.2. Recommendations

Accident investigations should use a more structured approach, to identify the real root causes and initiate improvements. A simple method is to use the 5 M’s problem analysis method (also called Ishikawa fishbone).

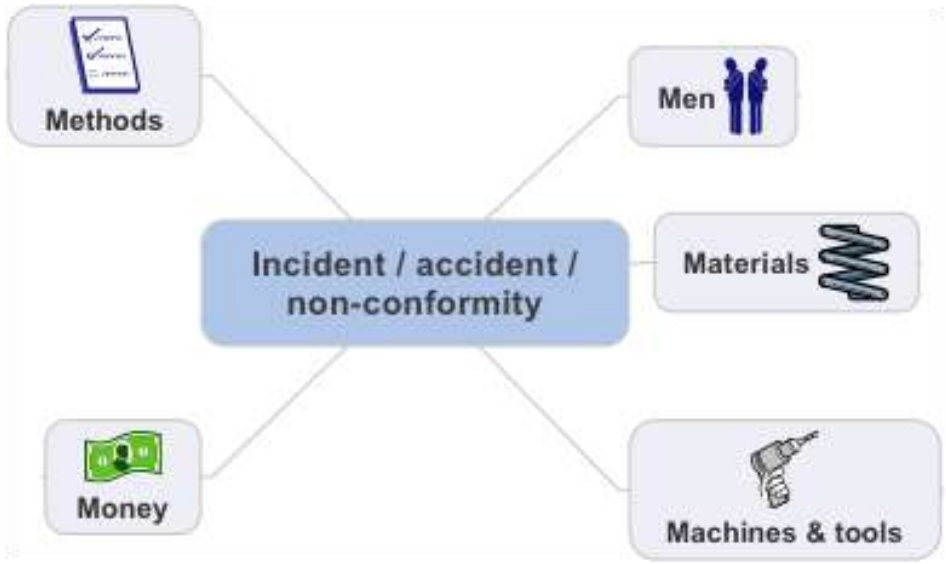



*Table 9: 5 M’s problem analysis*

An illustration for the analysis of a contamination of drains resulting from an oil spillage by contractors could look like this :


*Table 10: Analysis of a drain contamination through 5 M’s*

**Related action of the ESAP: 3.11 (and 3.2)**

### 4.5.4. MANAGEMENT OF RECORDS

#### 4.5.4.1. Current status

The general procedure PG-02-01 covers the management of records. It includes the identification, codification, use, retention, protection, archiving and elimination of records.

#### 4.5.4.2. Recommendations

No specific recommendations have been identified on this item.

### 4.5.5. INTERNAL AUDIT

#### 4.5.5.1. Current status

The general procedure PG-03-01 covers QHSE auditing activities. It addresses the audit programme and the audit realisation and follow-up. PG-19-01 covers auditor competencies. It is based on ISO19011. The 2011 audit programme covers internal, external, compliance and supplier audits. It also covers the simulation of emergency situations, which is an interesting practice.

#### 4.5.5.2. Recommendations

No specific recommendations have been identified on this item.

## 4.6. MANAGEMENT REVIEW

### 4.6.1. CURRENT STATUTS

The general procedure PG-18-01 covers management reviews.

A management review is performed every year, at the end of the year in general. All the department heads attend the review, which is a very good practice. Actions from QHSE management plans are reviewed and they discuss actions that are not realized. Beforehand, separate reports are prepared for quality, environment and safety by each system owner. The minutes of the management review of January 2011 have been reviewed and have been found concise and of real added-value.

No specific recommendations have been identified on this item.

# 5. EBRD PERFORMANCE REQUIREMENTS

The table below lists the 10 Performance Requirements of the 2008 Environmental and Social Policy of the EBRD and actions needed to comply with those requirements, when relevant.

*Table 11: EBRD performance requirements compliance table*

| Performance Requirement Key requirements | Status* | Comments Gap analysis ; reference | Recommendation |
|---|---|---|---|
| **PR1 - Environmental and Social Appraisal and Management** | | ACC is certified to ISO14001 and OHSAS since 2008.<br><br>In general, used contractors already have licenses, which allow them to perform certain tasks. For instance, for excavation works, they define where earth will be deposited; this must be authorized. Zones impacted by works should be rehabilitated. The contract owner should pay for those works. | > See section 3 of ESAP |
| **PR2 - Labour and Working Conditions** | | 2 deaths have been reported in 2011.<br>Average wage in ACC is 9% lower than the sector average wage, according to the head of the price and economical analysis section. The basis to establish the salary grid is the national minimum wage of 1100 LEI. The branch minimum wage of 1250 LEI, negotiated between Unions and government at the national level, is not applied, despite regulatory requirements to do so. **The minimum wage in ACC is therefore 11% lower than the branch minimum wage.**<br>Wage records are periodically checked by the Labour Inspectorate.<br><br>Rules for overtime and overtime compensation are not defined in the work contract, contrary to expectations from PR2 | > See actions 3.9 and 1.4 of ESAP |
| **PR3 - Pollution Prevention and Abatement** | | See section 2 and Environmental Analysis | > See actions 1.1 and 2 of ESAP |
| **PR4 - Community Health, Safety and Security** | | While hypochlorite is now used in the main water treatment plant, the central chlorine deposit still stores significant quantities of liquid chlorine, above threshold of Seveso II directive | Reduce chlorine Storage<br>> See actions 1.3 of ESAP |
| **PR5 - Land Acquisition, Involuntary Resettlement and Economic Displacement** | | Works are performed on existing networks and no resettlement is expected. New pumping stations should be built on public land; the precise location has not been defined yet. | Set up a grievance mechanism<br>> See action 2.6.1 of ESAP |
| **PR6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources** | | The PIP is not affecting protected zones and should reduce pollutant discharges to the BIC river | / |
| **PR7 – Indigenous people** | | This issue is not relevant in Chisinau | / |
| **PR8 – Cultural Heritage** | | Ancient buildings are mainly in the centre of Chisinau, which is not affected by the PIP | / |
| **PR9 – Financial intermediaries** | | This is not applicable to the project | / |
| **PR10 - Information Disclosure and Stakeholder Engagement** | | According to the Production director, the following key stakeholders are affected by the PIP:<br>➢ Local council<br>➢ Population of Bubuici, around the WWTP<br>➢ Population of Station de Vadel Lui Voda, which is going to be closed<br>➢ ANRE, the organization in charge of setting water tariffs<br>➢ Association of Apa Canals of Moldova, headed by the General Manager of ACC<br>➢ Miscarea Ecologica ecological organization<br>➢ Relevant ministries<br><br>A new communication specialist has been working in | Set up an external communication plan.<br>> See action 1.110 of ESAP<br><br>Have the Stakeholder Involvement Plan reviewed by the communication specialist |

| | | | |
|---|---|---|---|
| | | the press deptartment of APAC since December 2012. She is in charge of feeding in the news website and is in the process of modernizing the website.<br><br>In February 2011, all the water meters froze : many complaints were received. Several Press conferences were organized and explanations on the website were provided (see website, 3 Feb. 2012).<br><br>All those information are transmitted to mass media, through an electronic distribution list held by the communication specialist.<br>She holds an electronic register of what has appeared on ACC. For instance, there was a report on TV on the subject, of odours from the WWTP ; ACC was interviewed and explained the issue and that it will be resolved<br><br>Complaints for service disruption are directed to the dispatching unit.<br><br>On 5th May, an Open Day for the students, at the WTP and WWTP will be held, showing the full water cycle. A contest will be organized, asking for an essay on the role of water in society and worldwide. | |

* Green indicates compliance, Yellow partial compliance, Red non-compliance.

# Annexes

# Annex 1: Environmental and social action plan

| № | Action<br>> Detailed measures or reference to ESAP report | EHS Risks Liability/ Benefits | Legislative requirement<br>----------<br>EBRD perf. requirement | Target and evaluation criteria for successful implementation | Timetable | Responsibility* | Investments, Resources or Costs | Status / comments |
|---|---|---|---|---|---|---|---|---|
| **1. OPERATIONAL ISSUES ASSOCIATED WITH THE CURRENT & FUTURE OPERATIONS AND ACTIVITIES OF THE BORROWER** | | | | | | | | |
| 1.1 | Environment | | | | | | | |
| 1.1.1 | Improve the control of chemicals<br>> See: §2.2.7, 2.2.6 of ESAP report | Reduced risk of pollution of soils, networks | ISO14001<br>----------<br>EBRD PR 3 | Instruction for the control of chemicals | 2012 | Environmental manager + laboratory manager | 3 days + 2000 euros (bunds, spillage reaction kits) | Not started |
| 1.1.2 | Increase company awareness on resource care: energy, water<br>1. Design and print awareness stickers: close me (water taps); switch me off (light switches); spare me (toilets); turn me off (computers)<br>2. Place stickers in relevant places: light switches, water taps, toilets, desks equipped with computers...<br>> See: §2.2.8 of ESAP report | Reduced costs and pressure on resources ; exemplarity | ISO14001<br>----------<br>EBRD PR 3 | Pictures of awareness stickers in relevant places | 2012 | Environmental + communication specialists | Design and printing of stickers | Resource awareness campaigns have already started as part of ISO14001, but can be enhanced |
| 1.1.3 | Involve neighbours to manage odours from treatment plants<br>> See: §2.4.3.2 of ESAP report | Improved relationships with neighbours | ISO14001<br>----------<br>EBRD PR 10 | List of neighbours involved in the odour management plan | 2013 | Production director + communication specialist | Time | Not started |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.1.4 | Build remote storage areas for sludge<br>> See mitigation plan of environmental analysis and §2.2.1 of ESAP report | Reduced risk of pollution of groundwater and odours | ISO14001<br>---<br>EBRD PR 3 | Map of storage areas for sludge | 2013 | Production director | To be defined | Not started |
| 1.1.5 | Promote agricultural use of sludge<br>> See mitigation plan of environmental analysis | Lower use of additional land for sludge landfilling | ISO14001<br>---<br>EBRD PR 3 | Amount of sludge used for agricultural use, as a % | 2013 | Production director + communication specialist + sanitary authorities | Time | Not started |
| 1.1.6 | Set up a Committee for the Restoration and the Protection of the Bic River<br>> See mitigation plan of environmental analysis | Improved relationships with neighbours | ISO14001<br>---<br>EBRD PR 3 | Statutes of the Committee | 2014 | General manager + environmental specialist + local authorities | Time | Not started |
| 1.1.7 | Restore manholes covers<br>> See mitigation plan of environmental analysis | Reduced risks for population | ISO14001<br>---<br>EBRD PR 3 | Work reports | On-going | Production director | Time | On-going |
| 1.1.8 | Clean up and control safety of derelict Water treatment plant (Vadul Lui Voda)<br>> See mitigation plan of environmental analysis | Reduced visual impact and risks for population | ISO14001<br>---<br>EBRD PR 3 | Pictures of secured and cleaned up plant | Decomissioning of Vadul Lui Voda plant | Contractor | To be defined | Not started |
| 1.1.9 | Clean up and restore old sludge drying beds – preliminary survey<br>> See mitigation plan of environmental analysis | Reduced risk of groundwater pollution | ISO14001<br>---<br>EBRD PR 3 | Results of preliminary survey of soil pollution in old | 2013 | Environmental specialist | Time | Not started |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | sludge druing beds | | | | |
| 1.1.10 | Define a communication plan to improve the image of the WWTP (site visits, website, public information…)<br>> See mitigation plan of environmental analysis | Improved relationships with neighbours | ISO14001<br>---<br>EBRD PR 10 | Communication plan | 2012 | ACC Communication specialist | 1 day for the plan + time for implementation | Positive initiatives are already taken by the new communication specialist of ACC |
| 1.1.11 | Verify old transformers that could contain PCB's and ensure suitable maintenance and bunds are in place<br>> See: §2.2.1 of ESAP report | Lower risk of soil pollution | ISO14001<br>---<br>EBRD PR 3 | List of transformers that may contain PCB's and actions decided | 2012 | Environmental specialist + energy manager | 5 days | Not started |
| 1.1.12 | Ensure waste bins are correctly labelled and used in the production base and other facilities. Implement regular controls to check this.<br>> See: §2.2.6 of ESAP report | Better waste segregation and recycling | ISO14001<br>---<br>EBRD PR 3 | Reports of inspections | 2012 | Environmental specialist + facility managers | Time | Not started |
| 1.2 | Occupational Health and Safety | | | | | | | |
| 1.2.1 | Ensure Personnel Protective Equipment are duly worn. Ensure managers are more stringent on this point.<br>> See: §2.2.6 of ESAP report | Lower risks for staff | Local Labour Code<br>OHSAS18001<br>---<br>EBRD PR 2 | Internal note Safety inspection reports | 2012 | Safety manager + facility managers | Time | Not started |
| 1.2.2 | Ensure the verification programme of cranes is duly implemented<br>> See: §2.2.6 of ESAP report | Reduced risk of accident linked to cranes | Local Labour Code<br>OHSAS18001<br>---<br>EBRD PR 2 | Crane verification plan and status | 2012 | Safety manager | Time | Not started |
| 1.3 | Industrial risk | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.3.1 | Central chlorine storage: review requirements of the Seveso II directive (96/82/EC), establish a compliance plan and achieve compliance | Major industrial accident | Seveso II<br>---<br>EBRD PR 2, 3 | Seveso II compliance report from specialised consultant | 2012 for the compliance plan | ACC Managing director | Support from speciaiised consultants | Local procedures are in place and are tested periodically |
| 1.3.2 | Reduce chlorine storage below 10 t (seveso II threshold)<br>1. Evaluate solutions<br>2. Implement chosen solution | Reduction of risks of a major accident | Seveso II<br>---<br>EBRD PR 2, 3 | Stock register of the main chlorine storage | 2012 | Production director | Time and consultant support | The implementation of hypochlrorite treatment in STA plant has already reduced chlrorine needs |
| 1.3.3 | Lack of implementation of regulations on smoking ban | Fire risk | OHSAS18001<br>---<br>EBRD PR 2 | Ensure compliance with rules on smoking ban, including from management (note from CEO) | To be defined | OHS manager + CEO | 0.5 day | Not started |
| 1.4 | Social | | | | | | | |
| 1.4.1 | Evaluate the need and feasibility to take into account the branch minimum salary, instead the national one<br>> See: §5 of ESAP report | Compliance with wage regulations | Moldovan wage regulations<br>---<br>EBRD PR 2 | Note | 2012 | General manager | 11% higher personnel costs | Not started |
| 1.4.2 | Define in work contract (or other document communicated to the workers) the rules for overtime and overtime compensation<br>> See: §5 of ESAP report | Transparency of wage rules | Moldovan wage regulations<br>---<br>EBRD PR 2 | New model of work contract | 2012 | HR manager | Time | Not started |
| **2. OPERATIONAL ISSUES ASSOCIATED WITH THE FUTURE INVESTMENT PROGRAMME (CONSTRUCTION ACTIVITIES)** | | | | | | | | |
| 2.1 | Noise and vibration | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.1.1 | The contractor shall:<br>1. use equipment conforming to national of international standards and directives on noise and vibration emissions<br>2. maintain exhaust systems in good working order, properly designing engine enclosures, using intake silencers where appropriate and regularly maintain noise-generating equipment<br>3. restrict working noisy activities between 07 a.m. to 06 p.m. within the residential areas<br>4. inform management staff of likely impacted schools and hospitals about the work program in order to find arrangements for limiting the nuisance<br>> See mitigation plan of environmental analysis | Limited nuisance during construction due to noise | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | Works in residential areas (mainly pipe network) | Contractor | No marginal cost | Not started |
| 2.2 | Air quality | | | | | | | |
| 2.2.1 | Machinery, vehicles and equipment will be fitted with pollution control devices, which will be checked at regular intervals to ensure that they are in working order<br>In residential areas<br>- trucks carrying earth, sand or stone will be covered with tarps to avoid spilling<br>- water or wetting agents will be sprayed on work sites not covered by pavement or vegetation and during the delivery and handling of dusty materials.<br>> See mitigation plan of | Limited dust and pollutant emissions during construction | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | Works in residential and rural areas | Contractor | No marginal cost | Not started |

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| | environmental analysis | | | | | | | |
| 2.3 | Loss of soil | | | | | | | |
| 2.3.1 | As much as possible the extracted material will be reused for backfilling trench and excavations<br>> See mitigation plan of environmental analysis | Reduced use of soil during construction | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | On all work sites, especially laying of water pipes | Contractor | No marginal cost | Not started |
| 2.3.2 | All sand and selected material brought to the worksites by the contractor will have to be extracted from borrow sites authorized by the environmental authorities<br>> See mitigation plan of environmental analysis | Reduced use of soil during construction | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | On all work sites | Contractor | No marginal cost | Not started |
| 2.3.3 | Deposit of spoil material on public land shall be done on sites authorized by the environmental authorities. Protection of stockpiles against runoff erosion<br>> See mitigation plan of environmental analysis | Reduced use of soil during construction | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | Spoil material disposal sites | Contractor | No marginal cost | Not started |
| 2.4 | Pollution of soil and water | | | | | | | |

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| 2.4.1 | Disposal of spoil material in any water course is strictly forbidden<br>Hydrocarbon storage and refuelling areas must be concrete made and located away from any watercourse.<br>Tanks above ground must be placed on a watertight concrete made area and fitted with a retention basin. On- site fuelling and greasing will be restricted to heavy machinery, all precautions will be taken to avoid any spillage. In case of spillage, the oil/fuel patch will be covered by sand and removed to be disposed into adequate landfill.<br>No fuel and lubricant will be stored in containers more than 100 l within 100 m of a watercourse or a water body.<br>Placing proper containers within the permanent and mobile work sites in order to collect all kinds of common solid waste such as: glass, paper, cardboard and plastic waste and packaging. Common waste will be transferred to the containers of the company responsible for general domestic waste collection or by the contractor towards a dumping site which is formally used for domestic waste.<br>Hazardous waste such as batteries, oil filters, etc., shall be collected in special containers proof for any | Reduced risk of soil and water pollution during construction | ISO14001<br>----------<br>-------<br>EBRD PR 3 | Non compliance statement in works monthly report | All worksites and construction camps | Contractor | No marginal cost | Not started |

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| | leakage/spillage. If not recycled, they will be conveyed to adequate landfill.<br>Particular waste such as section or asbestos cement debris should be handled and transported with care and disposed in an appropriate dumping site.<br>> See mitigation plan of environmental analysis | | | | | | | |
| 2.5 | Destruction of terrestrial flora and fauna | | | | | | | |
| 2.5.1 | Manual land clearing. Cutting trees above 4 m high or with aesthetic value shall request authorization of the Supervisor.<br>In residential or suburban areas:<br>- temporary fences placed around the roadside or adornment trees not to be felled<br>- replantation of felled roadside or adornment trees in the same site but in such a way that the roots of the new tree will not likely damage the buried pipe. | Preservation of flora and fauna | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | All worksites | Contractor | No marginal cost | Not started |

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| 2.5.2 | Tree plantation on 25 ha, Involvement of Forestry Service in choice of species, plantation methodology. Plantations will be made by AAC's staff or a skilled operator | Preservation of flora and fauna | ISO14001<br>---<br>EBRD PR 3 | Specific report | ACC land or public area (public forests) | ACC's staff or skilled operator | To be defined | Not started |
| 2.6 | Damage to private and public goods, economic displacement | | | | | | | |
| 2.6.1 | 1. Detailed location private and public goods likely to be affected by works and working with care in the vicinity of these goods. In case of damage, full restoration by the contractor at its own expenses.<br>2. Compensate activities (shops...) or potential households affected by works: set up a grievance mechanism<br>> See mitigation plan of environmental analysis | Reduced risk of damage to private and public goods | ISO14001<br>---<br>EBRD PR 3,10 | 1. Non compliance statement in works monthly report<br>2. Grievance mechanism | All work sites, more particularly where laying pipes | Contractor | No marginal cost | Not started |
| 2.7 | Disruption to public services | | | | | | | |
| 2.7.1 | Detailed location of public services. Continuous liaison with operating companies/authorities in order to properly protect and/or divert public services without heavy impacts. In case of anticipated cut-off, information of the served population to attenuate disturbance.<br>When working in the vicinity of overhead power cables, the contractor shall ascertain and satisfy himself about the safe clearances to be maintained from the power cables in consultation with the authority operating the | Reduced risks and impacts of service disruptions | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | All work sites, more particularly where laying pipes | Contractor | No marginal cost | Not started |

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| | power line.<br>Contractor's full responsibility for any damage and for full restoration of the damage.<br>> See mitigation plan of environmental analysis | | | | | | | |
| 2.8 | Disruption to road traffic | | | | | | | |
| 2.7.1 | The contractor shall ensure the continuity of the road traffic. If traffic interruption is necessary, the information of the concerned population shall be ascertained by the contractor with a proper schedule in order to attenuate disturbance.<br>After laying pipe and backfilling the trench with adequate material, all the damaged surface of carriage ways and sidewalks shall be restored in accordance to the relevant standards.<br>> See mitigation plan of environmental analysis | Reduced disruptions of road traffic | ISO14001<br>----------<br>-------<br>EBRD PR 3 | Non compliance statement in works monthly report | All work sites, more particularly where laying pipes | Contractor | No marginal cost | Not started |
| 2.9 | Risk for health and safety of nearby population | | | | | | | |

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| 2.9.1 | Speed limit for contractor's and subcontractor's vehicles: 40 km/h inside residential areas and 50 km/h outside residential areas.<br>The contractor shall provide a written and clear traffic control plan including schedules and places of flagmen, traffic cones, barricades and/or lights.<br>Work sites on along roads shall be properly signposted with adequate marks and tools such as cones and coloured bands.<br>Fences to protect pedestrian, on diversion paths.<br>Access to private houses, shops and all commercial public buildings shall be preserved by the means of safe footbridges.<br>> See mitigation plan of environmental analysis | Reduced health and safety risk of nearby population | ISO14001<br>---<br>EBRD PR 3 | Non compliance statement in works monthly report | All work sites, more particularly where laying pipes | Contractor | No marginal cost | Not started |
| 2.10 | Health and safety of contractors | | | | | | | |
| 2.9.1 | 1. Submit to the Employer or its Engineer (Supervisor) an Health and Safety Plan (HSP) which sets out the Health and Safety Policy of the Contractors, as well as the detailed methods to prevent accident for all the relevant worker's situations relating to the type of works and for the public. For example, as regards the pipe rehabilitation/replacement, the HSP will have to cover at least the work in confined spaces, the cutting/handling of asbestos- | Reduced health and safety risk for contractors | Local labour code<br>OHSAS18001<br>---<br>EBRD PR 2 | Health and safety plan | All work sites | Contractor | No marginal cost | Not started |

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| | cement pipes, the fencing and signalisation of the work area (trenches) and all the Personnel Protection Equipment (PPE) to be worn by workers. The HSP will have to be approved by the Employer/Engineer before the commencement of works.<br>2. The Contractor shall report details of any accident to the Employer and the Police, if appropriate, as soon as possible after its occurrence<br>> See mitigation plan of environmental analysis | | | | | | | |
| 2.11 | Health and safety of contractors | | | | | | | |
| 2.9.1 | 1. Submit to the Employer or its Engineer (Supervisor) an Health and Safety Plan (HSP) which sets out the Health and Safety Policy of the Contractors, as well as the detailed methods to prevent accident for all the relevant worker's situations relating to the type of works and for the public. For example, as regards the pipe rehabilitation/replacement, the HSP will have to cover at least the work in confined spaces, the cutting/handling of asbestos-cement pipes, the fencing and signalisation of the work area (trenches) and all the Personnel Protection Equipment (PPE) to be worn by workers. The HSP will have to be approved by the | Reduced health and safety risk for contractors | Local labour code OHSAS18001 ---------- EBRD PR 2 | Health and safety plan | All work sites | Contractor | No marginal cost | Not started |

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| | Employer/Engineer before the commencement of works.<br>2. The Contractor shall report details of any accident to the Employer and the Police, if appropriate, as soon as possible after its occurrence<br>> See mitigation plan of environmental analysis | | | | | | | |
| **3. ENVIRONMENTAL MANAGEMENT ACTIONS (APPLICABLE TO CURRENT, PROJECT AND FUTURE ACTIVITIES - see EHS management section)** | | | | | | | | |
| 3.1 | Continue operating a certified quality, environmental and health and safety management system<br>> See: §4.1.2 of ESAP report | Strong level of confidence in the management of customer care, environmental aspects and health and safety risks | ISO9001<br>ISO14001<br>OHSAS18001<br>---<br>EBRD PR 1 | Valid ISO9001, ISO14001 and OHSAS18001 certificates. Certification audit reports available on request to the Bank | On-going | Quality director | Already secured | The renewal audit for the 3 standards was successfully passed in 2011 with an accredited Romanian certification body |
| 3.2 | Define a roadmap of environmental performance improvements linked to the PIP implementation<br>> See: §4.3.3.2 of ESAP report | Long term visibility over performance | ISO14001<br>---<br>EBRD PR 1 | Availability of a roadmap validated by senior management | 2012 | SACRE & PIU | 2 days | Not started |
| 3.3 | Ensure the environmental management specialist spends more time on the field<br>1. Visit periodically all facilitiles of ACC<br>2. Visit work fields<br>3. Accompany the air measurement | Enhanced knowledge of actual environmental issues and ability to spread environmental | ISO14001<br>---<br>EBRD PR 1 | Minimum time spent on the field (out of office) of 30% (1.5 days a week), as demonstrated | 2012 onwards | Environmental specialist, with support of SACRE manager | 60 days + Transport mean | Not started |

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| | contractor<br>> see: §4.5.1.2 of EHS report) | awareness among staff and contractors | | by the agenda of the environmental specialist | | | | |
| 3.4 | Enhance the quality of environmental induction training<br>> See: §4.4.2.2 of EHS report | Provide expert advice on how to deal with environmental issues, make people aware of why it is important to comply with environmental rules and ensure that the environmental specialist is known by staff | ISO14001<br>---<br>EBRD PR 1 | Induction training records signed by the environmental specialist | From 2012 onwards | Environmental specialist | 5 days per year | Not started |
| 3.5 | Set-up visual management on EHS performance<br>> See: §4.4.3.2 of EHS report | Increase the involvement of staff in EHS performance | ISO14001<br>OHSAS18001<br>---<br>EBRD PR 1,10 | Pictures of communication boards at relevant locations | 2012 onwards | SACRE Safety Quality | 20 days + Wood panels | Not started |
| 3.6 | Improve the critical analysis of emergency tests<br>> See: §4.4.7.2 of EHS report | Continuous improvement of emergency procedures | ISO14001<br>OHSAS18001<br>---<br>EBRD PR 1 | Detailed emergency test protocole, complying with report requirements and identifying improvement opportunities | 2012 onwards | Safety manager | Digital camera (pictures + movies) | Not started |

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| 3.7 | Define and post brief emergency instructions in relevant places, for the following scenarios:<br>1. Chlorine leak in pumping station<br>2. Fire<br>3. Spillage of chemicals<br>> See: §4.4.7.2 of EHS report and examples in annex 2 | Increased awareness on how to react in case of emergency; local availability of simple instructions in relevant places | OHSAS18001<br>---<br>EBRD PR 2 | Pictures of the 3 types of emergency reaction sheets posted in relevant places | 2012 | Safety manager | Plastic folders for emergency sheets | Not started |
| 3.8 | Monitor waste performance<br>> Measure waste segregation or valorisation<br>> See: §4.5.1.2 of EHS report | Increased percentage of recycled waste | ISO14001<br>---<br>EBRD PR 3 | Waste recycling indicator | 2013 | Environmental specialist | 3 days | Not started |
| 3.9 | Systematically consider accidents as managerial faults<br>> See:§4.5.1.2 of EHS report | Lower number of accidents | OHSAS18001<br>---<br>EBRD PR 2 | Internal note from ACC director setting up responsibilities for accidents | 2012 | ACC director<br>Safety manager<br>HR manager | 2 days | Not started |
| 3.10 | Increase resources for OHS controls to comply with regulatory requirements and implement a similar control system for environment<br>> See:§4.5.1.2 of EHS report | Non-compliance with regulatory and internal requirements | ISO14001<br>OHSAS18001<br>---<br>EBRD PR 2,3 | Records of safety and environmental controls, as compared to objectives | 2013 | Safety manager<br>SACRE | Transport means<br>Time for safety and environmental teams | Not started |
| 3.11 | Define a structured method for the analysis of incidents / accidents /non-conformities<br>> See:§4.5.3.2 of EHS report | Corrective actions will be more appropriate and more likely to prevent re-occurrence of issues | ISO14001<br>OHSAS18001<br>---<br>EBRD PR 1 | Procedure for problem analysis applied to an accident | 2013 | Safety manager<br>SACRE | 3 days | Not started |
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| **** Keys :*** | | | | | | | | |

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| | *SACRE: Environmental protection department of APA Canal Chisinau* | | | | | | | |
| | *PIU: Project Implementation Unit* | | | | | | | |

# Annex 2: examples of Emergency Instruction Sheets

# Emergency Instruction 1 : Chlorine leak

| | Who does | What ? |
|---|---|---|
|  | | **Alarm of the chlorine sensor (if available) or chlorine smell** |
| <Add pictures of employees of the chlorination unit> | **Any employee** | **Alert an operator of the chlorination unit** |
| <Add picture of employee checking the sensor and leak> | **Operator of the chlorination unit** | **Confirm the problem through the chlorination control room** |
| <Add picture of technical director> | **Operator of the chlorination unit** | **Alert the technical director** (or the secretary if not available) |
| <Add picture of crane operation><br><br><Add picture of lime> | **Operator of the chlorination unit** | **Put the chlorine container in the containment well**<br><br>**Fill the well with water and add xx kg of lime to the water in the well** (to be defined with the chlorine supplier) |
|  | **Technical director** | **Define how to deal with the leaking container** |

Version 0.1 of 31 May 2012

# Emergency Instruction 2 : Fire

| | Who does | What ? |
|---|---|---|
|  | | **Fire** |
| <Add pictures of members of the fire response team> | **Any employee** | **Alert a member of the fire response team** |
|  | **Fire response team member** | **Evaluate the problem** |
|  | **Fire response team member** | **Use appropriate fire extinguishers** |
| <Add picture of technical director> | **Fire response team member** | **Ensure the safety director is alerted** (or his deputy if not available) |
|  | **ACC safety manager, or deputy** | **Contact the City fire brigade if necessary tel : xx xx xx**<br>**Give address, telephone, describe the situation, potential injured people. Do not hang up the phone before the fire brigade contact** |

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# Annex 3: Example of an alternative QHSE policy

The purpose of ACC is to provide drinking water and collect and treat waste water. SInce our responsibility is economical, but also social and environmental, I have defined our **TOP10** medium-term objectives for the period 2012-2015:

**General objectives**

- **G1**: maintain the certification of our integrated Quality, Environmental and Health & Safety (QHSE) management system
- **G2**: make QHSE part of our culture, at all levels

**Quality objectives**

- **Q1** : improve the service level for drinking water from xx% to yy%

**Environmental objectives**

- **E1**: improve the ratio of amount of water used to amount of water delivered from xx % to yy %
- **E2**: develop an odour management system with relevant neighborhoods and set up objectives
- **E3**: implement best practices for the management of chemicals
- **E4**: improve the quality of our waste water treatment to comply with European standards

**Health and Safety objectives**

- **S1** : improve the reporting of incidents and near-misses
- **S2** : reduce the incident rate from xx to yy
- **S3**: strengthen OHS controls on sites, with a minimum of 1 per month per activity unit

It is my responsibility to make our stakeholders aware of this QHSE policy. All are endeavours will be driven by the following **3C** principles :

- **C**omply with requirements from regulations or other identified and accepted sources
- **C**ontinuously improve our quality, environmental and health and safety performance
- **C**are for the satisfaction of our clients, the well-being of our employees and the environment through preventing risks and all kinds of pollution

(Mrs/Mr. name) is in charge of delivering on this policy through dedicated QHSE management programmes. I expect all of you to contribute positively and actively to this project, which is part our general development strategy.

(signature)

(name, function)

(date)