

1. SCOPE

This Guideline describes the Cement Plant water network, assigns roles and responsibilities for a reliable monitoring, data collection and reporting system of the plant water balance and provides recommendations for the efficient management of the complete water cycle.

2. IMPLEMENTATION AND RESPONSIBILITIES

This Procedure is applied to all activities of the Cement Plant associated with water and waste water management and the person responsible for its implementation is the Environmental Manager. This Procedure is part of the existing Environmental Management System in accordance with the provisions of the Standard currently applied, ISO 14001:2005. The persons responsible for its implementation are:

- i. at the Plant level, the
 - Environmental Manager
 - Environmental Engineer
 - Plant Manager
 - Production Manager
 - Maintenance Manager
- ii. at the Group Engineering and Technology/Production Technology (GET/PT), the
 - GET/PT Head of Environmental Department
 - GET/PT Director

3. DESCRIPTION

3.1. Cement Plant Water Network and Water Uses Description

The water intake points in Antea plant are the 4 drills, drill number 2, drill number 3, drill number 4, and drill number 5.1. Each drill has a pump and a mechanical flow meter. All the water pipes collect to the water filtering system before it is stored in three tanks.

Environmental purposes and potable water tank:

The Environmental purposes and potable water tank is constructed with concrete and has a capacity of 300 m³. This tank has two pumps (one as back up pump). The flow meter is installed on the tube that connects tank with potable and environmental purposes distribution network. The water pumped from the tank goes for irrigation and for hygiene purposes to the plant premises.

Process and fire fighting water tank:

The Process and fire fighting water tank is constructed with concrete and has a capacity of 300 m³. The tank has a water pump and there is a mechanical flow meter at the pump exit. The water pumped from this tank goes to 4 other smaller tanks used for process. The four tanks location and capacity are described as follows:

- a) Cement Mill metallic tank, with a capacity of 4 m³.
- b) Pre-heater tank a metallic one, with a capacity of 10 m³.
- c) Pre-heater down comer metallic tank, with a capacity of 10 m³.
- d) Raw Mills metallic tank, with a capacity of 6 m³.

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Circulating water tank:

The circulating water tank used for mechanical cooling. It is a concrete tank with a capacity of 500 m³. There are three pumps that pump water from this tank. One is used to pump the water and the other two are stand by in case that there are damages to the first pump. There are installed two flow meters for quantity check, one is installed after the water pumped from the pump and the second one is installed before the water returns back to the tank (after circulation).

3.1.1. Water Withdrawal by source

Anteas possible water sources include:

- Ground Water (e.g. wells, drills, etc)
- Bottled water used as drinking water

The groundwater is pumped from the wells according to needs and is filtered before storing to the respective tank. The water used for mechanical cooling is demineralised, and analyzed every day. Head of DPS (Designs, Projects & Schedule), Utility (Compressed Air & Water), Dedusting (Bag Filters) in cooperation with Chemical Lab is organising analyses for ensuring quality of the water as required for parameters as: conductivity, turbidity, hardness, pH, free Cl⁻, electrical potential.

3.1.2. Water Consumption by destination

The water consumption within the plant is:


- Water used for mechanical cooling
- Water used for Process and fire fighting.
- Water used for Environmental purposes and potable water.
- The water used for dust suppression.
- Losses for the backwash of filters.
- Losses from the water evaporated from the water cooling system.
- Losses from overflow water from overloaded tanks.

3.1.3. Water Recycling-Reuse

- The mechanical cooling wastewater is recycled within the same process.
- Wastewater from the back washes of filters and the losses from tanks overloaded is channelled to decantation unit no 2 and is stored and reused for environmental purposes, such as dust suppression and irrigation.
- The recycled water for mechanical cooling is measured by two Mechanical flow meters placed one in the sending water to the system and the other to the returning point before the water entrance in the Circulation tank.

3.1.4. Water Discharging

Water from waste water treatment facility is channelled by a special pipe and discharged in vicinity of Droja River north of Plant. The quantity of discharged water from waste Water treatment Facility is measured with a mechanical flow meter installed at the exit of the Waste Water Treatment Facility, before discharge.

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3.1.5. Records

The Environmental Manager is responsible for keeping proper records associated with the description of the Plant Water Network and Water Uses within the Cement Plant boundaries updated every year upon request from the GET/PT Director and referred to F-1.EP.1040: Plant WFD Template.

3.2. Water Quality Management


3.2.1. Data Collection and Monitoring

This procedure is applied to all activities of the Cement Plant associated with Water Quality data collection and monitoring and the Environmental Manager is responsible for its implementation and coordination. Water sampling for the data collection and monitoring should take place while the site is operating.

In Antea Cement plant water sample from the Intake are collected every three months, and the water samples from the discharge are collected every month. Cement Plant Water Intakes and Discharges are described in paragraphs 3.1.1., and 3.1.4., and refer to the updated WFD Template F-1.EP.1040. The mandatory parameters for analysis, considered as the absolute 'minimum', are:

3.2.1.1. Wells quality check:

- Total coli forms
- Intestinal enterococci
- Escherichia coli
- Color and odor
- pH
- Electrical conductivity
- K
- TSS
- Turbidity
- Phenol alkalinity
- Hardness total
- Hardness carbonate
- Bicarbonate HCO₃⁻
- Ammonium (NH₄)
- Nitrate ion (NO₃)
- Nitrite ion (NO₂)
- Phosphate
- Total Organic Carbon(TOC)
- Chloride
- Sulphate(SO₄)
- TDS
- Magnesium (Mg)

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3.2.1.2. Decantation units quality check:

- pH
- Oil and grease
- TSS
- Turbidity

3.2.1.3. Waste water treatment facility

- pH
- Oil and grease
- TSS
- Turbidity
- BOD5
- COD
- Phosphate
- Nitrate
- Total coliforms
- Intestinal enterococci
- Escherichia coli

The recommended sampling position for the Cement Plant waste waters is after their passage through the treatment facilities and prior to their outflow.

The samples collection is performed by experts from the Certified Company contracted for the water analysis. The contracted specialist is responsible to deliver the collected samples to the authorized body or lab upon the requested conditions and the time schedule defined by the Environmental Manager. The analyses data are delivered to the Environmental Manager by the authorized body or lab.

The Environmental Manager monitors and performs an assessment of compliance of the water analyses results with the Water Intake and Discharge plant limits defined according to national/local legislation or Environmental Permit. Whenever necessary, corrective and preventive actions are undertaken in accordance with the provisions of paragraph 3.5.

3.2.2. Data Reporting

This procedure is applied to all activities of the Cement Plant associated with Water Quality data reporting and the Environmental Manager is responsible for its implementation. Plant level reporting to Third Parties is implemented by the Environmental Manager in coordination-if necessary-with GET/PT Director. For Group level reporting to Third Parties, the GET/PT Director is the person responsible to implement.

The water analyses assessment of compliance is reported in the Water Quality Analyses Templates referred as F-1.I-1.EP.1040_Groundwater chemical and microbiological sampling and F-1.I-2.EP.1040_Waste water chemical and microbiological sampling, in chapter 4 below, and submitted by the Environmental Manager to the Plant Director, complete with copies of the original results documents delivered by the authorized body or lab which performed the measurements. Upon Plant Manager Approval, the Environmental

Manager delivers an electronic copy of the Quality Analyses Templates F-1.I-1.EP.1040 and F-1.I-2.EP.1040 to the GET/PT Director at the end of every year half (twice per year) and reports all the data monitored during the last six months.

In case where additional data about the Cement Plant's water quality are required to be included in reports to third/interested parties, references, reviews, news or press release etc., the GET/PT Director determines the type and the form of template of the required data.

The Environmental Manager proceeds to the collection of the requested data, based on the requirements that derive for each report. Those requirements are received by the respective Managers or persons in charge in hard-copy or by email (required information, required format of information, etc).

3.2.3. Records

The Environmental Manager is responsible for keeping proper records which are associated with the Water Quality Management of the Cement Plant Water Intakes and Discharges, as well as the completed Forms F-1.I-1.EP.1040 and F-1.I-2.EP.1040 and the relevant supporting data/documentation from various senders. The records are updated every six months and reported to GET/PT Director.

3.3. Water Use Management

3.3.1. Data Collection and Monitoring

This procedure is applied to all activities of the Cement Plant associated with Water Use data collection and monitoring and the persons responsible for its implementation are the Mechanical Maintenance Manager and the Environmental Manager.

At the Cement Plant water intakes, referred to paragraph 3.1.1.as water withdrawal by source:


- the flow meters positions and the data collection frequency are described as following:
There are mechanical flow meters in every respective drill/well. The data are collected every month under the responsibility of the Mechanical Maintenance manager and reported to the Environmental Manager.
- the positions of Piezometric Level measurements inside the wells or drillings and the data collection frequency are described as following:
Every beginning of the month the Mechanical maintenance department measures the level of each water drill, and reports to the Environmental Manager.

At the Cement Plant for any water consumption, referred to paragraph 3.1.2.as water consumption by destination:

- The flow meters positions and the data collection frequency are described as following:
There are mechanical flow meters in every water tank and the data collection frequency is every month under the responsibility of the Mechanical Maintenance Manager.

At the Cement Plant water discharges, referred to paragraph 3.1.4.as water discharging:

- The flow meters positions and the data collection frequency are described as following:
There is a mechanical flow meter that measures the water discharged after the Waste Water Treatment Facility (sewage) and the data collection frequency is every month under the responsibility of the Mechanical Maintenance Manager.

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At the Cement Plant for any water recycling-reuse, referred to paragraph 3.1.3.as water recycling-reuse:

- The estimation/calculation methods applied for water use data collection and monitoring are described as following:

Estimation is used for the water used for environmental Purposes, based on the number and capacity of the vehicles used for this purpose. The water used in this case is taken from the decantation units.

The water data from flow meters, calculations/estimations or standardized uses should be collected and recorded in the Water Drills Consumption Form F-2.I-1.EP.1040 at least 1 time per month. The responsible person for its implementation is the Mechanical Maintenance Manager who should also include a short Measurement Type comment of the applied method, in the before mentioned Form F-2.I-1.EP.1040 Template.

The Form F-2.I-1.EP.1040, with all the data described above, is submitted to the Environmental Manager at the end of every month. The Environmental Manager monitors the water consumption for any use at the site operating boundaries and evaluates the compliance with:

- Environmental Permit or Local Legislation limits,
- The corresponding water consumptions from the preceding year
- Any water consumption targets if applicable

Piezometric Level measurements data are also collected and recorded in the “Ground water level and quantity measurement” Form F-3.I-1.EP.1040 every month. The responsible person for its implementation is the Mechanical Maintenance Manager.

The Form F-3.I-1.EP.1040, with all the Piezometric Level data described above, is submitted to the Environmental Manager at the end of each month. The Environmental manager monitors the wells/drillings water level and evaluates the compliance with:

- Environmental Permit or Local Legislation limits,
- Any local hydro geological study.

In case of water leakages, high consumption, low wells/drillings water level or water network damages findings, the Environmental Manager informs the Mechanical Maintenance Manager. Whenever necessary, corrective and preventive actions are undertaken in accordance with the provisions of paragraph 3.5.

3.3.2. Data Reporting

This procedure is applied to all activities of the Cement Plant associated with Water Use data reporting and the Environmental Manager is responsible for its implementation. Plant level reporting to Third Parties is implemented by the Environmental Manager in coordination-if necessary-with GET/PT Director. For Group level reporting to Third Parties, the GET/PT Director is the person responsible to implement.

The Environmental Manager arranges for the prompt collection of monthly water uses data reported in the Form F-2.I-1.EP.1040 and the data entry in the respective software file (worksheet ‘Water drills Consumption F-2.I-1.EP.1040). The monthly form is sent electronically to the GET/PT Director at the end of each month who keeps these records with water consumption from the beginning of the year.

This electronic file calculates automatically the water consumption for any use in the worksheet 'Water Use Calculation'. At the end of the year, the Environmental Manager draws up the yearly water consumption from the before mentioned calculation worksheet. The yearly data are also used for the yearly EPIs reporting and the WFD Template update.

The yearly water consumption report (worksheet 'Water Use Calculations') is officially endorsed by the Plant Manager and is sent electronically by the Environmental Manager to the GET/PT Director.

The Environmental Manager also arranges for the prompt collection of the Piezometric Level measurements data reported in the Form F-3.I-1.EP.1040, which is sent electronically to the GET/PT Director at the end of the year.

In case where additional data about the Cement Plant's water use are required to be included in reports to third / interested parties, references, reviews, news or press release etc., the GET/PT Director determines the type and the form of template of the required data.

The Environmental Manager proceeds to the collection of the requested data, based on the requirements that derive for each report. Those requirements are received by the respective Managers or persons in charge in hard-copy or by email (required information, required format of information, etc).

3.3.3. Records

The Environmental Manager is responsible for keeping proper records which are associated with the Water Use Management of the Plant and include

- the monthly Water Drills Consumption Form F-2.I-1.EP.1040
- the yearly Water Use Calculation worksheet and
- the Ground water Level and Quantity Measurement Form F-3.I-1.EP.1040
- any relevant supporting data / documentation from various senders.

The records are updated every month (Form F-2.I-1.EP.1040) and at the end of the year the total water consumption is calculated in the Form F-2.I-1.EP.1040. At the end of every month and year respectively, these records are delivered electronically to the GET/PT Director.

3.4. Water Network Management

3.4.1. Water Network Operation and Monitoring


This procedure is applied to all activities of the Plant associated with Water Network Operation and Monitoring. The Mechanical Maintenance Manager is responsible for its implementation.

At every shift, the shift Mechanical Maintenance technician should perform the following actions concerning the status of the plant's Water Network:

1) Visual inspection of the water pump/treatment plant area(s) for detection of any abnormal situation/operation (e.g. excessive vibrations, high bearing/pump/motor temperatures, too high/low pressures, low water flow, contamination etc.) and subsequent resolution of the issue(s) if possible.

2) Visual inspection of the water distribution pipe network for detection of:

- Corroded/damaged pipe sections

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- Corroded/damaged pipe support structures
- Leaking point (e.g. through flanged connections)
- Improper operation of components (e.g. ball valves which are closed/open instead of the opposite, clogged filters etc.)

3) Visual inspection of water flow and water level(s) at intermediate or final discharge locations (e.g. at storage and/or cooling tanks, at settlement tanks, at discharge ponds/basins/lakes etc.)

At the end of each shift, the Mechanical Maintenance shift technician should record the result of the inspections and the corresponding actions/resolutions in the Maintenance Reporting Book.

In case of an emergency (e.g. serious equipment malfunction, environmental issue etc.), the shift technician should immediately inform the Mechanical Maintenance Manager, the Production shift supervisor and if necessary the Electrical Maintenance manager for further actions.

The Mechanical Maintenance Manager should create and submit a Monthly Water Network Incident Report to the Environmental Manager regarding the major maintenance incidents and the corresponding remedies/actions (Non Conformity Report, Corrective and Preventive Actions. F-1.P.920)

All mechanical & electrical maintenance of water network system will be performed in accordance with all equipment manufacturer instructions, as well as all pertinent state laws, rules and regulations.

3.4.2. Records

The Mechanical Maintenance Manager is responsible for enforcing the proper record keeping of the Maintenance Reporting Book which includes the recorded incidents which are associated with the Water Network Operation and Monitoring, for creating the Monthly Water Network Incident Report, and for sharing this information within the plant and regularly reporting them to the plant's Environmental Manager.

3.5. Corrective and Preventive Actions

The Environmental Manager is responsible for reviewing the groundwater measurements and after consulting with the Plant Manager, he determines appropriate mitigating actions in case related risks are identified in the context of sustainable usage and management of groundwater. The corrective and preventive actions are recorded using F-1.P.920 "Non Conformity Report, Corrective and Preventive Actions" and the Environmental Manager is responsible for their implementation and monitoring.

3.6. Records

The Environmental Manager is responsible for keeping proper records of the updated Water Management guideline, the References documentation as presented in chapter 6 and the Referred Forms Templates described in chapter 5. In case of update or modifications in the guideline, the updated documents should be approved and recorded by the Plant Manager and the GET/PT Director. Approved updated Water Management guideline is delivered to everyone described in the following recipients table.

4. RELEVANT INSTRUCTIONS, FORMS AND SOFTWARE

- F-1.EP.1040 Plant Water Flow Diagram (WFD) Template
- F-1.I-1.EP.1040 Water Quality Analyses Template (Intake)
- F-1.I-2.EP 1040 Water Quality Analyses Template (Discharge)
- F-2.I-1.EP 1040 Water Drills Consumptions
- F-3.I-1.EP 1040 Groundwater level and quantity measurement

5. RECORDS

Code	Filled by	Kept by	Retention Time	Copied to
F-1.EP.1040	EM (E)	EM (H)	3 years	PM (E) MM (E) PrM(E) GET/PT
F-1.I-1.EP.1040	EM (H)	1. EM (H) 2. Archive	3 years	PM (E) MM (E) PrM(E) GET/PT
F-1.I-2.EP 1040	EM (E)	EM (H)	3 years	PM (E) MM (E) PrM(E) GET/PT
F-2.I-1.EP 1040	EM (E)	EM (H)	3 years	PM (E) MM (E) PrM(E) GET/PT
F-3.I-1.EP 1040	EM (E)	EM (H)	3 years	PM (E) MM (E) PrM(E) GET/PT

6. REFERENCES

- P.920 "Non Conformity, Corrective and Preventive Actions"
- P.930 "Internal Audit"
- P.140 "Communication"
- P.940 "Management Review"

7. DOCUMENT HISTORY

Version Nr.	Date	Changes made
1	18.12.2012	