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ACTIONS FOR THE ENVIRONMENT

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Abstract

As an International Organization, one the most important issues that CERN has to respect and guarantee is the protection of the environment.
Several of ST activities and operations have a direct impact on the environment: civil engineering works, electrical (transformers) and air-cooling operation, chemical products storage, various waste disposal etc....
Important measures, taken in the past, have to be kept and new ones should be applied in order to insure the conformity of the infrastructure with existing legislation, the correct operation of equipment and systems, the constant monitoring of the different situations and the traceability of the events.
Moreover good management of the environment would bring large savings to CERN.

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1 INTRODUCTION

The Safety Policy at CERN (SAPOCO 42) document defines the CERN's policy concerning occupational health, work safety and environmental protection.

The document states that every supervisor is responsible for all matters of safety, occupational health, and protection of the environment related with his activities or his projects.

Attaching great importance to the safety and environment aspects, one of the main aims of the Organization is then to prevent or at least reduce the risk of pollution wherever possible, which means that cleaning up should be ensured if pollution has occurred in order to avoid any repercussion on the ecosystem and population, whilst maintaining a high quality landscape design.

2 ST DIVISION AND THE ENVIRONMENT

The efficiency of the environmental safety depends on CERN's personnel, users and contractors performing their daily work and tasks.

According to the SAPOCO, it is a duty of the Organization and of the divisions to:

- define and allocate responsibilities clearly ;
- provide training and information to the staff ;
- provide the resources needed for a satisfactory application of these regulations ;
- monitor the implementation of these regulations.

In order to satisfy these requirements, in ST division, responsible of several activities having a direct impact on the environment, the Division Leader has appointed a Divisional Environment Officer (DEO) to assist him in the performance of these duties.

3 THE DEO ROLE

Most of ST activities and operations have consequences on the environment: civil engineering works, electrical (transformers) and air-cooling operation, chemical products storage, various waste disposal etc.... Some parameters, related to these activities and representing different aspects of potential pollution and landscape modification, have to be considered and controlled in order to minimize their impact and ensure that the Host States' legislation is strictly followed.

Once the ST obligations in the respect to the environment have been defined and the potential polluting activities have been identified, it is part of the DEO tasks to implement the necessary measures to reduce and prevent environmental accidents as much as possible.

Moreover, in case of events, the DEO has to set up an operational team and coordinate it in the identification of the nature, aetiology and degree of involvement of the pollution, to apply corrective appropriate measures and to establish a recovery program.

Summarising, the main tasks of the DEO are:

- analysing hazardous activities and applying preventive measures ;
- controlling the environment respect for new works and for the operation ;
- launching corrective measures in case of environmental events and checking their application.

In order to perform these tasks, the DEO has created a permanent divisional working group. Every member is responsible of carrying out a specific activity or role (installation and control room operation, documents, monitoring etc.).

4 ANALYSIS OF RISKY ACTIVITIES AND APPLICATION OF PREVENTIVE MEASURES

Different steps, resumed in identification, design, works, and procedures, have to be followed in order to fill the mandate of the working group.

- Identification: once acknowledged the Host States legislation and their admissible limits about emissions, the task consists in the identification of potential pollution sources through the analysis of the available documentation (drawings, technical papers and diagrams etc..), sites visits, inspections and tests in situ.
- This phase allows also to identify eventual discrepancies between the documentation and the reality and to foresee up-dating and modifications on the available information.
- Once the identification phase is over, a prevention program is established; it is up to the working group to fix the priorities of the interventions based on the degree of seriousness and on the possible impacts on the environment.
- Design: a study phase starts after the identification of the most sensitive and potentially dangerous activities and the related equipment involved. Technical solutions to improve the situation reducing the risks of pollution are elaborated and analysed in agreement with the works and operation teams. Their feasibility, the cost of their implementations, and a realisation planning are evaluated in order to optimise the interventions in terms of reliability, rapidity, budget and manpower availability.
- Works: the work phase is normally performed by the works teams in each involved group, constantly in contact with the operation teams.
- Procedures: during and at the end of the work phase, a series of procedures is elaborated (or up-dated if already existing) to ensure the correct operation and maintenance of the new systems or equipment. Some "consignes" are also awarded in case of urgent repairs or interventions are needed following the reception of an alarm in the technical control room.

4.1 Example: Waste and clear water system

The waste water coming from all CERN sites is piped into the public drainage system towards three treatment stations, two in France (St. Genis-Poully and Ferney-Voltaire) and one in Switzerland (Peney).

For the clean water system (collecting the cooling water and rainwater including underground work site drainage water and demineralised water), the two main discharge points are:

- the *Nant d'Avril* stream in Switzerland collecting the rain water coming from the SPS sites, the deconcentration water coming from the SPS and PS cooling towers and the 70% of rain water of Meyrin site ;
- The *Lion* stream in France collecting the rain water coming from BA2 site, the 100% of rain water of Prevessin site, the 30% of rain water of Meyrin site and the 15% of the cooling water.

The rain water collected on the various LHC sites and the drainage water from the underground structures are disposed of locally: in the *Allondon* at Points 2, 3 and 32, in the *Varfeuille* at Point 4, in the *Oudar* at Point 5, in the *Nant de la Rabatière* at Point 6, in the *Nant Marquet* at Point 7 and in the *Nant Gobé* at Point 8.

The legal limits for the concentration of different substances in the water are defined in the French and Swiss legislations[1].

4.1.1 Measurements

For the waste water system, some instruments to monitor the flow rate are installed and maintained by ST/CV group.

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[1] France - *Arrêté du 2 Février 1998 relatif aux prélèvements et à la consommation d'eau ainsi qu'aux émissions de toute nature des installations classées pour la protection de l'environnement soumises à autorisation*

Suisse – *Ordonnance du 28 Octobre 1998 sur la protection des eaux (Oeaux 814.201)*

For the rain and drainage water, more sensitive, the monitoring is performed in two different ways:

- at the water release points of CERN sewage system just before the water joins the closest receptor stream: in these points pH and temperature (and somewhere also the flow rate) are constantly monitored by ST/CV and ST/MA groups;
- in the various rivers receiving water from CERN, the monitoring, upstream and downstream the discharge points, is done regularly by TIS division, with special consideration for pH, temperature, hydrocarbons rate and dissolved oxygen.

The results of the measurements of the related parameters are regularly communicated to the French and Swiss authorities.

4.1.2 Working group actions

In order to increase the reliability of the global system 'instrumentations and transmission' and to guarantee the correctness of the measurements, the working group is replacing old equipments and instruments, recalibrating them and checking the transmission chain to the Technical Control Room (TCR) (Fig.1).

A special campagne has also been initialized to increase the number of control points on the CERN sites in order to facilitate the identification of the pollution source in case of environmental events.

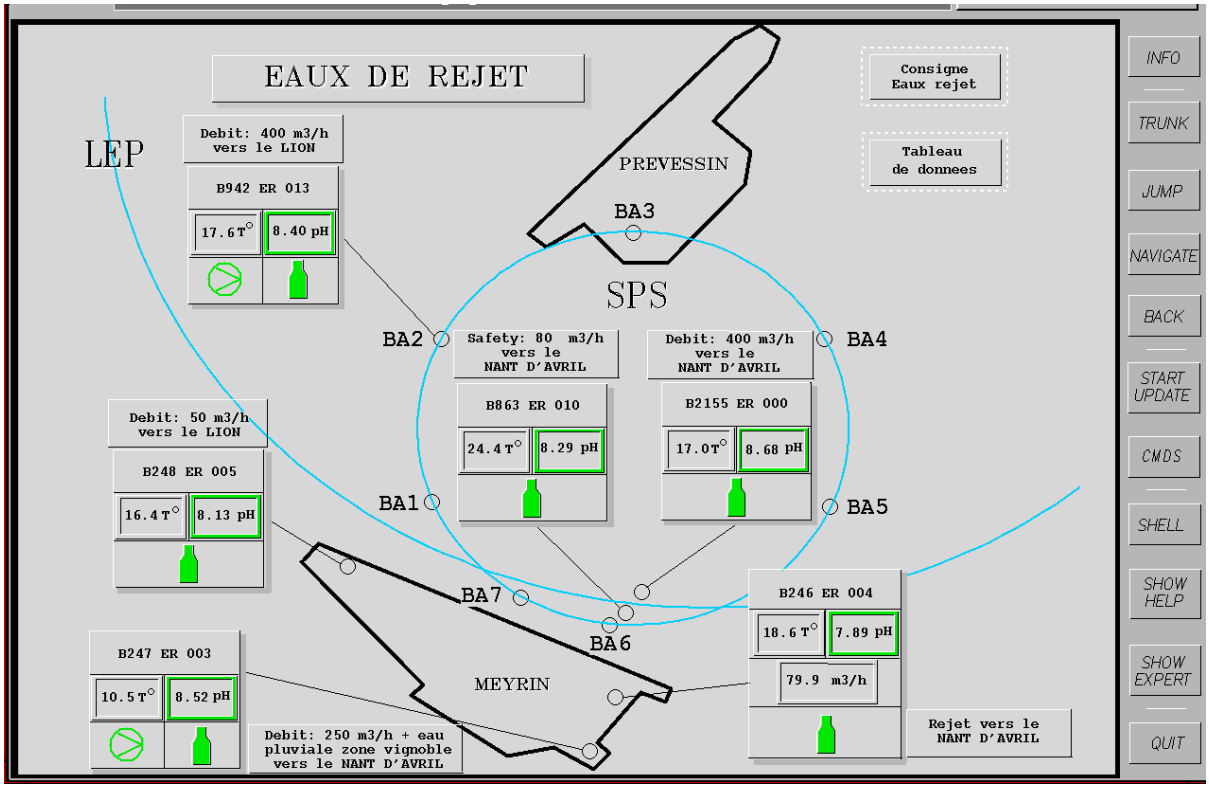

Fig. 1: Monitoring synoptic in TCR

5 CONTROL OF THE ENVIRONMENT RESPECT FOR NEW WORKS AND FOR THE OPERATION

Different steps, resumed in feedback, identification, intervention program, corrective measures application, regular check are followed by the working group.

- Feedback: regular visits on the sites are carried out by ST division. Through inspections and tests in situ, dangerous situations may be reported to the working group to be analysed ;

- Identification: the task consists in the identification of the dangerous situations/problems as potential pollution sources. A risk evaluation of an impact on the environment is carried out.
- Intervention program: in case the identification phase has detected a hazardous activity or equipment operation, a preventive program is established; it is up to the working group to fix the priority of the intervention based on the situation degree of seriousness. Technical solutions or special campaigns to reduce the risks of pollution are elaborated and analysed in agreement between the works and operation teams. Their feasibility, the cost and a realisation planning are evaluated in order to optimise the interventions in terms budget and manpower availability.
- Corrective measures application: the task consists in the intervention on site; it is normally performed by the works teams in each group involved, constantly in contact with the operation ad maintenance teams.
- Procedures: once the corrective measures have been applied, a series of procedures is elaborated in order to improve the operation and maintenance of the concerned systems or equipment.

5.1 Example: Separator tanks

Electrical transformers containing oil represent a not negligible potential source of pollution. They are normally installed on transformers pits where an eventual leakage of oil can be collected before reaching the drainage network connected at the bottom. The pits convey also rainwater to the same outlet.

In order to prevent any pollution by hydrocarbons, the water-oil mixture passes into appropriate separator tanks dimensioned for retaining the volume of oil of the biggest transformer installed and a safety volume. Once separated from the water by gravity, the oil is pumped and disposed of following an appropriate treatment; the rainwater transits automatically into the outlet piping system.

5.1.1 Working group actions

The separators are regularly checked and cleaned but in order to increase the safety of their operation, a special campaign has just been launched in ST division.

All big separators on the sites, especially on the LHC and SPS points, will be inspected in order to check their dimensions, to verify the completeness of the available documentation, to detect eventual technical problems and to correct them.

The main aim is the prevention of accidents and the optimization of budget and planning for their regular maintenance.

6 LAUNCH OF CORRECTIVE MEASURES IN CASE OF ENVIRONMENTAL EVENTS AND CHECK OF THEIR APPLICATION

In case of an environmental event, different tasks, resumed in identification, temporary corrective measures application, intervention plan, definitive corrective measures application and regular check, are carried out by the working group.

- Identification: the task consists in the identification of pollution sources through sites visits, inspections and a rapid consultation of the available documentation.
- Temporary corrective measures application: once the source of pollution is identified, temporary corrective measures are immediately applied in order to dodge any impact on the environment.
- Intervention program: a special intervention program is then established to avoid the phenomena occurring. Technical solutions are elaborated in order to intervene on the source and to stop the pollution. A short term realisation planning is evaluated to accelerate the intervention.
- Corrective measures application: the technical solutions elaborated in the intervention program are then applied on the installation or equipment source of the pollution. The works are carried out by the works and operation teams.

- Regular checks are performed on the installation in order to verify the normal situation is fully permanently re-established.

7 CONCLUSIONS

In order to satisfy the SAPOCO requirements in terms of respect of the environment, ST division constantly checks and monitors several parameters; it studies alternatives solutions to reduce risks and contain costs; it is engaged in the updating of the documentation.

Methodical inspections and good prevention procedures are the only effective and efficient solution to provide the Organization with the necessary conditions to improve water, air and ground quality in its own and in the community interest.

The cost to prevent damage is always less than the cost to apply correctives measures. Starting form slight non-compliances of parameters up to events, the recovery actions are particularly onerous in terms of money and personnel resources which must be promptly available at the occurrence and for the whole duration of the reaction.