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INTEGRATED SAFETY AND ENVIRONMENT GROUP

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ABSTRACT

This report summarizes the main activities of the Integrated Safety and Environment (IE) Group of the Safety Commission (TIS) during the year 2003, and the results obtained. The different topics in which the group is active are covered: environment, quality management, safety training and major accidents follow-up.

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SUMMARY OF THE MAIN GROUP ACTIVITIES IN 2003

The activities of the Integrated Safety and Environment Group (TIS-IE) in 2003 were mainly directed towards environmental protection, software support, safety training and quality management. A description of the mandate of the Group is given in paragraph 1.2.

In the field of environmental protection the Group carried out all the measurements foreseen by the CERN environmental monitoring programme, assessed the obtained results, and prepared the periodic reports for the authorities of the Host States.

The Group also contributed to the operation of the CERN Environmental Protection Committee (CEPC), and to the Tripartite Committee on Environment, where CERN discusses environmental matters with representatives of the local Swiss and French authorities.

Important achievements in 2003 were the completion of the inventory of polluted sites located on the CERN site, which was required by the Swiss authorities, and the starting of the implementation of the CERN Environmental Management System (EMS). Decision on the long-term implementation of the EMS will be taken in 2004 after validation from the new CERN Direction.

Internally to the Safety Commission the Group ensured the software support to all other Groups. It organized and managed the TIS Informatics Forum (TIF), where the divisional strategy on informatics is decided. In particular during the past year the work of revising all the TIS databases in collaboration with EST Division was started. Completion of this work is expected by the end of 2004.

The Group contributed, in close collaboration with the Radiation Protection Group (TIS-RP), to the completion of the call for tender of the future radiation monitoring system for the LHC. This included finalization of the technical specification, preparation of the tender, and follow-up. TIS-IE was responsible for the environmental part as well as for the software and control aspects.

The Group ensured organization of all official Safety training courses for the whole of CERN, organized safety campaigns and ensured follow-up of major accidents, verifying the correct implementation of all actions decided by accident boards.

In the last four months of the year the Group started developing the guidelines for the ambitious project of implementing a divisional quality management system.

1 INTRODUCTION

1.1 Organizational matters

Last year the Group underwent major organizational changes, dictated by a complete restructuring of the Division. The former Mechanical Engineering and Inspection Sections were transferred to TIS-GS, while the former Material testing and High-Dose dosimetry Section was dissolved, with partial redistribution within the Division of some of its tasks.

The new structure was introduced with the aim of concentrating the activities of the Group on environmental matters, and of creating a structure capable to assess and intervene, with a “transversal” approach across the Groups, on the procedures and operational tools of the Division. The definition of a divisional quality management system aimed to integrate as much as possible homogenous activities, goes in that direction.

Two colleagues joined the Group, one to look after quality management and integration, and the other bringing in the Group responsibilities on Safety training, Safety information and follow-up of accidents.

Annex I shows the organizational chart of the Group on 31.12.2003.

1.2 Mandate of the Group

The responsibilities of the IE Group can be grouped into two functional areas: support supplied to TIS Groups, and CERN-wide responsibilities. The mandate of Group in these two areas can be resumed as follows.

Support to the other Groups in the TIS Division

- Provide software support for:
development and maintenance of databases (medical, radiation protection, mechanical, fire-brigade etc) as well as for the TIS Web pages;
communications software and office automation.
- establishment of a quality management system.
- integration of procedure and standards

CERN-wide responsibilities

The mandate of the Group consists in the fulfillment of the TIS obligations, according to the CERN safety rules, in the following fields:

- *Environment:*

- environmental monitoring at CERN. Monitoring of the ionising radiation and radioactivity on the CERN sites and in the regions surrounding CERN.
 - quantification of the environmental impact of CERN on its premises as well as on the regions surrounding the Organization. This assessment is made by measuring the radioactivity in samples of air, water, soil and vegetation samples taken at various locations.
 - monitoring of NOx and Ozone.
 - monitoring of the quality of the CERN water effluents, by regularly measuring the water pH and temperature.
 - publication of the periodic reports requested by the Swiss and French Authorities.
 - running of the Environmental Management System (EMS) of the Organization.
 - running of the CERN websites on environment.
 - provide assistance to other CERN units and committees involved with environmental matters, including those with responsibilities in the political relationships with the Host States.
- *Safety training and Safety campaign*
- organize the official CERN safety courses.
 - assess the need to modify the list of safety courses or their content.
 - organize safety campaigns.

The IE Group also has the responsibility to keep up-to-date the CERN safety documents on the World Wide Web related to the activities mentioned above.

2 ENVIRONMENTAL PROTECTION

P.Vojtyla

2.1 Environmental monitoring

In 2003 the Environment Section carried out the routine monitoring programme of the impact of CERN's activities on the local environment, according to the schedule defined in the CERN environmental monitoring plan [1].

The results of the radiological monitoring programme confirmed the full compliance of CERN with the environmental regulations in force, and the impact of the accelerator operation on the environment was proven to be negligible. An event related to the SPS machine development is to be retained. In October 2003, during testing the LHC-type proton beam, activated air reached the surface and leaked to the BA1 building and subsequently to the environment. This event revealed that underground area might not have been always ventilated through the transfer tunnel TT10, depending on the weather conditions. An air-tight door was installed underground to prevent any such leakage. The effective dose due to this event to a hypothetical person residing at the fence of the BA1 site was estimated to be smaller than 0.5 μSv and hence negligible when compared with the annual source-related guideline value of 300 μSv .

Fifteen conventional pollution events took place in 2003, seven of which could be clearly attributed to civil engineering. Most of them had none or negligible impact on the environment. Worth to mention is the accident that happened in August 2004 at the LHC site PA6, where about 200 litres of used engine oil leaked on an area close to a pond located on the site. The cause was the accidental punching of a storage tank by a fork-lift operated by a contractor. The pond was slightly polluted and had to be cleaned by specialized companies under the supervision of the TIS Division. Thanks to the quick reaction of the intervening staff, the stream Nant de Rebatière, which receives water from the pond, remained clean.

Neither the nitrogen dioxide nor the ozone immission levels in the ambient air were influenced by any of the CERN activities. Meteorological conditions, traffic, industrial and domestic heating and other emissions were the main causes of the measured variations. Refer to reports [2] and [3] for further details on the radiological and conventional parts of the monitoring programme, respectively.

2.2 Environmental management

The beginning of the year 2003 was devoted to edition of the Environmental Management System (EMS) Manual. This document describes in a short and concise way the basic aspects of the CERN Environmental Management System. A clear structuring and formulating of the document was considered to be of crucial importance for a smooth implementation and success of the CERN EMS. The EMS team proposed to the CERN Environmental Protection

Committee a strategy for the EMS document control and public information on environmental matters, which was approved by the Committee in the autumn of 2003. The strategy foresees integration of two public websites, one website dedicated to the environmental aspects and impacts of the organization (technical part) and one website (managerial part) describing the CERN EMS and systematically collecting links to the public EMS documentation stored in the CERN Engineering Data Management System (EDMS). The two public websites shall be linked to a common "root" home page but yet remain separated. All internal information shall be organized in an additional website with appropriate access security. This website shall serve as an EMS working tool for the CERN staff involved in activities with environmental aspects.

A CERN Environmental Safety Code N was drafted and work started on the revision of the CERN Radiation Safety Code F, which includes the protection of the public and the environment against ionizing radiation, in conformity with the EU and Host States' legislation.

Handing over to TIS Division of the public website "CERN and the Environment", which was previously developed in the AC Unit, was successfully completed. The production software was mastered; the site was updated and put on a CERN central web server (www.cern.ch/environment) and the TIS Division got the full control over it.

In the middle of 2003 the compilation of data for the Swiss cadastral register of polluted sites for areas belonging to the CERN sites was completed with the satisfaction of both CERN and the Swiss competent authorities. The final report was issued in July 2003. Modalities for sampling and PCB analyses of water released from the CERN Meyrin site were agreed with the Swiss competent authority and first samples were taken with the assistance of the Section staff. The PCB concentrations were below the regulatory limits.

2.3 Pollution prevention

The Section staff re-examined the practices related to the treatment of water used in accelerators (e.g. regeneration of ion exchangers) and reviewed the Host States' regulations of concern. As a result, legal limits were defined for the executing CERN units and their procedures were updated.

2.4 Impact studies

During the year 2003, impact studies were carried out for the V0 evaporator [4] and the n-TOF experiment for special targets [5]. Following the completion of the collimator design in the LHC straight section IP7, the radiological environmental impact of air releases had to be reviewed. A refinement of the models developed previously was desirable for the study, which took place at the end of 2003 and continued in 2004.

2.5 RAMSES Project

At the beginning of 2003 the technical specifications for the RAMSES (Radiation Monitoring System for the Environment and Safety) project were completed. A Call for Tender was open in the summer and a Bidders'

Conference took place. The offers were reviewed technically and a winning consortium was selected by the end of the year.

2.6 Laboratory equipment

In spring of 2003, a new automatic beta counter was installed in the environmental laboratory. The device replaced four old and aged manually-operated beta counters. However, two such counters remained installed in the laboratory serving in case of failure of the new instrument. A lot of effort was spent for customizing the data evaluation software with the manufacturer and setting the optimum working conditions.

During the very hot summer of 2003, instrumentation had to be switched off when not needed because the temperature in the laboratory exceeded acceptable levels. A project was started to equip the laboratory with an air-conditioning system. A price enquiry for two new HPGe gamma detectors, which would replace the two oldest HPGe gamma detectors in the laboratory, took place, so preparing their purchase in 2004.

Water analyses by using the spectro-photometer acquired in 2002 were mastered and the relating operational procedures were drafted. The monitoring programme for watercourses receiving water from CERN and for the discharged water was completed with detailed physicochemical analyses carried out on the quarterly basis [6]. The year 2003 was a testing year for these developments so that the enhanced programme could be fully deployed from 2004 on.

3 SOFTWARE SUPPORT

G. Segura Millan

3.1 Databases

Members of the Group led a working group set up by the Division aimed to identify the requirements and priorities in terms of database development and maintenance. The result of the working group was resumed into the document TIS Databases requirements (EDMS: 383892). Based on the result of the working group, TIS and EST Divisions started a collaboration on databases support. In the frame of this collaboration, TIS and EST launched a project having as goal the upgrading of the Database of Safety Inspections (DSI). The DSI system not being able to answer the needs of the Division will be replaced by a new system based on up-to-date technologies standard to CERN (Oracle) and satisfying the requirements of the Division.

In parallel with the mentioned activities, a project was started for the development of a database, and set of associated software applications, for the infirmary of the medical service. The aim of the project was to replace the infirmary register, currently a hand written file, by a computer based tool providing enhanced functionalities (advanced search facilities, interface to HR databases, etc). The system will be integrated with the current information system of the Medical Service. A part of the system was developed and started to be tested by the ME group in December 2003.

The group gave support to the RP Group on the assessment of the technical feasibility of the integration of the ISRAM system (software for radioactive waste management) into the CERN environment.

As a routine activity, the Group provided support and maintenance for all the relational databases used by the Division.

3.2 Radiation Monitoring and Data acquisition.

During 2003 the Group was involved in the technical specification of the RAMSES project (Radiation Monitoring System for the Environment and Safety). Within this project the Group participated in the preparation of the technical specification taking the responsibility of the software infrastructure specification. It also carried out the technical assessment of the offers received by CERN in response to the invitation to tender. In parallel with the work on the RAMSES project, the Group continues in its role of providing maintenance and user support for the ARCON system, i.e. the radiation monitoring system currently in exploitation at CERN. Ensuring the correct functioning of the ARCON system was extremely difficult due to the age of the system, which needs to be replaced soon by an extension of RAMSES.

3.3 Desktop Computing Support

A Desktop Computer Support (Computer Local Support) contract, established via IT Division, was managed with close supervision of the performance of the service. The Group ensured the computer account administration for the entire Division and played the role of Computer Security delegate for the entire Division.

3.4 Other activities

The Group was responsible to run the TIS Informatics Forum (TIF), a divisional Committee in which all the informatics requirements of the Division are discussed, priorities decided and resources allocated.

Since mid 2003 the IE group has the responsibility of the division official website (responsibility transferred from GS group). Among other purposes, the website makes available up-to-date CERN safety documents (Safety Codes, Safety Instructions, Safety Bulletins, etc) to the staffs and enterprises working at CERN.

4 QUALITY MANAGEMENT AND INTEGRATION

M. Castoldi

Following the decision taken in 2002 to implement Quality Management in the Safety Commission a staff was transferred to IE Group for this activity in September 2003.

During the last four months of the year initial discussions within the Commission was promoted in order to define the structure of the Quality Management system to be implemented, and the strategy to improve the inter-group procedures.

A review of the existing Safety Rules and Emergency Procedures was initiated, which first result was the revision of the Safety Code A2. In order to review the procedures for the implementation of the safety rules at CERN, some CERN legal/contractual aspects related to responsibilities of SC, as well as of the representatives of Host States authorities and of third parties possibly involved, were assessed.

The preparation of a protocol for safety audits of the experiments and projects such as LHC and CNGS was started with the aim of monitoring their compliance with CERN safety policy and to assess whether safety requirements are integrated into mainstream works advancement.

5 SAFETY TRAINING, SAFETY CAMPAIGNS AND FOLLOW UP OF MAJOR ACCIDENTS

A. Kerhoas

New Safety training courses were started in 2003 on cryogenics safety, ergonomics and noise. A total of 130 persons were trained. Compared to the previous year the persons trained in newcomers safety courses increased from 2500 to 3300, while the number of trained first aiders increased from 70 to 100.

Safety campaigns organized in 2003 mainly concerned personal protective equipment (helmet, gloves, shoes). Safety Bulletins were issued after serious accidents involving CERN personnel and a leaflet was published to remind CERN staff and users of the main safety issues.

The Group also participated in the Fact Finding concerning an accident involving the use of CERN cranes and ensured the implementation of the requests issued by the Accident Board.

The accident statistics (for CERN staff) are summarized in Table 1, which concerns declared accidents entailing at least one day of absence from work. Frequency rate of road accidents on the journey to or from CERN is decreasing (referred to number of accidents); however severity of road accidents is increasing, the number of lost days being multiplied by 4. Detailed reports on accidents happened upon in 2002 and 2003 are published separately.

Table 1 - Professional accidents affecting CERN staff in 2003. (In brackets 2002 data)

Total declared accidents	Number	Lost days
(i) Accidents in total	38 (24)	1550 (206)
(ii) Road accidents on the journey to or from CERN	9 (10)	493.5 (80.5)
(iii) Road accidents within CERN or between CERN sites	8 (6)	23.5 (49)
<small>i) Accidents entailing at least one day's absence from work ii) and iii) are included in i)</small>		

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ANNEX 1

31.12.2003.

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