

OPERATIONS AT CERN UNDER INB REGULATIONS

André Faugier

CERN, Geneva, Switzerland

Abstract

The CERN high energy accelerators are classified as INB ('Basic Nuclear Installations') under the French legislation. The rules and regulations governing such installations will first be exposed in general terms. The consequences and constraints for accelerator operations will then be reviewed, particularly the needs for documentation in and around the control room (logbooks...), the requirements for written procedures, the operation of the access system and the possible conflicts of interest.

1. INTRODUCTION

Founded in 1954, the CERN laboratory is located across the French-Swiss border, near Geneva. About 70% of the two largest accelerators of CERN (LEP/LHC and SPS) are located on french territory.

In 1984, a convention has been signed between CERN and the French government, where by the organization agreed to take the necessary steps to guarantee the safety of the installations of the LEP machine, according to modalities submitted to the approbation and the control of the French authorities.

In July 2000, a new convention has been signed, concerning the LEP dismantling, the new LHC collider under construction in the LEP tunnel, the SPS machine and its transfer/injection lines including the future CNGS (neutrino to Gran Sasso), and their associated infrastructures, both underground and on the surface, within a perimeter precisely defined by a set of plans.

2. THE INB CONTEXT

The signature of these conventions assimilates the installations to an INB like French nuclear reactors or installations for storage of radioactive materials.

The others CERN accelerators which are located on Swiss territory are not presently concerned.

2.1 Control of the installations

The nuclear safety authority (DSIN) controls these installations. The nuclear safety authority (DSIN) itself comes under the authority of the French government environment and industry departments.

On the Swiss part of CERN installations, the control is exerted by the Federal Office of public health (OFSP).

2.2 Organization of the INB structure at CERN

A lot of important and varied studies are requested by the authorities; this in turn implies an important documentation effort. The present structure which deals with these activities includes:

- one INB coordination unit which ensures the permanent link with French authorities and coordinates all the related work (report writing and associated studies) – 1 FTE
- one 'AQ-INB' unit which ensures that all INB activities are in accordance with quality assurance criteria – 0.5 FTE
- a group of about 20 correspondents in the divisions, mainly from the Technical Inspection and Safety division (TIS) and the accelerator sector – ~ 8 FTE.

3. CONSEQUENCES AND CONSTRAINTS

3.1 Specific systems or activities of the INB

In the accelerator domain, INB regulations emphasize on specific systems or activities called important elements for safety (EIS). The accent is put on the radioprotection, on the access system, on the alarms, on the waste treatment and disposal channels, on the traceability; these activities must follow quality assurance rules and are submitted to a careful control.

3.2 Zoning

A justified a priori 'zoning' of the installation must be established; the entire perimeter of the INB must be decomposed in conventional and nuclear zones.

In a nuclear zone, the materials waste produced is radioactive or susceptible to be so.

In a conventional zone, the waste produced is conventional.

3.3 Traceability

Every equipment leaving or entering the INB perimeter must be traced as long as it exists, which implies that a somewhat heavy infrastructure has to be set up.

4. CONSEQUENCES FOR OPERATIONS

4.1 EIS

As previously mentioned, both design, construction and operation of these systems must follow quality assurance rules. Every incident, abnormal event, modification or anomalies treatment must be clearly documented and recorded. Some of these, according to the nature or the impact (personal safety or environment) must be reported to the authorities.

4.2 Operations

Concerning machine and access operations, clear written procedures must be established. The definition of a precise zoning of the installation is generally not done by the Operations. Nevertheless, Operations is strongly involved for the following considerations:

- the nuclear zone must be precise and rather minimized because it is not presently possible to declassify a nuclear zone in a conventional one; the opposite is possible once duly justified;
- the nuclear waste disposal channels are very expensive and necessitate a very heavy work: complete inventory of the radionuclides in the radioactive waste, conditioning to minimize the cost;
- moreover, safety is prevailing on efficiency and doses to the persons involved in nuclear materials handling must be minimized (ALARA).

For these reasons, Operations has rather to think in terms of minimum beam losses, minimum induced radioactivity, localised and well explained beam losses, clean operating conditions and clean 'intensity records'. Enough resources must be put in an efficient and reliable beam diagnostic system which includes a complete recording of detailed transmission efficiencies/losses, coast data, recording of beam loss data, loss patterns. The logbook has an important role to play here: precision of the information (time stamp), clear documentation of the events or operation mode changes.

The potential advantages of such an approach are numerous, among them can be mentioned:

- easier anomalies treatment and reporting
- easier justification of the zoning redefinition
- cheaper radioactive waste disposal

5. CONCLUSION

CERN has signed conventions with the French Government in which we agree that certain of our facilities become classified as INB.

In the convention, we have agreed to abide by the regulations and statutes concerning INB, this is to guarantee the safety of the operations of the installations through modalities submitted to the approval and the control of the French authorities.

Finally, INB rules compel us to work within a quality assurance frame and therefore ask us to do all efforts to even better master the accelerator Operations.