OSART Good Practices
RADIATION PROTECTION
Organization and Functions

Lingao, China

Mission Date; 6-23 August, 2001

A very clear and instructive video VCD-programme has been developed for training persons who are working in the Radiation Controlled Area (RCA). Also, an evaluation (examination) is performed by the radiation protection department (RP) of every contractor working in the RCA, based on this instructive VCD-programme. Instead of a simple and uninteresting instructional content, this training video has a scenario of an RP engineer guiding a visitor to the controlled area. A funny cartoon character presents the key knowledge points. With a vivid story, it delivers to the trainees the basic RP knowledge, the approaches of controlled area access and exit, the usage of RP instruments, the identification of safety signs, the RP materials and the prevention methods of internal and external exposures. In each section, it also contains multiple choice questions about trouble-shooting, letting the trainees find the actor‘s wrong behaviors, thus enhancing the understanding of RP knowledge and skills.

Tianwan, China

Mission Date; 26 Jan.-12 Feb., 2004

The 24 hour 7 days/week on duty system in the Temporary Medical Centre has many advantages:
- Quick first - aid for the workers on site.
- Early diagnosis and medical management of radiation injuries and non radiation injuries.
- Decontamination of contaminated workers.
- Treatment of internally contaminated workers.
- Medical surveillance of radiation workers
- Medical emergency response to nuclear accidents
- Medical consulting service for workers on site any time
- Reduce human error to workers on site due to timely treatment of their common diseases.
- Serious patients can be delivered to hospital immediately, safely and appropriately.
- Increase workers sense of safety.

Penly, France

Mission Date; 29 Nov.-16 Dec., 2004

The SPR engineering section has a very innovative method of including mandatory requirements together with field activities in documents developed by the SPR: 'the implementation loop'.
The inclusion of the mandatory requirements related to radiation protection in the local procedures is one of the responsibilities of the SRP. The risk exists that engineers who write local documents are far from the field and write very specialized documents from an office standpoint but which cannot be applied in the field.

Each time a mandatory requirement is issued or modified, the respective SPR engineer has to implement it according to a three-steps approach:
-Planning phase: the SPR contacts the users (those who will have to apply the document) and involve them in writing the document in order to incorporate their opinions. It does not mean a negotiation of expectations, but an investigation on the way they can be applied.
-Implementation phase: the SPR explains the document to the work teams having to implement it. This can take the form of a specific training.
-OE phase: after a period of time the SPR provides OE on actual application of the document. He incorporates OE by amending the document, thus returning to the planning phase.
The feedback loop forms an integral part of the projects at Penly to stimulate the presence in the field.

Penly, France

Mission Date; 29 Nov.-16 Dec., 2004

The incident library is the capitalization, processing and dispatching tool for operating experience (OE) within the Prevention and Radiation protection Service (SPR). It is used by the SPR team to inform them on risks and to prepare the responses they are dealing with.

From the OE file for the plant, the SPR imports in the incident library the events that are considered significant in terms of risk prevention and ALARA practice. The SPR completes the incident library by including reported OE aspects raised by SPR field operators.

For each selected event, the SPR engineer in charge of OE identifies:
-the main plant system to which the event is linked ;
-the operational documents (maximum of 2) to which the event is linked ;
-key words (maximum of 2) to which the event is linked and that can be used for the search to find an event.

When an activity is prepared, SPR members look through the incident library. Thanks to the operational documents or to the key words or even to the main plant system, they will rapidly access the events they are interested in and take into account the related OE.

The actual implementation and regular usage of the incident library has been confirmed at several occasions.

Brunswick, USA

Mission Date; 9-26 May, 2005

The site uses low dose waiting areas within the RCA where workers can rest or prepare for further activities while staying out of high radiation fields. This area could be further equipped with safety posters or performance indicator panels.
Special low dose waiting areas equipped with air conditioning is located on the refuel floor. This measure seems to be a good practice for workers wearing personnel protective equipment/clothing to protect them against heat stress. Also, there are designated drinking areas within the RCA where workers can drink after performing personnel contamination monitoring.

Volgodonsk, Russia

Mission Date; 1-19 October, 2005

Technical competition "Best health physicist in all Russian NPP".
To improve and ensure the technical competency of radiation protection technicians, a utility wide technical competition of the radiation protection technicians is held yearly, in which representatives from all Russian nuclear power plants participate.
On June 5, 2003, an order was given by Rosenergoatom to organize the competition "Best health physicist in all Russian NPP", on September 1, 2004; the order was updated based on the competition result in 2003.
In response to this order, Volgodonsk NPP issued an order on December 23, 2003 to organize a competition for the "Best health physicist at Volgodonsk NPP"; a document about the management of the competition, procedures, and test evaluation criteria was developed.
In 2004, competition to select the best health physicist was organized at the plant; the competition includes theoretical examination to evaluate the participant's knowledge and operations to evaluate the participant's skill. The radiation protection staff feels that it is not only a competition but also a good opportunity for communication and radiation protection team building in the utility.

St. Laurent, France

Mission Date; 27 Nov. - 14 Dec., 2006

The plant doctor has additional responsibilities as a research, educational and advisory role. He is involved in studies regarding body stress conditions, for example, due to ventilated suits. Based on these studies, he gives advice at the national level. He is also a member of the stakeholders committee regarding high risk work planning and contributes to work safety.

The doctor carries out risk mapping for each post and for each employee. He also takes part in debriefings after incident situations. He participates in annual colloquiums at national and international level and is a member of a steering committee of national professionals in this field. The doctor prepares educative courses for medical personnel in the region who do not directly deal with radiological incidents. The doctor represents the plant to the public and local community to explain the medical aspects of injuries or exposures of personnel in case of radiological incidents.

Beyond normal health care, the plant medical center has developed preparedness - including equipment, personnel, procedures and training & drills to handle up to 50 patients with radioactive contamination.

Neckerwestheim, Germany

Mission Date; 8-24 Oct., 2007

Reduction of exposure and emission discharges during reactor pressure vessel (RPV) head opening.

In the past, flooding of the reactor cavity caused an increase of aerosol concentration within the containment building. In particular in the initial flooding phase of the reactor cavity, the air volume from the loop lines passes the dried top of the core support structure, carrying over radioactivity. The discharged activity led to higher ambient air activity, and thus, to higher contaminations in the entire reactor building.

The corrective action taken was a temporary coverage of the reactor cavity, which encloses the activity volume discharged in the reactor cavity. The radioactivity underneath the cover is extracted by a suction system equipped with aerosol and iodine filters. The cleaned exhaust air is discharged.

For the purpose of opening the primary circuit, the loop lines are pre-filled, and the reactor pressure vessel head is lifted. It is placed on its designated parking position, and the cover is pulled over the reactor room and utility room on a substructure. Once the reactor cavity is completely covered and the suction system is operational, the shift supervisor is informed that he may start flooding the reactor cavity.

Continuous radioactivity monitoring of ambient air in the operating rooms is used to check and to help decide whether personnel protective equipment (PPE) should be worn including, among other things, masks and respirators. Activity surveys are also conducted underneath the cover; in some areas, they show higher activity concentrations. A comparison of activity levels inside and outside the reactor cavity cover provides evidence on the effectiveness of the cover.

The benefits of this process are prevention of an increase in ambient air aerosol concentrations and associated higher contamination of the operating rooms by opening the primary circuit and flooding of the reactor cavity (maximum contamination in this area is 10 Bq/cm² under the travel path of the reactor pressure vessel (RPV) head), reducing the subsequent cleaning required and resulting in a reduced dose. The operators who need to be present on the site to open the primary circuit are less exposed as a result of the reduction of ambient air activity. The iodine and aerosol emissions during the first week of an outage are reduced as a result of this practice.