OSART Good Practices
EMERGENCY PLANNING AND PREPAREDNESS
Emergency Procedures

Belleville, France

Mission Date; 9-26 October, 2000

An extended and very well developed "Health and Fire Fighting Plan" (PSI: Plan Sanitaire et Incendie) supplements the Internal Emergency Plan (PUI: Plan d'Urgence Interne). This PSI plan includes 3 main phases: during the first intervention, the main objectives are to alert the NPP staff and to proceed with the first rescue intervention without special means. The second intervention is led by the "2nd-intervention team" deployed quickly on the field, while the third intervention consists of intervention of external rescue teams. The second intervention team is composed of 5 on duty members: 4 coming from the Operation service and one from the Site Protection service. The 4 Operation members pass trough a "Safety Room" for getting equipment (fire protection clothes, respiratory protection means, first medical aid case, etc.) while the Site Protection member goes to a PRS point (Rescue Collecting Point identified by the location of the event. A mobile PC is installed using a vehicle equipped with communication means, dose meters, etc. The role of this 2nd-intervention team is to co-ordinate the intervention, to assist the potential injured people and to assist and guide the external rescue teams on the site. In addition, a logistic team, composed of some of the PCM members on duty, is activated to further support the 2nd-intervention team (supplying of additional material, medical support from the on duty nurse, etc.). The available mobile fire fighting means are very extensive (vehicle with a large amount of different kind of equipments, mobile motorised pump, etc.). Observation during the OSART mission of a local PSI exercise confirmed the operability of the PSI plan.

Temelin 1/2, Czech Republic

Mission Date; 12 Feb.-1 Mar., 2001

To facilitate the consistent and positive identification of pre-selected monitoring points in offsite areas a detailed appendix to the procedure for field monitoring has been developed. There is a large scale area map with each pre-selected sampling location annotated which aids in proper orientation and sample location selection. Then for each location a detailed map is provided giving clear locating information. This is accompanied by a picture of the sample location which includes readily recognisable permanent land marks which make each monitoring point uniquely identifiable.

Lingao, China

Mission Date; 6-23 August, 2001

The Emergency Operating Procedures (EOPs) used for control room operations classification, assessment of environmental releases and assessment of protective actions have been integrated to an exceptional degree. Each of these procedures has a simple flow-chart of the basic steps to be performed and refers to related steps in other procedures. The procedure used for classification was greatly simplified by indicating that entrance into a specific EOP warranted consideration of declaring a specified emergency class. The classification procedures also directly references the environmental criteria assessed in the monitoring procedures. The protective action assessment procedure uses and refers to the results of the classification procedure and results from the environmental assessment procedures. In addition the procedures used for classification and assessment of environmental releases and protective actions are based on the very latest international guidance. This demonstrates an exceptional effort to keep abreast of and apply international guidance.

Dukovany 1/4, Czech Republic

Mission Date; 5-22 November, 2001

The plant has established a card describing actions that personnel have to accomplish should an emergency occur. Such card, that shows a top management signature, has been plastified and fixed behind each door of the buildings offices and workplaces to remind personnel of the actions to undertake should an emergency be declared at Dukovany. What makes these cards unique in Dukovany is the extent to which it has been communicated to the plant staff and contractors. The card recalls in an introductory paragraph how personnel would be informed of an emergency (what the warning signal would be). In a second part, the card delineates in a very straightforward and clear way the 9 steps that personnel have to complete before going to the shelters:

1) Do not panic;
2) Finish current activity and place equipment in a safe condition;
3) Store documents in a safe place;
4) Switch off unimportant devices and lights;
5) Shut the doors and the windows;
6) Use emergency protection aids;
7) Ingest KI if instructed to do so (through the internal broadcast system);
8) Leave for the corresponding shelter;
9) Behave according to instructions given by the shelter teams.

Sta. M. Garona, Spain

Mission Date; 18 Feb.-2 Mar., 2002

Use of flow charts in preparedness and response for a nuclear or radiological emergency and integration of severe accident management in the internal emergency plan.

Santa María de Garoña NPP has developed flow charts for extensive use in the below mentioned three ways of preparedness and response for emergencies. The flow charts contain clear references to the procedures they are based on.

1. Flow charts for emergency identification, notification and activation
Following four very easy understandable flow charts (one for each emergency category), operators can promptly determine the appropriate emergency category and the level of emergency response and shall initiate the appropriate on-site actions. This is possible by following the out line of the schematic flow charts.

2. Area action and work center guides
The areas of operations, radiological control, maintenance and logistics, as well as the central offices emergency center (CEOC), external emergency center (CEE) and medical services, all have flow charts which give an easy-to-follow, integrated and graphic representation of the actions they should take and what competencies of the corresponding personnel needed.

3. Training Sheets
The people in charge of each area have training sheets, which have been developed in flow chart format for teaching during the training period. They explain their action in a way that is easily recognisable.

These flow charts help all personnel involved in the emergency response organization to develop and maintain a rapid and collective overview of what their responsibilities are and how they must act in each case. They were developed based on the fact that they are predominantly practical and useful as well as on the favourable acceptance on behalf of the users. The use of the flow chart increase the degree of safety by making surveillance of the emergency management more complete and simpler.

Santa María de Garoña NPP has also integrated the management of severe accidents into the preparedness and response for a nuclear or radiological emergency in the following manner:

1. Creation of a new "General Emergency" initiating event.
The "Initial situation in the Severe Accidents Guide" event is included in the initiating events related with the "Nuclear Steam Supply System" (NSSS).

2. Integration of Severe Accidents Management in the internal emergency plan together with its procedures with respect to organisation and responsibilities.
When necessary, the person in charge of the Operations Area transfers the Emergency Operation Procedures to the Severe Accidents Guides. The person in charge of the Operations Area and the two Operation Evaluators from the Emergency Technical Support Center form part of the Severe Accidents Management Team. To manage the severe accident, the team use flow chart on the same table where emergency procedures are, displayed under glass.

3. Periodical training of personnel
All personnel receive periodical training in Severe Accident Management according to their

position and responsibilities within the emergency organisation, as part of the annual training programme for the Emergency Plan.

The integration of Severe Accident Management in the Emergency Teams means an optimisation of human resources and of their knowledge in General Emergency situations originated by an event that implies a Severe Accident and an improvement in their response capacities.

Krsko, Slovenia

Mission Date; 20 Oct. 6 Nov., 2003

A special tool for the assessment of radiological consequences in the environment has been developed. It utilises a more realistic dispersion model, Lagrangean particle model instead of the simple Gaussian, to calculate dispersion. This accurate modelling is very important in areas with complicated meteorological modelling environment, such as Krsko. Graphical and numerical presentation of projected data are presented in several ways, such as dose at different distances and exposure types and map containing resulting ground dose rates due to fall-out. Dispersion projection may also be viewed in a three dimensional model. Meteorological input data is automatically taken from the NPP environmental information system while input data on release source term is manually given, based on emergency procedures and automatically collected plant status data.

A comparison between the two types of models, given the same release scenario and meteorological situation, shows that inadequate advises could be given the off-site emergency organisation in case of using the simpler model. A validation of the developed tool has been made using real release measurement data from a chemical plant. This approach may be a significant improvement for NPP´s in equivalent siting positions as Krsko.

Tianwan, China

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

There is good consideration of the placement of iodine blocking agents in the field for ready access by site personnel. Stable iodine is most effective if taken just before, or immediately after exposure to radioactive iodines.
Placement of stable iodine in locked containers at the remote assembly areas will ensure the burden to the emergency response organization.

Tianwan, China

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

Consequence assessment code allows for multiple input to develop sophisticated mapping of plume spread, dose consequence contamination patterns.
The consequence assessment code can run two distinct types of calculations. The first is the quick Gaussian plume model, which results in projected offsite doses, and a plume map. The second uses a more detailed model to plot deposition of radioactive materials as well as calculate doses. The code has 16 pre-loaded source terms, receives radiological and plant information from a direct link to the plant computer systems, can accept up to 10 meteorological inputs (which allow a very accurate prediction of plume travel), accounts for internal and external dose, accounts for the varied terrain effects in the area of TNPS, considers the impact of precipitation on the fallout of airborne particulate materials, and presents the results in a very easy to understand map. Additionally, the inputs from the live time radiation monitors. At any time, the user can click on a monitor symbol for the radiation monitors and/or the meteorological monitors on the map and live time readings will be displayed.. The same technique can be used at any point on the plume map to examine the dose/contamination predictions for that area of interest..

Cernavoda, Romania

Mission Date; 22 Jan.-10 Feb, 2005

useful emergency posters with radiation dates in the plant. In certain points within the station on the walls are "Emergency Posters" where emergency response teams can write radiation data in order to make station personnel aware.

- In case of real emergency these posters alert station personnel to avoid receiving of high doses;
- These posters can be used even in case of exercises. This helps the personnel to act as if in a real situation, respecting all the associated radiation protection rules, but knowing that it is an exercise, which is written on this poster too.

Quinshan3, China

Mission Date; 5-24 May, 2005

Electronic format Plant Technical Condition Reports (PTCR) by sharing Plant Digital Control Computer database.

According to the National Nuclear Safety Regulations, during Emergency Conditions plant shall send plant technical condition report in timely manner.

The most of the report's contents should be checked from lots of various safety system parameters, which makes the process time-consuming and handwriting errors may occur under time pressure.

TQNPC has developed an electronic format of PTCR by abstracting the necessary data from Plant Display System (PDS) that serves the basic on-line database of the Plant Digital Computer. The data of the report are automatically inserted once push the button and displayed in the emergency Technical Support Centre (TSC) and Emergency Response Centre (ERC) to be reviewed collectively by Emergency Organization members.

The purpose of this process is to minimize the time spent on checking the data from the PDS and avoiding handwriting error. The modification to the PDS software is minor, and can be easily performed by 3 plants IT engineers in 2-week period.

Comparing with previous handwriting method for preparing the same report, the new auto electric format report reduces the time from at least 20 minutes to less than 1 minute, and also free of handwriting errors.

This system was used during last December 2004 comprehensive exercise and was found as a good help for information sharing and decision-making.

Quinshan3, China

Mission Date; 5-24 May, 2005

Well-established and developed on-site and off-site Emergency Response Centre (ERC) and good communication technologies applied to ensure the emergency response actions to be carried out effectively.

On-site and off-site emergency organizations have established good facilities and effective communication technologies have been applied to the On-Site Emergency Response Centre (ERC) and the Provincial Emergency Response Commanding Centre (PERC), including computer application named Digital Data Network (DDN) transmission, Videoconference system and Group Paging and Short-message for cell phone system. The well-equipped emergency response centers ensured the reliable response actions to be taken in a timely manner.

The ERC and PERC have various connections of communication and share the same technical information through such DDN lines for site real-time environmental radiation monitoring results, wireless data transmission for mobile monitoring stations, videoconference system through satellite transmission system and telecommunication for personal information system.

Effective notification and information for local citizen during emergency conditions are well prepared by various methods, such as community addressing system, radio and TV broadcasting, etc. Also local police station sends special patrol during emergency to ensure all the citizens are informed of emergency situation.

Nuclear power plants are well known and acknowledged by local area citizens, through TV program, handbooks and CD introducing EPP knowledge as well as NPP basics. Local authorities also organized frequently activities for local students and citizens to better understand NPP and EPP, such as Plaza show, NPP knowledge contests and also camping specially for students.

Brunswick, USA

Mission Date; 9-26 May, 2005

Notification of Emergency Response Organization (Via Brunswick Emergency Notification (BEN) System)
BEN is a computer based Emergency Response Organization (ERO) callout and notification system. The computer system utilizes 36 phone lines to notify the ERO to respond to an event at the plant site. Upon activation BEN will automatically initiate digital and text group pages informing the ERO of the emergency classification, instructions on facility activation, and for minimum staffing personnel to call BEN system. Once notifications are made BEN, accepts incoming calls from ERO members and qualifies ERO members by determining if they can respond promptly (<60 minutes) and also if they are fit for duty. As ERO members call in BEN fills ERO minimum staffing positions required for facility activation. After a predetermined time BEN will make outgoing calls to the ERO for positions not filled using individual pagers, home and work phone numbers, and cellular phones. Once all ERO positions are filled the BEN system will stop searching for ERO members automatically. An additional function of the system is to automatically fax in-progress rosters to the control room every 15 minutes until roster is completed. This gives the site emergency coordinator assurance that the ERO is responding. During BEN system testing minimum staffing has been verified complete within 15 minutes. On the completion of ERO minimum staffing being filled, BEN begins filling rosters for facility support staff and the Joint Information Center (JIC) as needed.

Mochovce, Slovak Rep.

Mission Date; 4-20 Sept., 2006

In order to address the requirements of different regulatory bodies, and to enhance their response to emergencies, the plant developed emergency plans for each building onsite. These procedures provide response actions for non-radiological emergencies such as fires, bomb threats, explosions, and hazardous material releases. The procedures identify responsibilities, such as who is in charge of event response for various types of emergencies, and providing information on the types of hazards in each building including the types, locations and amounts of chemical and hazardous material. The procedures provide information on the appropriate types and locations of equipment used to combat the emergency, such as chemical events. To exercise the procedures and train personnel, the plant conducts and conducts an emergency drill in a selected building approximately monthly.

Arkansas, USA

Mission Date; 15 June. 2 Jul, 2008

The Emergency Planning Procedure/Print Document Disaster Recovery System enhances the plant's emergency preparedness.

The plant maintains all procedures and documents necessary for use by Emergency Response Organization (ERO) personnel on the Entergy Web. Should this system be lost for any reason, emergency planning has a disaster recovery system established that ensures access to these documents is retrievable by all ERO personnel. Designated computers, in each primary and alternate emergency facility, receive a daily download from document control. The most current revision of all procedures and drawings required for sustained ERO operations is loaded to the hard drive of these computers. If a failure of the intranet occurs, all required documents can be retrieved and used from local computer hard drives with no loss of information experienced while responding to an emergency event. This process reduces work burden and cost on document control by allowing electronic update of procedures and prints in ERO facilities without having to maintain hard copy backup. It also reduces the need to audit prints and procedures for current revisions which saves even more time.