OSART Good Practices

LEADERSHIP AND MANAGEMENT FOR SAFETY

Leadership for safety

Mochovce, Slovakia

Mission Date; 4-20 Sep., 2006

Combined probabilistic and deterministic risk assessment for the different operational and maintenance scenarios control and minimize of risk.
The risk-monitor (RM) system is implemented in NPP Mochovce for real-time evaluation of units in relation to the actual configuration of systems and equipment. Unit configuration includes system and equipment status change, mode and operational unit status change, securing of components from operation for the purposes of tests, maintenance or repair and following renewal of these components by repeated putting into operation. RM calculates new reactor core damage frequency value on the basis of executed changes and configuration of systems and equipment in relevant time. Furthermore, in cases where actual calculated risk is too high, this tool may work as an advisor identifying what equipment has to be put into operation to decrease the risk to acceptable level.
Deterministic risk analysis of outage activities using Failure Mode and Event Analysis (FMEA) methodology is applied in outage preparation. The analysis consist of listing potentially risky activities, and ranking them based on "risk index" (frequency, potential consequences, potential of easy detection) and defining preventive measures.

South Ukraine3, Ukraine

Mission Date; 9-25 Oct., 2006

Relationship between plant, public relations departments and media.

Public Relations (PR) of SUNPP works in cooperation with public relations departments of Ukrainian NPPs and region mass media. PR department systematically takes part in workshops and other activities devoted to nuclear power engineering. PR department also provides experience exchange related to PR activities. It also uses advanced technology as nonlinear editing for TV-programmes and computer makeup. PR department provides subject-matter video and radio-programmes, newspaper releases of SUNPP performance. PR cooperates to broadcasting local and regional channels, FM-broadcasting and regional newspapers releasing. PR department provides excursions of the SUNPP and pumped-storage plant for pupils, representatives of other enterprises of the satellite-city as well as for regional settlements. PR department arranges annual competitions such as brain-rings and exhibitions for pupils aimed to be acquainted with power engineering.

Examples of regular projects of public relations department:

- -"Energetic" newspaper - once a week
- -TV programme- once a week
- -Radio programme- 3 times a week
- -Special Informational programme- 2-3 times a week
- -Press-fact release- once a week

Results: Workers, community or any person interested can obtain complete information about SUNPP performance and be convinced of its reliability and safety. Additionally, on a regular basis the SUNPP staff and local residents are informed via local mass media about the results of implementation of ALARA principle and of activities to minimize the quantity of liquid and solid radioactive waste at SUNPP.

Note: The OSART team leader was invited to present OSART methodology and OSART objectives to a meeting where all mayors of the SUNPP Region (about 30) were present. This meeting was followed by a press release. In the same way a video was taped during the press conference, which was organized at the end of the mission to inform the public on the progress of the OSART mission.

St. Laurent, France

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

ID+ challenge and innovative idea forum

As part of total quality management aiming to have innovative ideas come up from shop floor level, an innovative idea forum was put in place at the Saint Laurent plant in 2002.

Each EDF and non-EDF staff member working at the plant can suggest improvements in any given area (nuclear and industrial safety, radiation protection, environmental safety, availability, cost, working conditions, communication, organization, etc.). The first level of validation is done at departmental level. It is then submitted for plant-wide validation to the plant innovative idea committee involving all plant departments. An 'idea of the month' is thus selected every month.

At the end of the year, a challenge is organized to pinpoint the best suggestions. During this event, the best Saint Laurent ideas are selected for representation at the corporate DPN challenge.

Savings in all areas (nuclear and industrial safety, radiation protection, environmental safety, availability, cost, working conditions, communication, organization, etc.). Thanks to the current organization, relevant suggestions can be submitted to the corporate DPN innovative challenge, for enhanced performance.

With this system, working conditions can be improved, thanks to the provision of the right solution to a given issue and efforts can be acknowledged (selection of the best idea every month, prizes granted to the winners of the ID+ challenge).

The solutions offered represent gains in all areas.

The suggestions selected during the ID+ challenge are shared with other plants during the corporate DPN innovative challenge. The good practices that are chosen to win are made compulsory to other EDF plants.

Loviisa, Finland

Mission Date; 5-21 Mar., 2007

Permanent safety upgrades to reduce overall plant risk.

The FORTUM Corporation has demonstrated a long term commitment to ongoing investment in equipment and system upgrades that have significantly reduced overall plant risk for core damage and release of radioactivity.

Several extensive modifications were completed to improve availability of the ultimate heat sink following internal and external events, including:
-Improved design and added additional redundancy for the residual heat removal system, including electrical separation.
-Providing redundant cooling water supply to emergency diesel generators

Several extensive modifications have been completed to reduce the likelihood of radioactive release post-accident including:
-Addition of automatic isolation of primary coolant purification system when pressurizer pressure decreases.
-Relocation of the reactor coolant pump emergency seal water suction line.
-Addition of automatic isolation of reactor coolant pump seal water heat exchangers based on high pressure.

Khmelnitzky, Ukraine

Mission Date; 29 Oct.-14 Nov., 2007

Personnel feedback tool.

A specialized live, on-line database for communication and tracking of personnel comments on various safety aspects of the NPP operation has been developed.

Accumulated operating experience showed that it would be beneficial to strengthen the feedback between personnel and management. It was one of the results of the KhNPP management self-assessment in February 2007. A personnel feedback committee has been established consisting of deputies department managers for personnel. The committee is focused on promoting a personnel feedback system to evaluate and address suggested issues. The plant staff has the opportunity and is encouraged to address issues to the plant senior managers by means of an electronic on-line database. Special software has been installed at work places based on departments' requests. Appropriate managerial and administrative documentation have been approved to support the system. The system also includes a special evaluation tool to assess the importance of the suggestion on ten-point scale. It helps to motivate people to provide their concerns because the most valuable suggestions are rewarded. Under the review period, 36 suggestions have been already received. The system allows anonymous application as well. There are no limits on topics. There are clear examples that the system brings safety benefits to the plant and builds desired ownership to the safe operation.

Two examples:

1) When analyzing the quality assurance (QA) guidelines of the NPP and the outside Maintenance Enterprise (contractor) documentation and job descriptions it was found that there was not clearly defined responsibilities for certain staff to provide information about discovered equipment defects. The engineer on duty is not responsible for reviewing department supervisors' logs.

Answer:
Urgent corrective action, (till 15.10.2007 - OSART) to amend "Guidelines for detecting defects..." 0.UP.2965.RK-2007.

2) KhNPP operating staff schedules #3 and #43, currently in force with 36 working hours, for electrical department electricians, electrical shift supervisor (senior electrical engineer and electrical engineer) do not include extra-training days (a specific working day when personnel is not on shift).
Existence of such days will permit to do activities with operating staff like training, briefings, technical training, exams, plant meetings, medical examinations during the working hours. With the existing schedules, the only issue of refresher training for electrical shift supervisor, senior electrical engineer and electrical engineer is resolved.

Schedules #3 and #43 that were in force till 1999 provided 1-2 extra-days per month. Management is considering the possibility of coming back to that schedules to provide 1-2 extra-days per month to use them for above mentioned purposes.

Khmelnitzky, Ukraine

Mission Date; 29 Oct.-14 Nov., 2007

Plant personnel qualification record booklet used in the field.

A small record booklet is carried by all employees with all necessary information on qualification and training for the person. It is a very effective tool for management to check whether the worker is fully qualified before being assigned to a task.

After training and exams, all personnel receive qualification confirmation, which is recorded in this booklet.

This booklet also contains information about the regular medical examination and individual liability coupons (notification coupons) for potential industrial safety violations. These qualification booklets are personalized and stamped by the plant to prevent usage by other employees. KhNPP staff should have this qualification booklet with them during the work at the plant.

This managerial tool significantly decreases the time for checking to confirm staff qualification before giving permission-to-work.

Existence of notification coupons inside this booklet is also a preventive measure for violations of safety standards as well as a means of motivation of staff to improve global safety culture.

Khmelnitzky, Ukraine

Mission Date; 29 Oct.-14 Nov., 2007

Public information is exceptionally well developed.

The public relations department arranges its activities at a very high level for the following areas:
- Daily information is provided on the NPP web site www.xaec.org.ua regarding safe operation of the units, radiation monitoring level, environment and all events at the plant. Web-site material is presented in Ukrainian, Russian and brief version in English.
- Public relations department constantly informs NPP staff and the public of the satellite-town (Neteshin) and the whole region using the following means:
  - o Newspaper"Perspectiva" (issued once a week, free distribution);
  - o TV-programme (transmitted once a week to Slavuta, Shepetovka, Izyaslav);
  - o NPP internal information TV (e.g. the current plant and safety performance, operational experience, planned activities for further safety improvements);
  - o Radio broadcasting (twice a week); and
  - o Live broadcasting with plant key specialists.
- Scheduled public interviews with NPP managers of all levels - 16 groups, 861 people;
- Regular meetings between KhNPP specialists and the public;
- Excursions for pupils, students, public organizations;
- Job-orientation activities for students of the satellite-town and nearby settlements.

Personnel and the public can receive complete and on-line information about the KhNPP operation, to understand its safety and reliability. Organized public relations activities are popular among the public and promote a good image of the KhNPP.

Chinon, France

Mission Date; 27 Nov.-14 Dec., 2007

Craft Safety Group (GSM) contribution to addressing safety issues within a particular profession (craft) based on teamwork.
Craft Safety Groups are decision-making committees established for each specific profession (craft) in the plant. The aim of GSM is to formulate safety policy fundamentals, to support safety culture enhancement and to address issues fed back from the field using plant, corporate and external operating experience and to avoid addressing events in isolation, event by event, but as a part of the self learning process.
The definition and implementation of improvement measures is a result of the teamwork inside the craft. When necessary, contractors are involved also.
Some examples of positive outcomes include:

- The team attended one GSM while at the plant. At the meeting, field operators explained that they had identified a deficiency associated with improper valve location within some emergency operating procedures. Operations management assigned an action to resolve the issue.
- At the operations GSM, the cause analysis for current weak areas of performance was covered. Input was solicited from operators on the corrective action plan.
- One item already resolved from this forum is the removal of all non-operations related public address announcements; this has contributed to control room serenity.

Forsmark, Sweden

Mission Date; 12-28 Feb., 2008

Structuring the management manual in such a way that the requirements for each unit are described in one chapter of the management manual. Responses by the units on how they will meet these requirements are described in an adjacent chapter. This structure aids in communicating expectations and commitments to the plant staff.

It is important to safety for the organization to be committed to the requirements. Thereby, the personal engagement can be improved supporting fulfilment of the expectations.

The plant has structure the management manual into four main chapters:

1. Management principles
    a. Company structure
    b. Vision and company mission
    c. Management philosophy
    d. Policies
    e. Management expectations
2. Organization
    a. Responsibilities
    b. Definitions of management levels
    c. Safety management principles
    d. Delegation
    e. Authorities
    f. Organization charts
3. Quality requirements
4. Replies from the individual units on how they meet the quality requirements.

In chapter 4, all eleven organizational units give their replies on how they meet the quality requirements stipulated in chapter 3. The replies are given on a free format, where applicable instructions, procedures, etc., are referenced in order to facilitate more detailed information when required.

Each reply must respond to all requirements placed on the organizational unit and the reply is used in internal audits to ensure that all responsibilities are taken care of. Internal audits are performed to ensure field observations are consistent with the commitments made.

Overall personal commitment to the requirements set up by the company is significantly improved by this structured approach.

Balakovo 4, Russia

Mission Date; 19 May-5 Jun., 2008

Permanent public answering machine (hot line) on the plant current status.
There are several ways how the plant information center informs the public in case of an operational event in the plant. The press release on the event is distributed to about 20 press agencies and newspapers. The information about the plant event is published on the corporate and the plant web pages. Following press articles and web information are monitored to provide timely and focused feedback. The plant information center also operates an answering machine permanently available to the public. In case of an operational event in the plant, the information on the answering machine is updated within few hours, 24 hours round, including days off. Using a permanent public answering machine with prompt information on the plant safety status is considered as a good element of transparency.

Example of the hot line information about an abnormal event:
"...on 8 April 2008, 13:32, there was a power reduction and disconnection from national grid of the Balakovo NPP unit 4 caused by a problem at the external electrical transmission line. The reactor unit was stabilized at 40% of nominal power. Power output of the units 2 and 3 was reduced to 700 MWe on request of the national grid dispatcher.

Level of radiation in the town of Balakovo and in the vicinity of the plant is without changes. Eight (8) to 15 microroentgen per hour, is the level of natural background activity in the European part of Russia. .."

Balakovo 4, Russia

Mission Date; 19 May-5 Jun., 2008

Motivation programme/ professional competitions

Comprehensive motivation programmes of professional competition are implemented both at the corporate and the plant levels. There are formalized criteria and indicators for competition among the plants (such as “the best nuclear power plant in Russia”, “the best plant in safety culture”), among the plant departments (the best department of Balakovo NPP, the best control room crew, the best working place of operational personnel, …) and among individual workers (the power industry man of the year, the best welder, the best field operator, the best electrician, …). Regular competitions are conducted with plant volunteer fire brigades. The competitions are widely popularized by the plant means of internal communication and the winners are given financial bonuses.

List of the plant general and professional competition programmes:
- The best NPP of Russia,
- The best Balakovo NPP department for fire safety
- Balakovo NPP department of the year
- The power industry man of the year,
- The best work place of operational personnel,
- The best department in industrial safety (evaluated montly),
- Quiz on radiological safety among Balakovo NPP subdivisions,
- Quiz and competition of plant volunteer fire brigades and subdivisions operating personnel,
- Quiz on industrial safety rules,
- The best control room crew,
- The best health physicist,
- The best field operator,
- The best electrician,
- The best welder,
- The best machinery maintenance worker,
- The best chemistry laboratory assistant,
- The best engineer,
- Competition for best training-methodological material,
- Russian Competition"Enterprise of high social effectiveness"

Arkansas, USA

Mission Date; 15 Jun.-2 Jul., 2008

The effective use of Performance Indicators to provide a foundation for driving continuous improvement

The plant staff utilizes performance indicators to effectively influence plant performance. The indicators are prevalent at all levels of the organization with lower tier indicators feeding forward to the broader scope indicators. The management team monitors the indicators and drives performance based on the goals reflected by the indicators. Goals are established which represent excellence in the industry. The monitoring of the indicators is woven into the daily plant status meetings to facilitate a high level of engagement in performance. The indicators are also used as key input elements in decisions. The administrative aspects of populating the indicators are integrated into the tasks to minimize the burden.

There are a variety of examples where the indicators have been used to improve performance. In the Radiological Protection area, dose and contamination performance has been sharply improved by broadly communicating the overall goals and then establishing short and intermediate targets for organizational focus. For example, success in meeting the annual dose goal is built upon meeting daily and weekly goals throughout the year. Dose performance is reviewed daily in management and working level meetings. Progress curves are utilized to monitor outage preparation and execution. These curves are reviewed frequently and are utilized to coordinate resources, identify problem areas and motivate the staff. The focus on goals associated with INPO(The Institute of Nuclear Power Operations) index, forced loss rate, and unit capability factor have also resulted in significant improvements in these areas.

The plant's high level indicators are reviewed by the corporate office and peers from other plants on a six week basis as part of Management Review Meetings. This provides an opportunity to examine performance, challenge goals and exchange ideas for improvements. The higher tier performance indicators reviewed at this level are reflective of the lower tier indicators and performance. This structure helps establish vertical alignment of the organization giving the plant staff common goals.

The indicators are both leading and lagging meaning they are used to establish performance goals for the future and measure past performance. The leading indicators are commonly indicators that measure preparation or monitoring of activities. The lagging indicators commonly measure actual production or accomplishments.

The benefit gained from this approach is a collective focus of the staff on the correct performance elements for the plant. The performance indicators are a leadership tool, a management tool, a communication tool, an education tool and a means of motivation. The engrained nature of the use of performance indicators provides a foundation for driving continuous improvement.

Cruas, France

Mission Date; 24 Nov.-11 Dec., 2008

In order to support the operating organization, the Safety and Quality Service SSQ has developed an easily accessible database with the answers to significant safety related questions.

This database called FQRL (local question/answer form) centralizes all relevant safety related questions, especially those related to the understanding of the general operational rules (RGE).
Every staff member has very easy access to this database, which is structured by safety function and then by system, one finds the question, the answer, references and, if needed, a deeper analysis.
These forms are very helpful in work preparation and in the real time decision taking process. It is an efficient tool to disseminate safety on the site.
The database enables everybody to input new questions.

Rovno 3/4, Ukraine

Mission Date; 24 Nov.-11 Dec, 2008

Production Activity Planning

The main tasks of Rivne NPP production activities for each year are specified in the "Integrated Plan of Organizational and Technical activities" and put into force by a direction approved by the corporate organization. The activities are grouped in the following way:
- Quality and management systems and certification;
- Safety analyses;
- Introduction of new equipment and technologies, equipment modernisation
- Ensuring nuclear and radiation safety;
- Operation of the active core and fuel handling;
- Environmental protection and efficient employment of resources;
- Radwaste handling;
- Ensuring labour, technical and fire safety;
- Lifetime extension;
- Management of materials;
- Water chemistry, including protection from corrosion;
- Emergency response system and civil protection;
- Personnel training and preparation;
- Physical protection;
- Metrology.

The basis for incorporation of activities into this integrated plan is:
- the Strategic Programme for the corporate organization development,
- the integrated programme for modernisation and improvement of power unit safety,
- special conditions of temporary regulator permits for power unit operation,
- the list of activities for the improvement of the safety of power units which are under operation in Ukraine, and
- industry level technical decisions and other documents.

The activities from this integrated plan are included into the monthly working plans of departments. The completion of these activities is controlled on the monthly basis. The department heads report on a quarterly basis about the completion of the activities in the integrated plan.
If it is necessary to make changes in the integrated plan, such as extension of the term of the activity completion or cancellation of an activity, then the department which initiates changes requires approval of the Director General.
The department working plans include the following activities:
- Main production and safety indicators
- Personnel development activities
- Development (revision and correction) of documentation
- Improvement of the production activity of the department (separately by laboratories, groups, sections etc)
- Activities identified in the collective contract
- Activities identified in the plans from the corporate organization
- Preparation for autumn-winter and spring-summer periods
- Activities resulting from the outcome of the meeting held by a commission headed by Director General, which reviews the results for the year
- Observance of requirements of statutory and other organizational regulative documentation of Rivne NPP
- Activities in the area of modifications and modernisation

- Activities resulting from the reviews by external organizations
- Specific areas of department activities

These arrangements support an integrated approach and clear accountability whilst retaining ownership at a functional level. This approach has led to an increase in plan implementation rate and a focus on key activities to support an enhancement in the level of safety and production at Rivne NPP.

Rovno 3/4, Ukraine

Mission Date; 24 Nov.-11 Dec, 2008

Safety Days

Rivne NPP has a practice of conducting Safety Days. Conduction of such days is based on the industry level standard document "Regulations in the area of work with personnel in the operating organization" and "Regulations about Safety Day conduction, developed at Rivne NPP."
A central commission is created yearly for the conduction of Safety days. The following people are included into this commission: Director General (commission chairman), Chief Engineer (deputy chairman), and managers of the upper levels (deputies general manager, deputies chief engineer, heads of the nuclear safety department, radiation safety department, internal inspection and fire protection) as members of the commission. This commission and the yearly programme for Safety Days' conduction are approved by the plant level order.
On the last week of each quarter inspections are carried out for two-three days. They cover different activity areas:
- Radiation safety. Review of compliance with radiation control regulations during relevant processes, the state of the arrangements for radiation control and following the requirements for radiation safety during storage, transporting and handling radwaste, compliance with the license conditions for activities associated with the sources of ionizing radiation.
- Nuclear safety. Review of the issues in the area of nuclear safety, fresh fuel handling, actual state of safety systems and safety related systems as well as compliance with the requirements for their operation. Consideration of issues of implementation of the schedule for modifications and modernisations aimed at the safety improvement at the Ukrainian power units in operation, compliance with the requirements of permits and licenses for unit operation. Review of the safety culture in the departments.
- Industrial safety. Review of adequacy of compliance with the regulator requirements, correctness of processes and certificates issued after technical inspections of equipment and pipelines; following the terms and schedules for the technical inspection of the equipment. Review of the operating instructions, programmes and results of equipment and pipeline tests. Review of operational safety indicators in the departments.
The majority of the operational departments take part in these reviews. Inspections are carried out inside the departments by department commissions. The chairman of each department commission is the department head. The members of the commission are appointed by the department head, usually chosen from the administrative and engineering-technical staff. One member from the central commission takes part in the work of each department commission. After the inspections each department commission registers all the detected deviations and remarks and also states activities for their elimination with the appointed responsible persons and terms for the implementation for these activities.
The final step of Safety Days are final meetings headed by the central commission chairman. At these meetings he listens to the reports of the department commission chairmen and the members of the central commission about the state of the activities which were scheduled for the previous quarter and results of the current quarterly review. Department commissions propose organizational-technical activities to eliminate deficiencies which were detected during the conduction of the Safety Days and the sufficiency of these activities is discussed at the final meetings.
A statement is issued during the week following the Safety Days of the results of its conduction. All the organizational-technical activities, with the terms for their implementation and responsible persons, are given in the attachment to this statement. Areas of control are distributed as follows:

- The area of nuclear safety- responsibility of Nuclear Safety Dept. Head
- The area of industrial and technical safety- responsibility of Internal Inspection and Fire Safety Head.
- Radiation safety- responsibility of Radiation Protection Dept. Head.

Complex organizational issues in part of Safety day conduction are the responsibility of Rivne NPP Nuclear Safety Department.

The approach used during the Safety Days is more extensive than the typical industry practice of communicating and reinforcing safety standards. The methodology and processes used allows improvements, including cross-cutting issues which can only be resolved with the involvement of several depts., to be addressed, and hence enhance the operational safety performance of the plant

Rovno 3/4, Ukraine

Mission Date; 24 Nov.-11 Dec, 2008

Planning of staffing needs, cooperation with external educational institutions, and succession training for manager positions

A five yearly and an annual planning procedure for staffing needs is implemented at Rivne NPP. The planning is performed on the basis of the analysis of the human resources flow, which includes the following:
- Analysis of retiring personnel of all categories,
- Analysis of voluntary terminations of working contracts by employees,
- Study of promotions including transfer to other parts of the organization.

On the basis of scheduled needs, the sources of human resources are specified. Usually they are the state employment services, external hiring processes, vocational schools of Rivne NPP and high educational institutions.

In order to satisfy the needs of staffing and work with personnel, a system of cooperation with educational institutions of different levels (universities, technical schools, vocational schools, training centres of other Ukrainian nuclear power plants) is implemented at Rivne NPP and in the operating organization. Cooperation with educational institutions is aimed at addressing the following issues:
- Selection candidates for future employment at Rivne NPP (professional orientation)
- Preliminary preparation of NPP working personnel and managers in order to provide them professional training
- Creation and maintaining the plant training base on the necessary level
- Advanced full time training of the personnel
- Improvement of the plant personnel of their general and professional education and knowledge

In addition, the cooperation with educational institutions has the following benefits:
- Work in the area of professional orientation for young population of the region in order to form a positive image of the power plant and encourage people to learn the professions necessary for the nuclear power plants.
- Support of the student development process.
- Provision of opportunities for internships.
- Ensuring future employment for students who have decided to work at the power plant.

The positions of managers of all levels are supported by the availability of well structured and trained staff reserve of all the management chains. A high level of effectiveness of manager staff reserve should be noted. The policy of planning for career promotion of these personnel ensures sufficient number of qualified and experienced personnel and the necessary inflow of young trained personnel. Creation and management of the management staff reserve is performed at all the levels of the Rivne NPP structure taking into account the following basic principles: dialogue, publicity, mobility, detection of potential, joint leadership, delegating of authorities. The process of generation and management of the management staff reserve in accordance with the above mentioned principles ensures the following:
- Organizational system of Rivne NPP management training on the basis of principle of management competencies development
- Development of management incentive and motivation in the staff reserve development
- Creation of a new generation of managers, capable of transferring to the modern type of NPP management based on the principles of strategic management and the involvement of managers of different levels in the organization management.

Fessenheim, France

Mission Date; 23 Mar.-8 Apr., 2009

Senior Management Support for Operational Safety

Senior Plant Managers are improving Operational Safety by their daily visible support for staff behaviours that enhance Nuclear Safety.

The Plant Director stopped an outage in 2007 after 3 events occurred. He met with the Shift Supervisors as a group and declared his personal support to stop any tasks that could negatively impact safety.

In 2008 plant management made a decision to extend an outage by proactively plugging tubes in two non leaking Steam Generators on Unit 2 after a leak occurred in a tube in the third Steam Generator.

In 2008, the plant pressure boundary inspection department were asked to assess a leak on the secondary side of the plant. They found a weld defect and raised a concern that the whole weld could fail and cause a serious non radioactive steam release. The Inspection Manager was supported in her concern by plant management. The line was isolated and the plant was shutdown to repair.

In March 2009, the Shift Supervisor made a conservative decision to delay the restart of Unit 1 by 8 hours. The person felt confident that the decision would be supported by management and in fact both the manager and the Plant Deputy Director for Production complimented the action.

The Plant has several 'Safety Engineers' who inspect equipment in the field and in the control room and bring concerns to the attention of the Control Room Operators. The Safety Engineers have trained over 400 staff to improve their understanding a compliance with Technical Specifications. Safety Engineers write a weekly newsletter to all staff discussing current Nuclear Safety issues and are very active in supporting safe execution of outages. There is a monthly private meeting between a Safety Engineer, the Safety Department Manager and Plant Director that is frank and self critical.

Automatic Reactor Scrams were reduced from 3.5 per unit per year in 2006 to zero in 2008 through a comprehensive program of human performance improvements and equipment changes.

South Ukraine, Ukraine

Mission Date; 2-9 Nov., 2009

The web-based system the utility uses for its NPP fleet for Safety Performance Indicators (SPI's) is sophisticated, but still easy to access and use. It provides information of safety performance of the whole fleet unit by unit with clear definitions of the indicators and good graphics to support trending.

The system is provided as part of fleet requirements and regulatory requirements but this system goes beyond that.

This information system allows the SUNPP:
-briefly provide information about the current safety level to all SUNPP managers and specialists in the large organisation that was earlier provided only as large reports that most of the managers had no time to read;
-keep track of the indicators' trends and ensure maintaining of the achieved or higher safety level;
-timely notification about the safety issues at the whole plant and for each unit
-monitor and compare results and performance of other plants of the fleet

Currently there are 40 safety indicators in use in the system (23 for regulator + 17 own). The system has been in use for 2 years now and is accessible by more than 1000 users at SUNPP.

Angra 2, Brazil

Mission Date; 28 Mar.-14 Apr., 2011

In 2004, the plant established a programme to have Senior Reactor Licensed Engineers in departments other than the operations department. This programme supports the safe operation of the plant and improves the plant knowledge of line managers and engineers. Currently there are nine licensed engineers in the following departments:
- two in system and reactor performance department;
- two in work control division;
- four in maintenance superintendence; and
- one in support engineering superintendence.

These engineers support their departments with the license training knowledge and assist in the decision making process with regard to the safe operation of the plant.

Metzamor, Armenia

Mission Date; 16 May-2 Jun., 2011

The plant maintains close cooperation with technical support organizations, research and design organizations in order to maintain design authority and ensure operating experience exchange and benchmarking.
In the process of its activity, the plant co-operates with a number of nuclear entities. Historically a close co-operation was established with the Russian Federation design and scientific research organizations and during last years they were added with organizations from such countries like Czech Republic, USA, Slovakia, UK, etc. With the mentioned countries, the projects were established for assessment of safety, planning and implementation of modifications, various analyses, calculations and other types of activities.
Good co-operation was established on joint application of collected operation experience, benchmarking with best industry practice and operation improvement by means of mutual support and use of good practice, allowing for decreasing of preparatory period for implementation of safety upgrading activities.
As a result of this successful co-operation about eight to ten safety related projects are implemented annually at the plant.

Koeberg, South Africa

Mission Date; 22 Aug.-8 Sep., 2011

Koeberg has developed an educational board game to enhance the understanding of the business cycle with the essential focus on safety and to improve the alignment around top level Koeberg goals, by using it in the Management and Leadership development program.

The object of the game is to accumulate the highest number of Key Performance Indicators (KPI) points whilst staying solvent. The key role of safety is built into the set of KPIs. The KPI washers are weighed at the end of the game to determine the winner.

There are 4 pairs of players and one banker at a table. Each team has a token item (representing a power station) which is driven clockwise around the board with the next landing point governed by the results of a double dice throw. Players take turns. A team falls out of the game if it is unable to pay any debt incurred, more than one KPI reaches zero, or the team cheats.
Each team has a KPI Rack filled with 30 KPI washers to bring it to target level at the start of the game. The higher the number of KPI washers, the better.

Each team starts with a fixed amount of money.

Each Initiative Card represents an action which is in support of a Station Goal as indicated in the centre of the board. When a player lands on an Initiative Card and it is not purchased, he may purchase it and then enjoy the KPI points benefits indicated should he again land on the block in future. If he lands on an Initiative block already owned, then he pays the penalty number of KPI points indicated to the bank. Any time he lands on an initiative block that he already owns, apart from collecting the KPI benefits from the bank, he may elect to increase the benefits and penalties of that block by paying the indicated doubling or tripling fee to the bank. Once a team owns an initiative block then he should put one of his buttons on the block. If the owner has pushed its penalties and benefits to double or triple then a corresponding number of buttons should be put on the block.

Event cards: On landing on an Event block (event are drawn from actual records), the team must carry out the instructions indicated on the card on the top of the pack (placing the old card at the bottom).

Angra 1, Brazil

Mission Date; 20 Aug.-6 Sep., 2012

The plant requires all Managers to obtain and retain at least Cold (Inactive) Licenses as a Shift Supervisor, which means that they undergo the entire training and evaluation (including psychological and medical) as a Shift Supervisor, including Simulator Training and routine re-training. The only difference from a Hot (Active) License is the requirement to perform a minimum number of shifts every year, which can be easily met if required. This practice was started several years ago, to combat the shortage of licensed Shift Supervisors, as one of the measures to increase the attractiveness of this specialized career (Operations) involving the arduous task of obtaining the License, the difficulties of working in shifts, and the tension of this highly responsible position.
That difficult phase is now long past, but this practice still provides the following significant benefits:
oAn ample supply of Shift Supervisors is assured.
oAll members of the plant management are well aware of the whole plant, its safety features and requirements, the exigencies of plant operation and the priorities in emergency situations.
oThe top management of the plant, coming from this pool, also enjoy this strong background.

Rajasthan, India

Mission Date; 29 Oct.-15 Nov., 2012

Area Co-ordinators for Improvement of housekeeping at the Station.
Area Co-ordinators are identified and earmarked for each specific area of the station operating island. They are responsible for good housekeeping in their designated areas. Display boards, mentioning the names and photographs of the area co-ordinators, are placed in the respective areas. Area co-ordinators patrol their respective areas frequently, raise any deficiencies in the computerised work management system and follow-up the status. Plant management interacts with the area co-ordinators in daily meetings to discuss and expedite any issues related to their respective area.
In addition, during the plant tours and field observations activities conducted by the team, good housekeeping was noticed in many areas of the plant indicating that area co-ordinators are having a positive influence on this aspect of the station’s operational safety performance.

Gravelines, France

Mission Date; 12-29 Nov., 2012

Development of a pocket-sized aid to determine time frames for modular work planning and scheduling (on-line-wheel).

Work planning aims to guarantee optimal schedule reliability and ensure plant safety in line with lines of defense. The Gravelines on-line team has developed an easy-to-use scheduling aid for time-sensitive activity steps. Using this tool, work-planners in the different departments can clearly identify the sequence of each of their activities.
The tool offers the following advantages:
–Quick reminder of expectations
–Easy scheduling of activities
–Proactive transmission of work packages
–Schedule reliability
–Proactive management of requests for support services
–Smooth anticipation of technical specification related LCOs
–Improved safety profits to a reliable schedule.
Results have demonstrated an increased number of work packages transferred 8 weeks ahead of time and improved schedule reliability in the second half of the year compared to the first half year.

Chooz, France

Mission Date; 17 Jun.-4 Jul., 2013

Information document on plant's performance and emergent issues.
The plant uses an information document with details of the plant's performance and emergent issues, which is sent once a month to the first line managers and they in turn, keep their staff informed.
Efficient top down communication is essential to keep the staff aware of important ongoing activities and to make them feel part of the organization.
The information document KIT R'FLEX provides information on station results in the areas of nuclear safety, production, industrial safety, environmental safety, radiation protection, human resources and financial performance. These topics are complemented with a new item of general and current interest. The document is made up of eight pages with associated comments.
First line managers use this information for briefing their teams in a consistent and structured manner.
The benefit of this document is to promote management alignment by facilitating dissemination of a common message to the whole workforce and to ensure consistency of messages conveyed by management. Timely, consistent and comprehensive information makes the workforce feel part of the organization and promotes ownership of individuals in the plant.
The first line managers appreciate this information transfer and valued it as a good tool to support them in briefing their teams.

Clinton, USA

Mission Date; 11-28 Aug., 2014

CPS has implemented a forward looking approach to the demographic challenges facing the station by deploying a comprehensive approach to knowledge transfer and retention.

This approach includes an assessment of risk arising from the likelihood that members of staff will leave the organization, the level of knowledge that would be lost from the station and the significance of that loss to continued safe operation. The risk assessment data is used in plans for recruitment, training and budgeting.

Personnel are hired in advance of anticipated departures to give sufficient time for new hires to be trained and gain experience in areas of vulnerability. The forward looking nature of this allows the station to use college partnerships, intern programmes and targeted external recruitment to attract candidates of the required quality.

The Exelon organization recognizes the strategic value of advanced hiring in terms of approvals for “over hire” positions.

The station training organization is fully engaged with the knowledge transfer and retention process. The various training committees incorporate the advanced hiring programmes when identifying and scheduling training needs so that adequate numbers of qualified individuals are available to support station activities. Rotating experienced line personnel through the training function is beneficial in maintaining recent plant knowledge in the instructor workforce and capturing this in training materials. This also helps ensure adequate instructor resources.

Training demands are optimized by evaluating new employees soon after hiring for qualification equivalency to avoid unnecessary duplication of previous training. Training and line supervisors are engaged in approving these exemptions.

The station has partnered with the corporate human resources function to agree the behavioural traits the station is seeking as well as the qualifications and experience needs so that candidates have the right attributes to fit the station culture. This results in new hires that ‘hit the ground running’ and gives first line supervisors’ confidence in the process.

Flamanville 1&2, France

Mission Date; 6-23 Oct., 2014

Dedicated field team

The plant has a dedicated field team, EDT, consisting of four managers at different organizational levels that, within one week, will spend two full days in the field, observing activities and correcting behaviour that is not aligned with management expectations. This task rotates between managers and is seen as complementary to the line managers being present in the field supporting their staff as part of their job. The team writes a report that is presented to the plant management team. The dedicated field team is an effective communication tool for reinforcing management expectations to the line workers and provides management feedback from the field. This process contributes to cross-functional organisational learning.

Kola, Russia

Mission Date; 10-27 Nov., 2014

Induction and development of young professional recruits by undertaking a comprehensive work oriented project as a part of their individual development programme.

Each young professional is assigned to a mentor who has valuable expertise in his/her working area. During the first day following recruitment, the young professional prepares an individual development programme in collaboration with his/her mentor.
This individual development programme is made up of a number of elements, including developing a project with the purpose of proposing a solution to a specific work related task.
The objectives of the project are to:
-reveal, support and develop the engineering potential of young professionals;
-deepen their knowledge of the plant and its equipment;
-establish contacts with colleagues and experts from other departments.
The time allowed for the fulfilment of this task is one and a half years. The task is chosen by considering the work area (specialism) of the young professional.
The best projects will be evaluated for implementation at the plant. They are also considered for scientific reports from the Kola NPP, as part of the plant`s participation in industrial and international competitions or conferences, for example - Youth: safety, science, business.
The examples of projects are:
-Modernisation of the plant drainage system and the turbine condensate return.
-Oil cooling scheme modifications for turbine oil systems 1-4.
-Creation of an object oriented data base for buildings and rooms at the Kola NPP, with the possibility of 3D modelling.
-Development of a process sheet for the radiographic inspection of elements of V-230 reactor covers.
The development of the projects enables the plant to:
-reveal the engineering potential of young professionals;
-have a fresh look at solving some urgent problems;
-focus the attention of young professionals on the importance and priority of safety, during the fulfilment of their task.

Sizewell B, UK

Mission Date; 5-22 Oct., 2015

Accelerated pace Nuclear Leadership Programme (NLP) with Inclusion Workshops for employees

A detailed and comprehensive Nuclear Leadership Programme trained current and emerging leaders on important nuclear leadership principles and behaviours. The Management Team went through the leadership programme first to ensure the tone was set and behaviours and knowledge were role modelled. The accelerated programme approach then managed to get 136 leaders through the training in the space of 2 years.

The station realized that the success of the Nuclear Leadership Programme could be maximized if some workers participated in Inclusion Workshops, where they were exposed to key module of the programme. The workshops enhanced cross-functional working and minimised departmental silo attitude. A total of 134 workers have now participated in these Inclusion Workshops.

There is a systematic approach to leadership & behavioural interventions through identifying performance gaps through trends in Condition Report (CR), engagement survey results, nuclear safety culture survey results, Significant Operation Event Report (SOER) & bespoke leadership survey for leaders.

Examples of impact:
–Inclusion Workshops – Employee Engagement Survey results have improved since implementing this training especially in the area of teamwork (score increased by 6 points from 2012 to 2013)
–Accelerated Nuclear Leadership Programme – High Performance Index has improved from 50 in 2011 to 63 in 2013, recovering the previous existing gap with the fleet. Nuclear Safety Culture Survey Results 2014 have also increased since the leadership & behavioural interventions have been introduced.

In addition to the initial NLP programme, Leadership principles have been summarized in a model developed by EDF energy based on international standards of excellence. This model, called “behaviours for success” is a fleetwide programme which targets improved performance through behavioural changes. This model is promoted, deployed and used across the whole station.

Bruce B, Canada

Mission Date; 30 Nov.-17 Dec., 2015

Use of a Visual Management Board (VMB) together with daily meetings are used to communicate safety related issues and align the organization's priorities in a consistent manner.

The Visual Management Boards facilitate an increase in a leader lead discussion with staff to reinforce the Safety First message, company values and increase staff awareness of their contributions to overall safety performance.

The objective of the VMB is to provide a standardized, visual focal point for organizing information used to display the current status of:
-Safety messages and employee concerns including nuclear, industrial, radiological and environmental safety.
-Plant conditions and crew specific station condition records.
-Work crew/section/department expectations, targets and priorities.
-Planned work for the next three days.
-Other crew specific information such as human performance, training, and radiation protection.

Currently a couple of hundred VMBs are actively used across the plant. Since inception of the VMB process, more than 9000 formal VMB observations have been documented in the observation and coaching database. During initial leader training, the VMB process and expectations are reviewed with the trainer leading the attendees through a simulated VMB meeting.

Barakah, UAE

Mission Date; 15 Sep. -3 Oct., 2017

A leadership development programme adapted to the multi-cultural, multi-national nature of the organization, to ensure that the cultural diversity is addressed, maintained and leveraged to build strong teams with a focus on safe operation of the plant was established.

The Excellence in Nuclear Leadership Programme(EiNLP) is a leadership development programme implemented in 2016 to define and reinforce the Plant Leadership fundamentals and behavioural expectations irrespective of experience either in Western or Korean power plants.

While grounded on the INPO leadership attributes, this safety-focused development programme aims at reinforcing the plant espoused leadership competencies for an organization that is Emirati-led, multicultural and multinational.

The programme is a strategic initiative designed to harness the culture of safety principles and leadership skills and create robust organizational leadership capabilities for the safe operation of the plant. Some of its unique differentiators compared to other leadership programs are:

- Leaders Teaching Leaders: Leadership engagement in the programme implementation is key to its success. As such, Executives, Senior Management and Subject Matter Experts are facilitating several modules throughout the programme and sharing their nuclear knowledge and experience as well as their anecdotal stories with the organization. In addition to the Line Managers, each leadership cohort or class has an assigned Executive Sponsor to support the learning journey.

- Experiential Learning or Learning by Doing: a foundational principle for the programme is offering leaders the opportunity to practice their new skills and tools at the workplace to ensure the Return on Investment.

- Multi-Cultural Program: In the context of the multi-cultural, multi-national nature of the organization, the programme participants are carefully selected to ensure that the cultural diversity is addressed, maintained and leveraged to build strong teams with a focus on safe operation of the plant.

- Diagonal or Vertical Slice: Implementation of leadership cohorts with participants from different functions and different levels of hierarchy (Heads, Managers, Directors and Senior Executives).

To date, 139 plant leaders of Korean, Western and Emirati descent have completed the programme and another 151 are registered for completion.