OSART Good Practices
OPERATIONS
Conduct of operations

Balakovo 4, Russia

Mission Date; 19 May-5 Jun., 2008

Hand held non-contact pyrometers and vibration measuring devices are used by field operators to monitor and take readings on specific equipment during their rounds. This information is then transferred directly to the field operators's computer to allow for data sharing and trending purposes.

The main benefit to using these tools and gathering this information on a routine basis is to provide early detection of equipment degradation. The information in the logs can be presented as trending information. This can then lead to scheduling of preventive or corrective maintenance on the needs basis, prior to development of more serious condition or damage.

Mihama 3, Japan

Mission Date; 20 Jan.-5 Feb., 2009

There is a mimic drawing painted on the wall in the RCA for easy identification of the valves in case there are valve wheels on the wall and the valves itself are behind the wall. The valve station within the radiation controlled area is attached to a wall to reduce exposure during valve operations. Since the piping cannot be checked during valve handle operation, mimics are placed on the wall which helps to prevent incorrect valve identification and incorrect operations.

Mihama 3, Japan

Mission Date; 20 Jan.-5 Feb., 2009

So called "S ring" is used to place the keys which are necessary for high voltage switchyard manipulations are in the required sequence. Once the keys are placed on the "S ring", the keys can be used and manipulations conducted only in prepared and verified sequence. The use of this tool during isolation/restoration operations on transmission line systems to operate breakers, switches and ground disconnecting switches effectively prevent incorrect sequence of manipulations.

Seabrook, USA

Mission Date; 6-23 Jun., 2011

Operations has implemented a Focus on Fundamentals program.

The training consists of dynamic learning activities (DLAs) at the human performance lab, the Technical Training Centre and in the simulator where operators are allowed to perform activities and be evaluated on their use of Human Performance tools and fundamentals by the instructor and fellow students. The dynamic learning activities were developed following a fleet self-assessment and are based on a good practice benchmarked at the South Texas Project.

Subsequent to DLAs conducted in the spring of 2010, the plant benchmarked Pilgrim Station and developed a Focus on Fundamentals initiative for the station. This Focus on Fundamentals initiative complements the plant's training program in much the same way that the DLA's do and consists of Senior Nuclear System Operators, overseen by an SRO licensed individual, engaging field activities in a mentoring role. The Focus on Fundamentals initiative concentrates on the use of core human performance tools as well as comprehensive Pre-job Briefs, STAR, field work best practices and enhanced Operator rounds. The Operations Focus on Fundamentals initiative and dynamic learning activities complements the Operations Training program by providing Operators with practical field work and experience.

This program enhances knowledge transfer and mentoring of junior NSOs and system awareness.

Chooz, France

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

Air- and hydrogen leak detection using an ultra-sonic detector

The operations department purchased an ultrasonic leak detector in order to have a reliable, user-friendly and quick detection tool for different types of leaks, such as for example, air leaks, steam leaks, air ingress and hydrogen leaks. It can also be used to monitor passing drain valves, which cannot be done with bubble-type liquid leak detectors.

The results achieved show that numerous leaks have been quickly and safely identified, thereby bringing improvements in the area of industrial safety, radiological protection, technical and economic performance.

As an example, the air system for the diesel generators used to be operated over several cycles with air-leaks that were difficult to pinpoint. This over-burdened the compressors and caused premature ageing. This ultrasonic leak detection device has made it possible to locate a leak quickly, to map the leaks and to conduct targeted repairs.

In order to ensure that all shift teams can make full use of this device, training has been begun to be delivered to individuals across all teams, in line with corresponding training specifications.

Chooz, France

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

Ergonomically designed lay-out board for tags on safety related valves in the tagging office

Depending on plant status, certain safety related valves have to be positioned in a pre-defined position in the field to guarantee the correct plant configuration. These valves are locally locked with a padlock. A red tag indicates the safety position of the valve. The position of these valves however is not indicated visually in the main control room.

The plant has developed a clear procedure on how and when the position of the locked-out valves can be changed. The position of the valves can only be changed after performing a risk analysis which has been approved by the shift manager. When the valve position is changed from the locked-out position, the associated tag is stored in the tagging office.

The plant has implemented an ergonomically designed lay-out shadow board in the tagging office for setting aside the tags for safety related valves. This allows the shift manager to carry out a simple, visual check of which safety tags have been issued and if the safety tags deployed on plant correctly match current plant status. This check is carried out at least once per shift. Since the introduction of this innovation there have been considerably fewer instances of safety related valve misalignment.

Clinton, USA

Mission Date; 11-28 Aug., 2014

Pre-Job Brief Database

The Pre-Job brief (PJB) database is used to capture lessons learned and opportunities for improvement using information acquired during post-job critiques. The database contains 'living' documents that are maintained and frequently updated with industry OPEX, recent related events and data from recent job performances. The PJB database also contains standard PJBs, tailored PJBs, Heightened Level of Awareness (HLA) briefings, checklists for Work Package Planning, sources of training for Equipment Operators and Infrequent Plant Activity (IPA) briefings for all modes of operation. The database provides a readily accessible, convenient location for all operations individuals to store lessons learned, OPEX, job performance notes and recent events. This database is seen as a significant aid in preventing events and avoiding repeat events.

Flamanville, France

Mission Date; 6-23 Oct., 2014

Plant component status tracking system

The plant has developed and implemented a comprehensive plant component tracking system (AIC) that is used during on-line and outage operations. The system uses a database that receives inputs from other station software systems, such as safety tagging and work authorization permits. These collective inputs are used to maintain the status of all plant components in one database, allowing operations personnel to easily track components that are not in the required position at power or shutdown conditions because of maintenance or other scheduled activities. In addition, the system analyzes component positions to determine the status of important functions, such as the capability of a shutdown cooling pump to provide flow to the reactor vessel.

This plant component status tracking system has several benefits. The system enhances the risk awareness of operations personnel because it displays the impact of out-of-normal-position components and their corresponding impact to important functions. The database displays information in a visually meaningful manner that is easy to access. Also, it provides additional defense-in-depth and efficiency to ensure that all components and functions are available before an operational change is authorized. In addition, it improves the efficiency and rigour of post-outage valve line-ups because it allows operations personnel to focus on systems and components that were manipulated during maintenance.

Since the plant component status tracking system was implemented in 2012, there have been no significant component mispositionings that require reporting to the regulator, and the number of low-level component mispositionings has been significantly reduced.

Krsko, Slovenia

Mission Date; 15 May-1 Jun., 2017

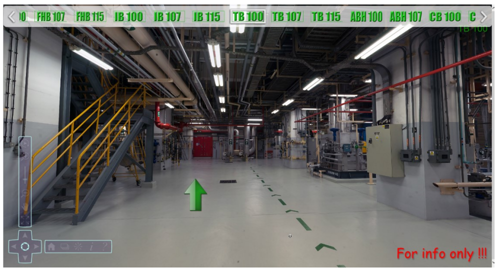
Plant panoramic tour

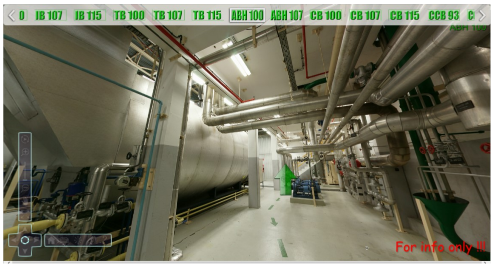
The plant has implemented panoramic tour using photos of technological areas.

Multiple panoramic snapshots were made inside plant technological areas in different elevations of buildings. The tool is available for all workers with access to a plant computer.

There are several benefits provided by this software:
- Reduced time in the tagging process: operators can readily locate and identify specific equipment and area requirements;
- Software could be used during pre-job briefings for better explanation of field specific features to workers before going in the field to do the task;
- It enhances the ability for new plant workers in becoming familiar with the plant layout;
- Civil structures engineers during the storage of equipment approval process can efficiently evaluate requested storage space;
- Areas which are not readily accessible such as the containment at power can be reviewed and discussed immediately.

This results in reduced radiation dose and improves the efficient use of plant working time.





Torness, UK

Mission Date; 22 Jan. - 8 Feb, 2018

Marine Ingress Weather Alert System

Marine Ingress into cooling water intakes, primarily related to seaweed and jelly fish, has caused operational issues across the life of the plant. Severe episodes of seaweed ingress have challenged nuclear safety and have led to reactor trips. The plant implemented comprehensive process to prepare and respond to marine ingress events. Updates were made to the plant documentation associated with the marine ingress risk indicator. This indicator is based on meteorological forecasts of wind direction, wave height and wave direction.   In addition, a review of the information available to the main control room, to aid decision making, was also carried out.

Improvements implemented include:

- A new comprehensive procedure and flow chart in place which defines the process by which an assessment of marine debris risk is performed to aid operations in the deployment of appropriate mitigating actions to minimise the potential impact on the station cooling water systems.

- Improved drum screen and circulation water pump level instrumentation to give accurate and reliable indications to the main control room to support operator decision making.

- Enhanced drum screen protection system improvement - prevents drum screen failures, loss of reactor sea water system flow and automatic trips from condenser circulating water pass loss of prime, by preventing excessive drum screen differential pressure.

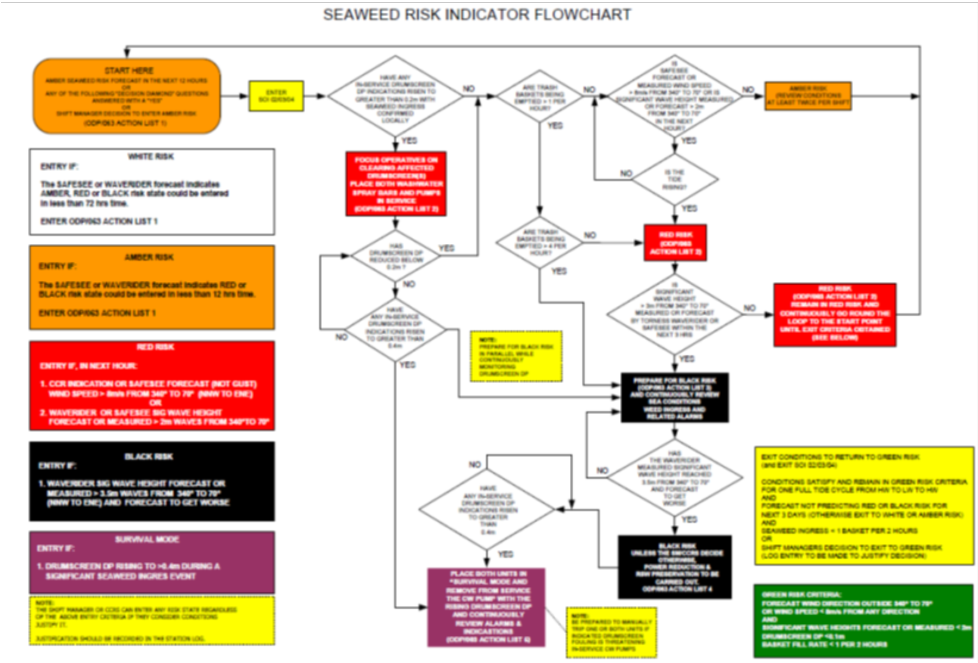
- Drum screen wash water augmentation uses the reactor sea water system to augment wash water supply which will address the lack of redundancy on existing system and greatly improves wash water availability.

- Installation of raking system reduces the likelihood of high drum screen differential pressure developing by removing larger weed upstream of the drum screens.


Enhanced drum screen protection


Raking system


Wash water augmentation


SEAWEED RISK INDICATOR FLOWCHART
START HERE
ENTER SCI 02/03/04
WHITE RISK
ENTRY IF:
The SAFESEE or WAVERIDER forecast indicates AMBER, RED or BLACK risk state could be entered in less than 72 hrs time.
ENTER ODP/063 ACTION LIST 1
AMBER RISK
ENTRY IF:
The SAFESEE or WAVERIDER forecast indicates RED or BLACK risk state could be entered in less than 12 hrs time.
ENTER ODP/063 ACTION LIST 1
RED RISK
ENTRY IF, IN NEXT HOUR:
1. CCR INDICATION OR SAFESEE FORECAST (NOT GUST) WIND SPEED > 8m/s FROM 340° TO 70° (NNW TO ENE)
OR
2. WAVERIDER OR SAFESEE SIG WAVE HEIGHT FORECAST OR MEASURED > 2m WAVES FROM 340° TO 70°
BLACK RISK
ENTRY IF:
1. WAVERIDER SIG WAVE HEIGHT FORECAST OR MEASURED > 3.5m WAVES FROM 340° TO 70° (NNW TO ENE) AND FORECAST TO GET WORSE
SURVIVAL MODE
ENTRY IF:
1. DRUMSCREEN DP RISING TO >0.4m DURING A SIGNIFICANT SEAWEED INGRES EVENT
EXIT CONDITIONS TO RETURN TO GREEN RISK
CONDITIONS SATISFY AND REMAIN IN GREEN RISK CRITERIA FOR ONE FULL TIDE CYCLE FROM HW TO LW TO HW
AND
FORECAST NOT PREDICTING RED OR BLACK RISK FOR NEXT 3 DAYS (OTHERWISE EXIT TO WHITE OR AMBER RISK)
AND
SEAWEED INGRESS < 1 BASKET PER 2 HOURS
OR
SHIFT MANAGERS DECISION TO EXIT TO GREEN RISK
(LOG ENTRY TO BE MADE TO JUSTIFY DECISION)
GREEN RISK CRITERIA:
FORECAST WIND DIRECTION OUTSIDE 340° TO 70°
OR WIND SPEED < 8m/s FROM ANY DIRECTION
AND
SIGNIFICANT WAVE HEIGHTS FORECAST OR MEASURED < 2m
DRUMSCREEN DP <0.1m
BASKET FILL RATE < 1 PER 2 HOURS
YES
NO