CORRECTIVE ACTION PROGRAMME

NUSIM 2010

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Scope

- New Corrective Action Program (CAP) was put into operation at Slovenské elektrárne from 1 January 2010
- CAP is supported by SAP Nuclear software
Context – Continuous Improvement Model

EXCELLENCE IN PERFORMANCE

RESULTS

Implementing Solutions

Performance Monitoring

Analyzing, Identifying and Planning Solutions

ACTIONS

GAPS
CAP objective

CAP is a tool to enable problem identification and resolution at NPP

The objective of the Corrective Action Program (CAP) is to:
- identify,
- document,
- evaluate, and trend
undesirable conditions (problems) and to take actions to correct problems
(WANO GL 2001-07)

Goal:
• Avoid recurrence of problems &
• Prevent occurrence of significant problems
Principal CAP process

Problem IDENTIFICATION, Reporting & Documentation

Analyze WHY problem occurred

Trending

Corrective action CLOSURE

Take MEASURES to
- Solve the problem
- Prevent recurrence

Effectiveness review

CA scheduling, implementation & tracking

Cause investigation with report

+ significance determination
What kind of „problems“ are reported into CAP

- Plant events
- Equipment failures
- Human errors
- Process losses
- Process control breakdown
- Plant damage
- Equipment damage
- Maintenance rework
- Loss of configuration control
- Equipment misoperation
- Component mispositioning
- Procedure deficiencies
- Procedure adherence shortfalls
- Radiological events
- Environmental incidents
- Fires or explosions
- Plant labeling deficiencies
- Housekeeping problems
- Near misses
- Issues identified by audits
- Injuries
- Unsafe conditions that has or could cause personnel injury
- Applicable operating experience (OE)
- Areas for improvement identified by selfassessment
- Improvement suggestions by staff
- Safety questions
- Adverse trends
- Regulator concerns
- Other adverse occurrences
CAP requirements

- Staff is required to **report all kinds of problems** (big and also small) using a single reporting channel – NG Notification **into SAP software**.

- **All issues** (events, failures, conditions, findings, improvement suggestions, enhancements) are documented, prioritized, and tracked in a single database.

- Reporting criteria require staff to report into the CAP **also low level problems**.

- Reported problems are **prioritised based on their significance**. Five significance levels are used.

- **Required depth and extent of problem cause analysis** is based on its significance.

- **Root cause investigation** techniques are applied to the most important (significance level 1) issues where recurrence is unacceptable.

- Causes identified for higher priority problems are **regularly trended** – this assists the identification of common problems that may pose a higher risk or the potential for a more significant events.

- **CAP is kept under management control** – Corrective Action Review Board (CARB) composed of Senior Managers provides management oversight above the CAP and is responsible for its overall effectiveness.
WHY CAP?

**What all NPPs usually do:**
- Investigation of plant events / big problems (20–100 Root Cause Analyses per year) and implementing corrective actions addressing root causes
- Fixing small problems (failures, nonconformances, issues)

No plant has enough capacity to investigate root causes of all small problems

**What more best NPPs do:**
- Trending off small problems – adverse trends identification
- Finding and resolving common causes for adverse trends (i.e. groups of small problems)

**Our intent:**
We decided to implement the CAP with the intent to enable better handling of small problems using trending
# Significance Level – Investigation Class

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Investigation Class</th>
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<tbody>
<tr>
<td>SL1 – High Significance</td>
<td>Class A - RCI Root Cause Investigation by a team</td>
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<tr>
<td>An event that results in <em>major impact</em></td>
<td></td>
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<tr>
<td>SL2 - Moderate Significance</td>
<td>Class B - ACI Apparent Cause Investigation</td>
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<tr>
<td>An event that results in <em>moderate impact</em></td>
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</tr>
<tr>
<td>SL3 – Low Significance</td>
<td>Class C - MACI Minor Apparent Cause Investigation</td>
</tr>
<tr>
<td>A condition that results in <em>minor impact</em></td>
<td></td>
</tr>
<tr>
<td>SL 4</td>
<td>No investigation, fix the problem only and assign trend codes</td>
</tr>
<tr>
<td>Small problem</td>
<td>SL 5 Improvement Item</td>
</tr>
<tr>
<td>Improvement Item</td>
<td>No investigation, improvement action</td>
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* Investigation Class can be increased based on risk assessment
CAP process flowchart was designed with the use of benchmarking with US NPPs.
CAP gives big emphasis on identification and trending of low level problems – WHY?

Experience has shown that there exist some ratio between major accidents, minor accidents and low level nonconsequentional errors – see the severity pyramid below.

Severity pyramid (Heinrich)
CAP gives big emphasis on identification and trending of low level problems – WHY?

- Experience has proved that minor events and conditions have the same underlying causes as big consequential events

- If we decrease the number of low level events and conditions we decrease also the number of big consequential accidents

- If we detect repeated minor problems, find and correct their underlying common causes
  - We can prevent significant plant events to happen
CAP gives big emphasis on trending – WHY?

- Problems and associated causes are trended to identify:
  - repeated occurrences,
  - generic issues, and
  - vulnerabilities
  at a low level before significant problems result.

- Trending facilitates correction of minor problems in aggregate, through the identification of key characteristics (common cause).

- Trending provides feedback from longer term perspective.

- Trending can identify declining performance in some area.

- Trending enables correct low level problems with relatively low demands on resources. We do not need to increase number of cause investigations (which require resources) if we are able to find common cause for group of problems and then make one root cause analysis.
# Main features of CAP

<table>
<thead>
<tr>
<th>BEFORE</th>
<th>NOW</th>
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<tbody>
<tr>
<td>Several reporting channels</td>
<td>One reporting channel for all kinds of problems and events</td>
</tr>
<tr>
<td>Up to 34 different databases</td>
<td>One database</td>
</tr>
<tr>
<td>Decision making at several levels and in different time</td>
<td>Daily screening of notifications in Screening Meeting at the NPP – assignment of significance level &amp; investigation class</td>
</tr>
<tr>
<td>Partial trending – problems with identification of adverse trends</td>
<td>Standard complex trend analyses of low level issues</td>
</tr>
<tr>
<td>CA effectiveness review not performed</td>
<td>Effectiveness review of important CA</td>
</tr>
<tr>
<td>Limited assessment of OE feedback effectiveness</td>
<td>Periodic selfassessment of CAP</td>
</tr>
<tr>
<td>No direct link between ARSOZ &amp; OE feedback</td>
<td>Link between CAP &amp; WMS. The same notification used for CAP &amp; WM.</td>
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<tr>
<td>Disunity in procedures, criteria, processes</td>
<td>One unified set of procedures</td>
</tr>
<tr>
<td>Several SW – ARSOZ, NaPČ, Lotus Notes</td>
<td>One SW tool SAP Nuclear</td>
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Databases to track problems and corrective actions at EBO and EMO (until the end of 2009)

- Deficiencies on installed plant equipment
- Plant Events (Transients, Incidents, Accidents)
- Procedure Problems Housekeeping Issues Industrial Safety Problems Workplace Condition, ...
- QA Audits

- ARSOZ Database
- Plant Events Database
- NaPC Database

- EHS and FP book - Database (in ARSOZ)
- Near-misses Database
- Regulatory Findings Databases (separate database for each regulator)
- EMS Audit Issues Database
- Simulator Training Issues Database

- Internal Fire Inspections
- Industrial Safety Inspections
- Near-misses
- Findings identified by regulators
New CAP - all existing databases converted into single CAP database

Corrective Action Programme

- PLANT EVENTS
- ARSOZ
  - Near-misses
  - Human Errors
  - EHS & FP book
  - WANO PR
- UJD Findings
- PSR Findings
- QA Audits
- EMS Audits
- Injuries
- Evaluations
- Regulatory concerns

CR

CAP Process
Benefit from CAP implementation

A. Benefit for employees

- **Simple problem reporting**
  - Single reporting channel for all kinds of problems (NG Notification into SAP)
- **Transparency**
  - Everybody can see all reported problems and current status of corrective actions taken to resolve problems

B. Benefit for managers

- **Better information**
  - They can see all reported problems and all corrective actions taken
  - They can see overall picture of problems in the area of their responsibility
  - They obtained a tool enabling to analyse overall set of problems using trend analysis, specific codes, KPI, etc.
- **Better prioritization and use of resources**
  - It is possible to prioritize all problems using the same priority scale
  - Problems can be solved based on assigned priority and significance
  - It provides a tool to manage backlog of reported problems based on priority assigned
  - All problems are daily screened for their impact on safety, plant performance, operability and reportability to regulator
  - The accountability for resolving problems is clearly assigned and recorded
Thank you for your attention