Safety Culture Assessment in SE Member of Enel Group

The IAEA Technical Meeting on Safety Culture

Jozef Zlatňanský, Head of Nuclear Oversight

26 - 30 November 2012, Cape Town, South Africa

Jozef Zlatňanský

- Slovak Technical University/ Nuclear Engineering
- **Head of Independent Nuclear Oversight** in Enel Slovensko
- Member of Board of Directors of SE a.s.
- Member of ENISS Steering Committee *(European Nuclear Installation Safety Standard Initiative)*
- *FORATOM (Chairman of Task Force for New Member States)*
- *Member of Nuclear Safety Committee - ENDESA –since 2008*

Previous positions:

- Acting Head of Europe Section - IAEA, Vienna
- *Vice Chairman of UJD - national regulator*

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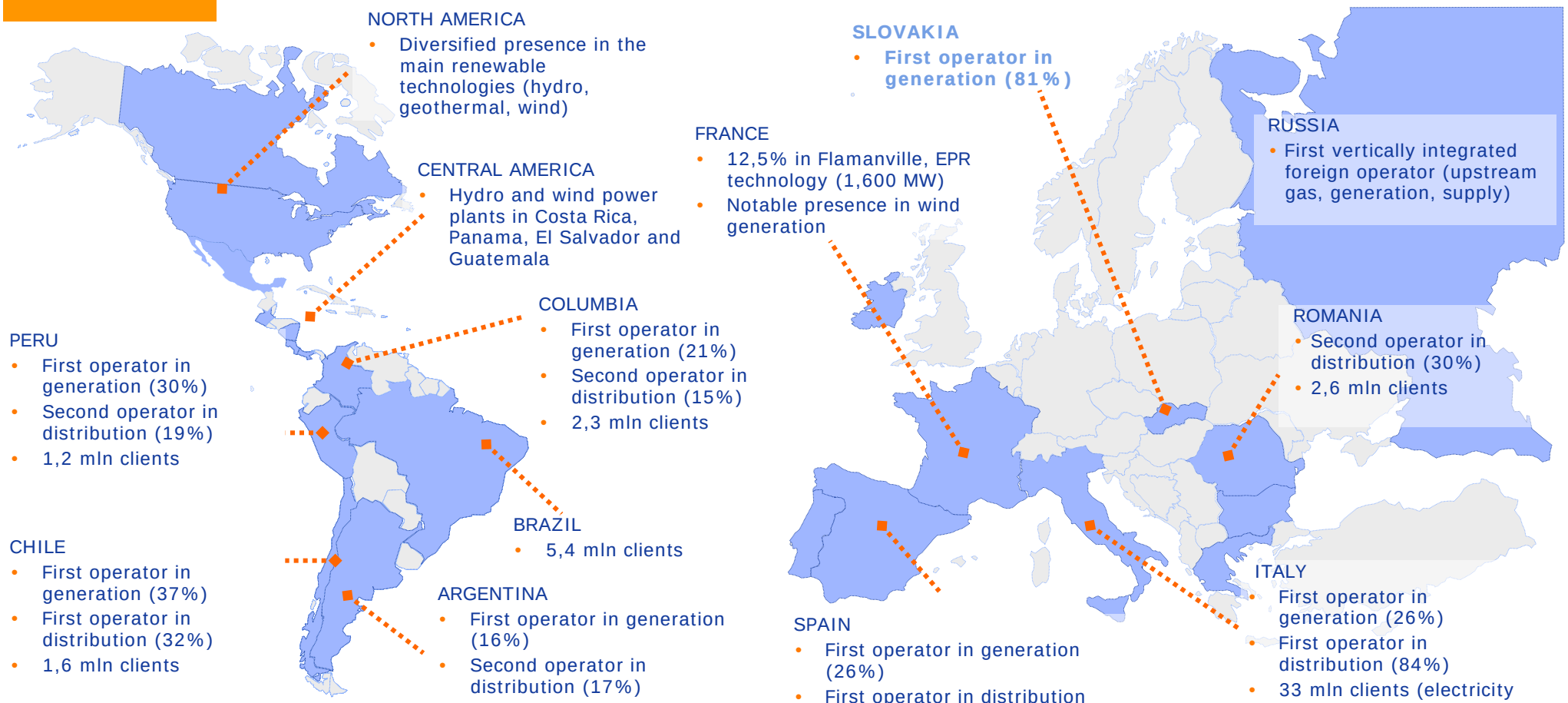
Slovenske Elektrarne, member of Enel Group



NORTH AMERICA
- Diversified presence in the main renewable technologies (hydro, geothermal, wind)

CENTRAL AMERICA
- Hydro and wind power plants in Costa Rica, Panama, El Salvador and Guatemala

PERU
- First operator in generation (30%)
- Second operator in distribution (19%)
- 1,2 mln clients

COLUMBIA
- First operator in generation (21%)
- Second operator in distribution (15%)
- 2,3 mln clients

BRAZIL
- 5,4 mln clients

CHILE
- First operator in generation (37%)
- First operator in distribution (32%)
- 1,6 mln clients

ARGENTINA
- First operator in generation (16%)
- Second operator in distribution (17%)
- 2,3 mln clients

FRANCE
- 12,5% in Flamanville, EPR technology (1,600 MW)
- Notable presence in wind generation

SLOVAKIA
- **First operator in generation (81%)**

RUSSIA
- First vertically integrated foreign operator (upstream gas, generation, supply)

ROMANIA
- Second operator in distribution (30%)
- 2,6 mln clients

SPAIN
- First operator in generation (26%)
- First operator in distribution (43%)
- 13 mln clients (electricity and gas)

ITALY
- First operator in generation (26%)
- First operator in distribution (84%)
- 33 mln clients (electricity and gas)

Market shares for distribution calculated per TWh of distributed energy

Slovenske Elektrarne Mission & Vision

Mission

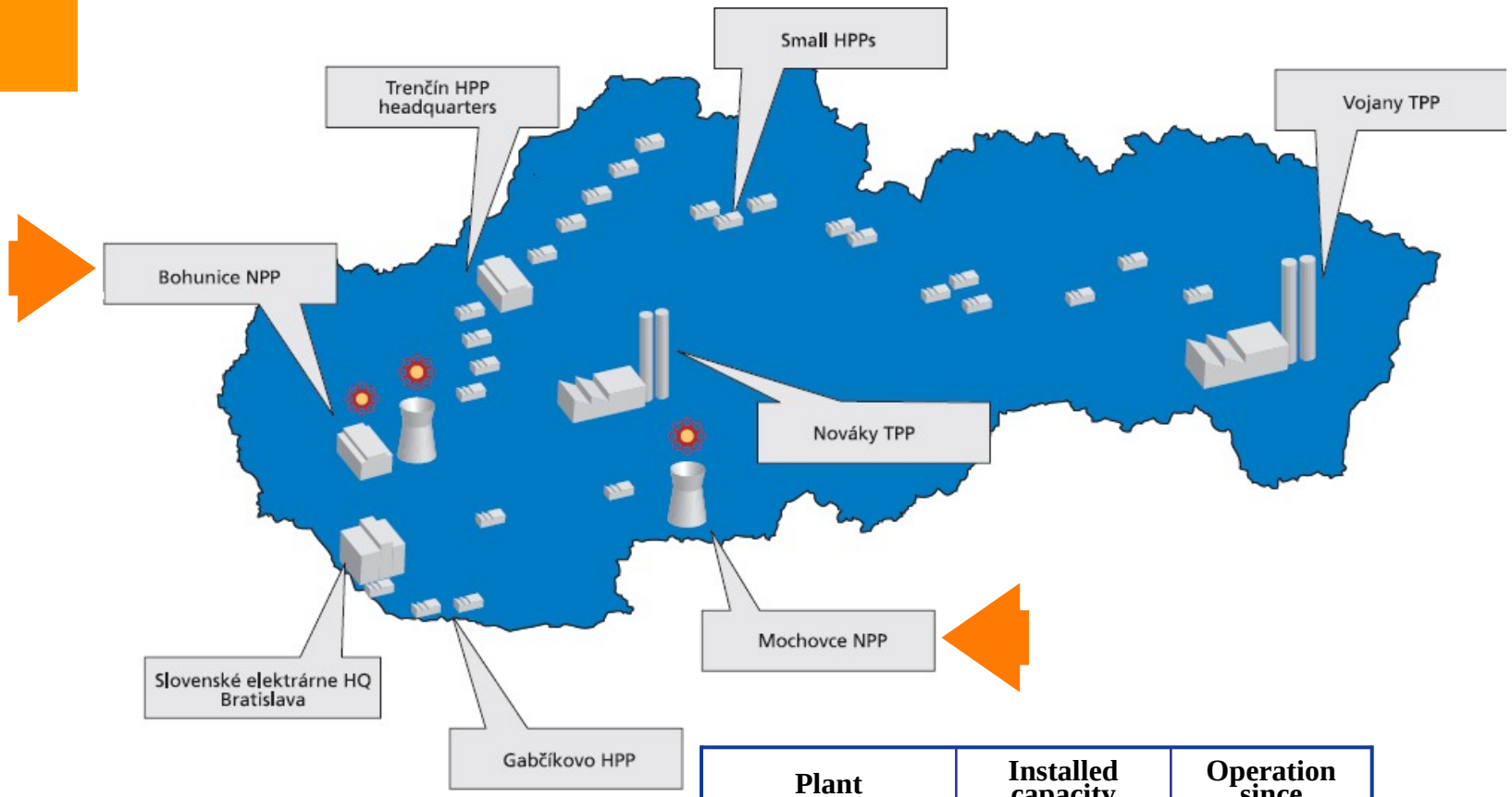
To achieve the highest levels of safety and performance through: **excellent execution**, **continuous improvement and teamwork**.

Vision

To be the **safest**, **most reliable**, **efficient and competitive** producer of electricity creating value for our customers, shareholders and employees.

Value Creation wheel

Slovenske Elektrarne as a Nuclear Utility



Plant	Installed capacity	Operation since
Bohunice NPP	**1010 MW[1]**	**1984-1985**
Mochovce NPP	**940 MW**	**1998-2000**
Vojany TPP	880 MW[2]	1965-1967
Novaky TPP	518 MW	1954-1955
Hydro	2399 MW[3]	1936-1993

[1] Bohunice V-2 units (3&4) after power up-rate
[2] Including 4x110 MW installed off-line capacity at TPP Vojany II
[3] Including the Gabcikovo HPP which is operated by SE

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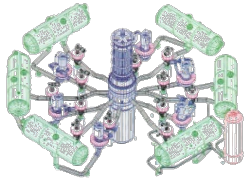
Mochovce 3&4

History of the project



Reactor moderated and cooled by pressurized water (PWR)

Core weight (t)	**42**
Number of primary loops	**6**
Rated thermal power [MWth]	**1375**
Gross output [MWe]	**440**

Units 3,4 to be completed

- Two Units, PWR 440 type
- Construction started in 1986
- Works suspended in 1992
- Feasibility study concluded in 2007
- Basic Design changes approvals obtained in 2008

Pre selected technology

- Status in 1992
  - Civil works 70%
  - Mechanical works 30%
  - Electrical and I&C negligible
- Preservation program approved by UJD and compliant with IAEA TECDOCs

Units 1,2 in operation

- Two Units, PWR 440 type
- Construction started in 1982
- Construction suspended from ‘92 and restarted in 1996
- In operation since 1998/2000
- Overall gross output = 940 MWe

Mochovce 3&4

Basic data

Approved budget: **3,161 Mln €**, **largest single investment**

Consolidated design with **Evolutionary safety measures**

Competitive economics, **flexibility**

Architect engineer – **Slovenské elektrárne / ENEL**

More than 100 contracts

Team: 500+ professionals SE, ATN, SRI

18 million man-hours

Workers: 4000+ (peak number)

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Nuclear Oversight in Slovenske Elektrarne

An independent off-line function consists of

1. **Nuclear Oversight** (internal unit reports to BoD)

2. **NSAC - Nuclear Safety Advisory Committee** (international part of NOS)

3. **International Safety Reviews** (WANO, OSART)

   (three years programme for each site + Corporate review)

OSART – „good performance“.....2010

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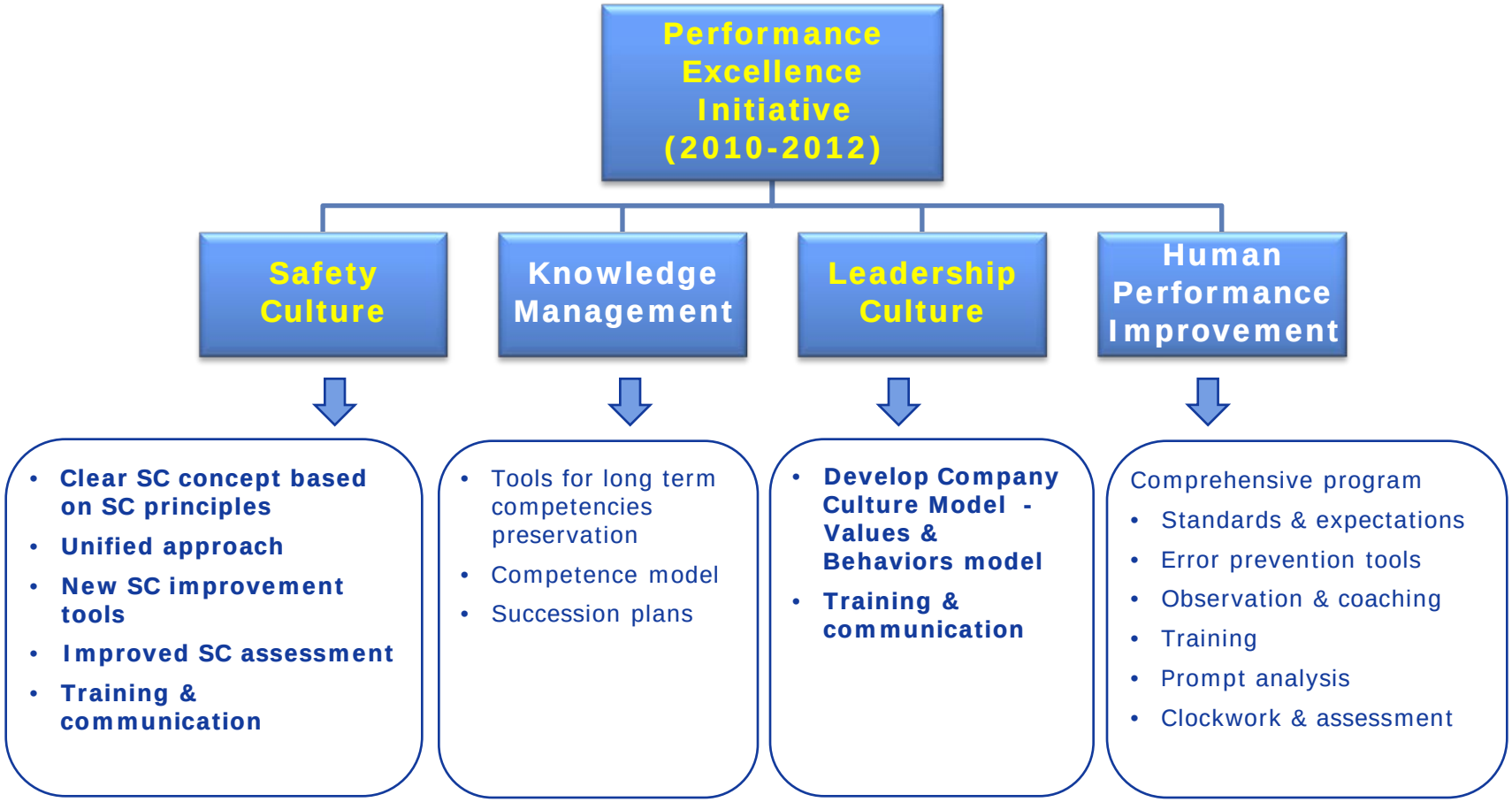
Safety Culture in Slovenske Elektrarne (SE)



Enel Group vision of Nuclear Safety Culture

"Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance" (INSAG 4 – 1991)

➢ **One Nuclear Policy** for all Nuclear Assets of the Group (since **2011**)

Overall Commitments

- Ensure that nuclear facilities adopt a **clear nuclear safety policy** and are operated with **overriding priority to nuclear safety**, the protection of nuclear workers, the general public and the environment from risk of harm
- **Encourage excellence in all plant activities and to go beyond compliance** with applicable laws and regulations and to adopt management approaches embodying the principles of Continuous Improvement and Risk Management
- **Promote a cooperation policy** on safety in the nuclear industry **worldwide**
- **Provide sufficient resources** to implement the safety policy

Duties as owner shareholder

- **Ensure** that even the relevant **nuclear organizations** where Enel has a minority participation **have adopted and published** suitable **policies** for nuclear and environmental safety, radioactive waste management and the physical security of nuclear assets

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SE assessment & monitoring of SC

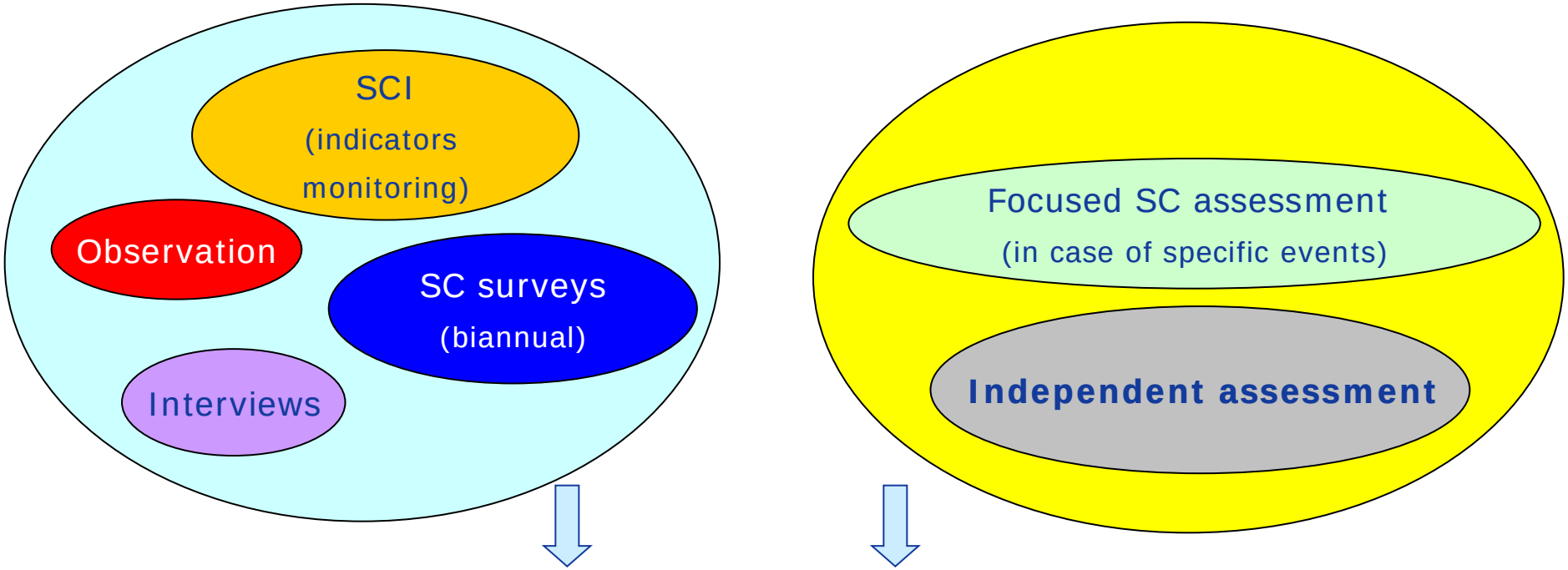
Based on SE Guideline: SE/MNA-134.01

SC Self-assessment

Integrated with other self-assessment activities

Independent assessment

Biannual frequency and Line independent



Feedback – Corrective measures – Continuous improvement

SAFETY CULTURE ACTION PLAN

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SE Self-assessment of SC

Safety Culture Indicators SCIs

- Set of **indicators**, related to **WANO SC principles** (power plant-wide and departmental)
- Part of **Self-Assessment and Benchmarking** process
- **SCIs guarantor** in each department evaluates indicators and proposes corrective actions
- **Safety Culture Commitee (SCC)** chaired by Safety Manager proposes and checks fulfillment of the **SC Action Plan** and coordinates tasks related to SC

Safety Culture Surveys (anonymous)

- **73 statements** based on **WANO SC principles** with **three possible answers** (positive, negative or neutral) and possibility to comment (adopted since **2010**)
- **Results** used as:
  - input for **Independent SC assessment**
  - develop **corrective measures** through the **SCC**

No.	SC Survey Statements - NPP
1.	Nuclear safety is discussed in all meetings of the company where working activities are planned or conferred upon at the plant.
2.	It is clearly understood at the plant that everybody is personally responsible for safety; this means that I am also personally responsible for nuclear safety, contributing to the overall safety culture.
3.	The authorities of workers and their responsibility for nuclear safety are clearly defined in the company.
4.	Supporting departments of the company understand their tasks and their contribution to nuclear safety.

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SE Independent Assessment of SC

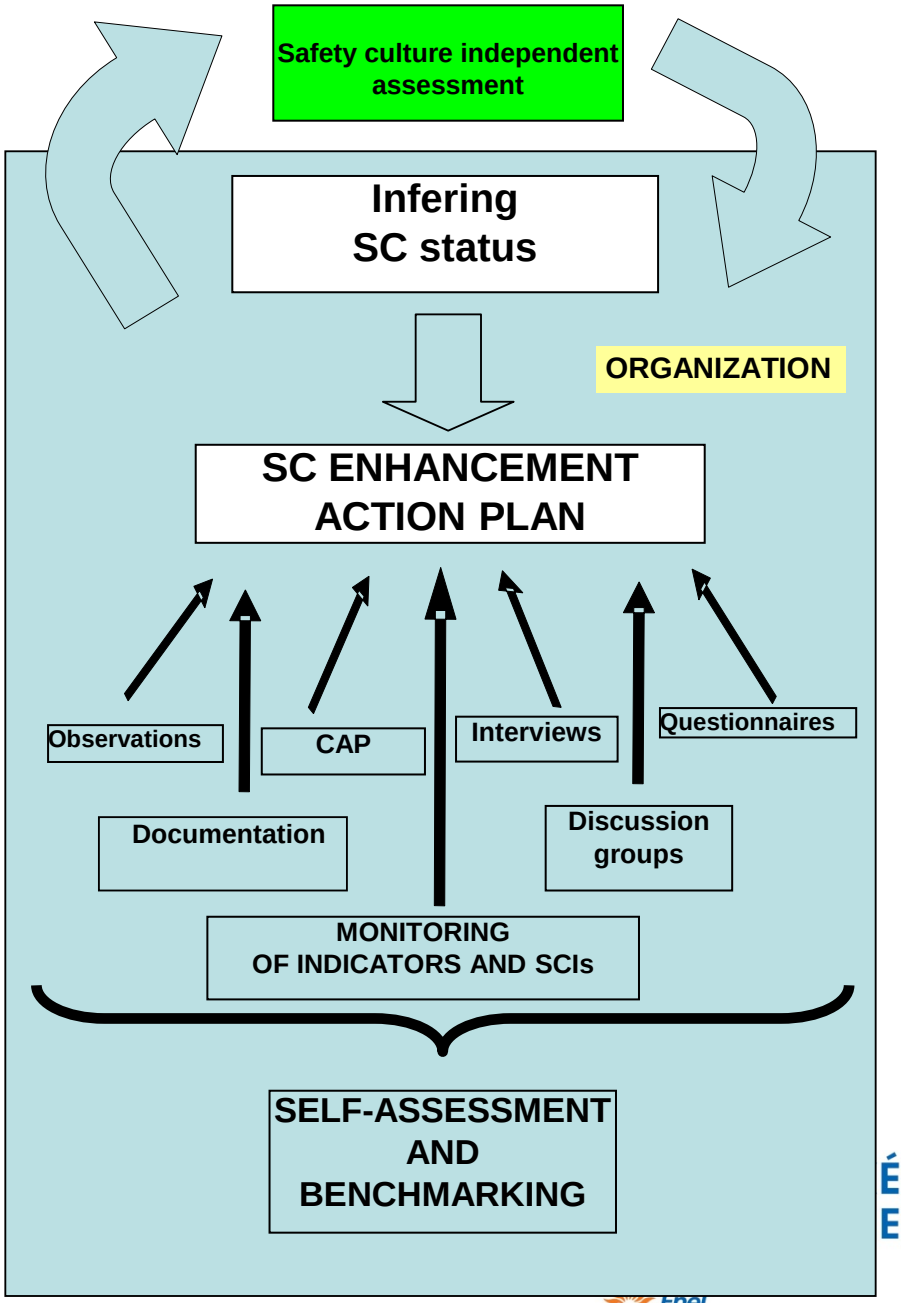
- Organized **biannually** by **Nuclear Oversight** unit with methodology and support from **Utilities Service Alliance**

- Line **independent** Assessment **team**:
  - SE Nuclear Oversight unit
  - Utilities Service Alliance experts
  - SE Nuclear Safety Advisory Committee
  - Other power-station companies (e.g. ENDESA)
  - SE senior employees or experienced specialists

- **Assessment methodology:**
  - Review of **SC survey results**
  - **Interviews** and **groups discussions**
  - **Field** and **meeting observations**

- **Areas for improvement** based on **comparison** with **WANO SC principles**

- **From 2012** assessment has been extended also to **Conventional power plants and SE central functions**



Safety Culture Assessment in 2012

SC Survey (18th June –13th July)

- Survey and assessment implemented for the first time on the whole company (4900 workers involved)
- 73 questions (attributes) for NPPs and HQ and 68 questions (attributes) for CPPs
- 82.4% overall participation rate thanks to
  - communication campaign (journal, intranet, emails, posters, handout, TV screen, Posters and discussion in Operational meetings)
  - dedicated project team
  - management support

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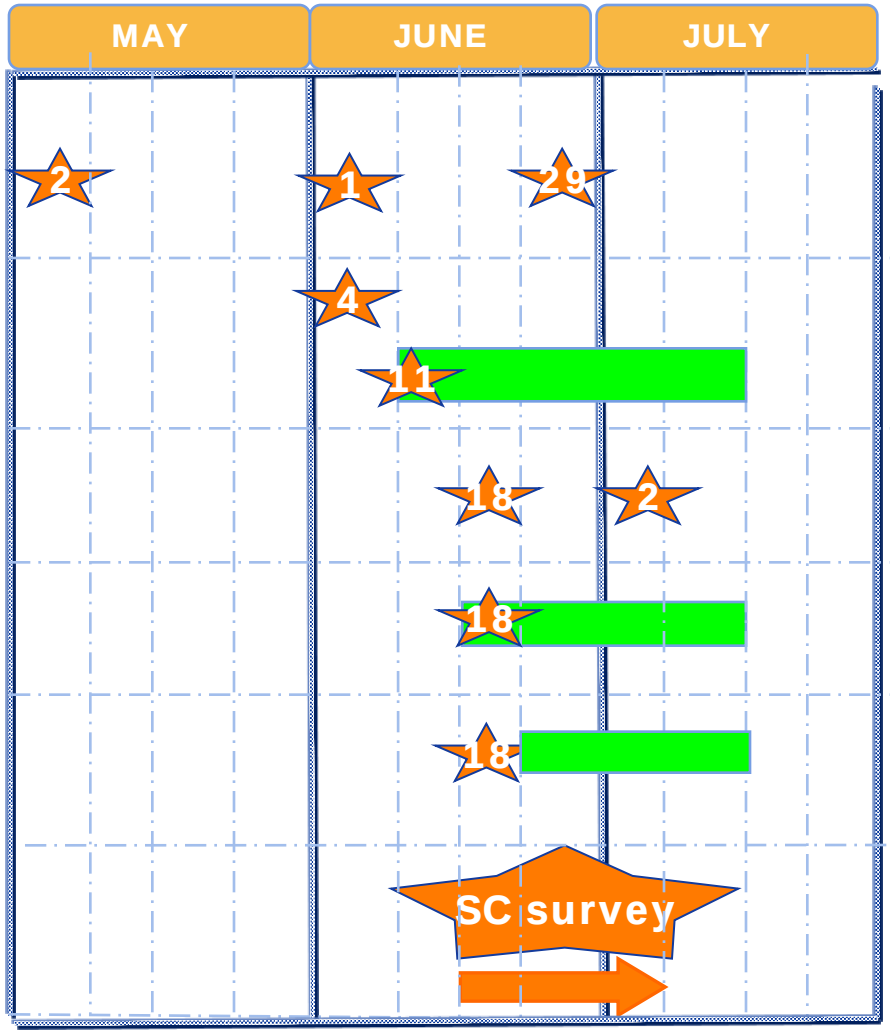
Communication campaign

- SLOVENSKÁ ENERGETIKA
- INTRANET
- E - MAIL
- Posters + Totem
- TV screens



Monitoring & Assessment of Safety Culture

*Based on **WANO GL - INPO Principles** for a Strong Nuclear Safety Culture*

1. Everyone is personally responsible for nuclear safety.
2. Leaders demonstrate commitment to safety.
3. Trust permeates the organisation.
4. Decision-making reflects safety first.
5. Nuclear technology is recognised as special and unique.
6. A questioning attitude is cultivated.
7. Organisational learning is embraced.
8. Nuclear safety undergoes constant examination.

The assessment methodology

The Nuclear Safety Culture Assessment (NSCA) process **is not intended to perform detailed technical evaluations** of the station's work practices and processes.

The elements of safety culture are behavioral in nature; the NSCA process focuses on the **evaluation of the perceptions and beliefs** that the station's workforce has regarding nuclear safety and leadership attributes.

Assessment data are collected through:

- Safety culture questionnaires
- Interviews
- Meetings and field observations

The assessment's model of a safety culture, the structure of the assessment process and the results of the assessment are expressed in line with **WANO- INPO's principles and attributes** of a strong nuclear safety culture.

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Assessment of Safety Culture in SE - 2012

SE Guideline: „Assessment and Monitoring of SC“

1. ***SC Questionnaire*** (18 June –13 July) - 1st part

2. ***Independent SC Assessment*** (9 - 21 Sept.) - 2nd part

Survey and assessment implemented first time for the whole company (5.000 staff):

- two NPPs - in operation
- one NPP - under construction
- Conventional plants
- Headquarters

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Safety Culture assessment in 2012
Independent assessment (3rd September –12th October)

- **An independent team composed by 16 assessors performed assessment in the different locations (4-5 assessors per location)**
- **118 Interviews and 9 observations performed involving all levels of the company**

Main activities		September	October	
Preliminary **analysis of documentation** and survey results	 3.9.2012	3.9.÷7.9. 2012		 12.10.2012
Interviews with staff and observations in **NPPs and HQ with U.S.A. experts**		9.9.÷14.9. 2012		
Interviews with staff and observations in **CPPs**		17.9.÷ 21.9. 2012		
Drafting of **final report with U.S.A. expert**			1.10.÷5.10. 2012	
Results sharing and **reporting**			8.10.÷12.10. 2012	

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Independent SC Assessment

Team Members	notes
Jozef Zlatňanský	Team leader
Clay Clifford Warren (USA)	
Alessandro Sessa (Enel ATN)	
Juraj Rovný	
Michal Kozický	
Ján Vittek	
Zoltán Zerola	
Tomáš Vanák	
Martin Danko	
Pavol Štancel	
Gianluca Geracitano (Enel INT)	
Lenka Maceková (Enel University)	
Alberto Lopez –Endesa	9th to 14th Sept.
Bill Ponec - Expert U.S.A.	8th to 15th Sept.
Therese and Michael Werner - Experts U.S.A.	
Tim Steele - Expert U.S.A.	Draft report
Karl Fullbrook	Cold eyes

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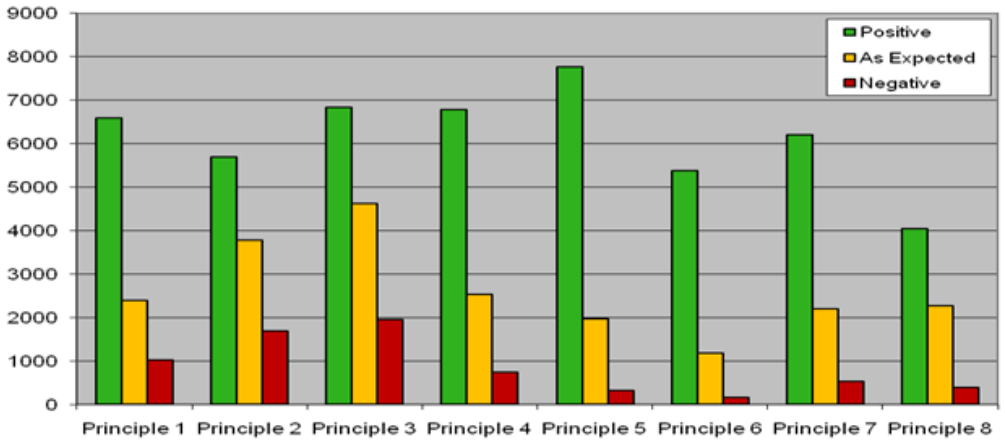
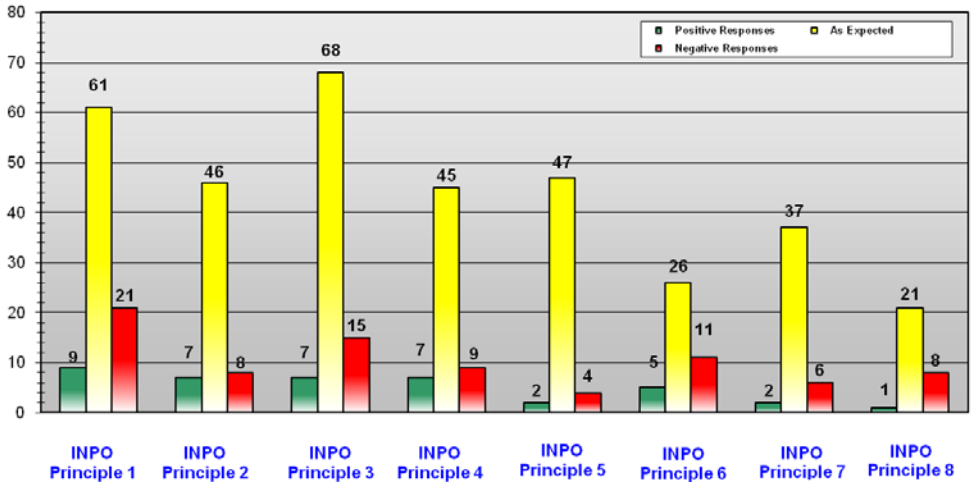
SE Assessment of SC

- **Self-assessment survey results**:
  - Detailed analysis for each principle is performed
  - Questions related to each principle are summed up
  - Main comments are summed up

- **Independent interviews results**:
  - Interview outputs are classified using evaluation tools
  - Results are validated in team discussion
  - Detailed analysis for each principle is performed
  - Questions related to each principle are summed up





- **Final independent assessment report** issued with **level of organization's SC-related maturity** status and **recommendations** discussed with **Line Management**
- **SCC integrates** actions in **SC Action Plan** (and Corrective Action Program)

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Comparison of 2010 and 2012 assessments (EMO)

Of the eight Negative Observations identified at Mochovce in 2010, five have improved or been adequately addressed and three still require attention to effectively resolve.

Principle	2010 NSCA Findings	2012 NSCA Findings	Difference
1B / 1C	Strategic changes and decisions from Procurement and HR impact on the plant workers without a full understanding as to the end goals and expected benefits. People only see the change and, in some cases, react negatively to the interim state.	(This attribute appears to be associated with a 2012 finding in 3F regarding inadequate change management).	No Change
1H	Rewards and recognition are perceived to be obtained as a result of production related performance and not as the result of displaying behaviors that support a strong nuclear safety culture.	Supervisory recognition for nuclear safety is inconsistent and the process lacks formality.	No Change
P2a / 2A	Managers and supervisors are not visible in the plant while they coach, mentor and reinforce standards.	Supervisors and managers are visible at the workplace while coaching according the new coaching program; however, there is a feeling that the presence and contribution of managers is inconsistent.	Improving
3D	Differing opinions are not welcomed and respected.		Improved
3F	Leadership communications and change management plans challenge the ability to maintain a high level of trust between management and employees.	Effects of upcoming changes are not managed to build organizational trust.	No Change
5F	Concerns with procedure quality, procedure usage and adherence, and a complicated procedure revision process.		Improved
6B / 6D	CAP process integration.		Improved
7C	Inter-department learning, and the sharing of lessons learned from Operating Experience.		Improved
8D	Sharing of audit and oversight findings and observations.		Improved

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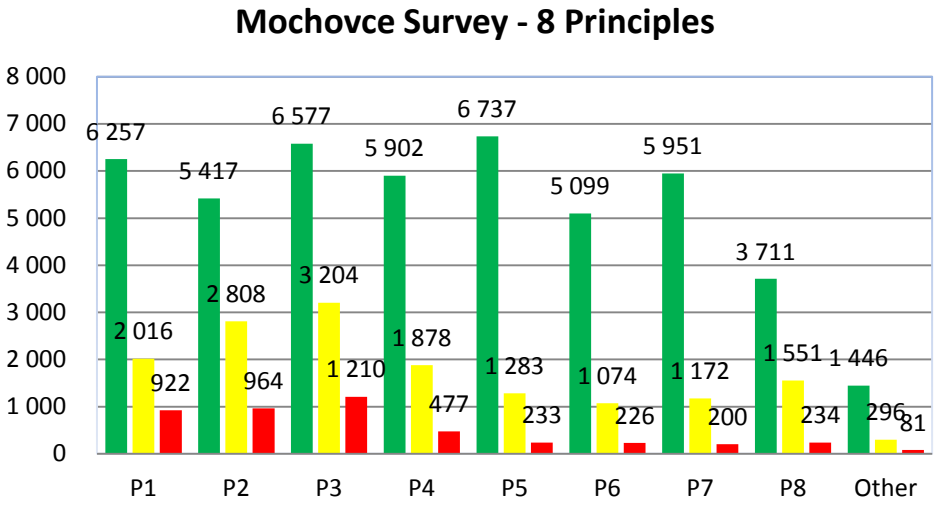
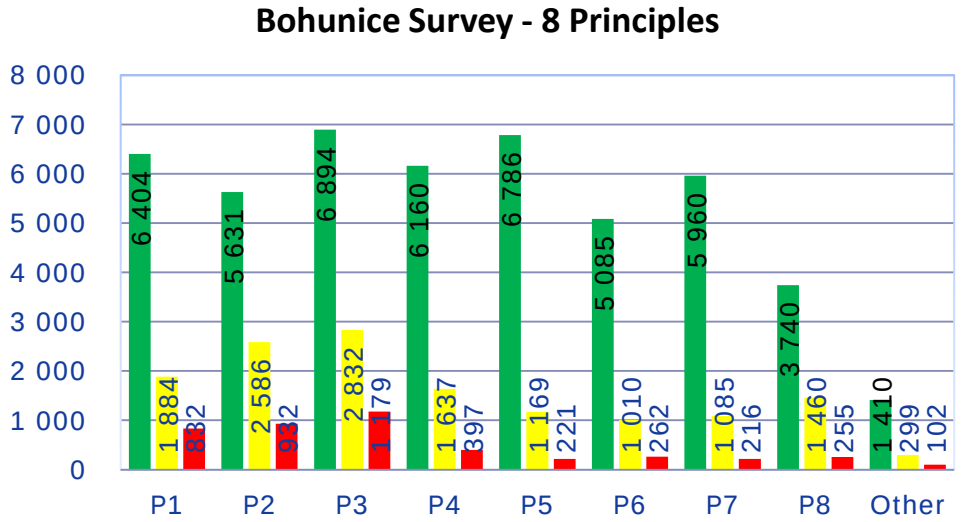
Comparison of 2010 and 2012 assessments (EBO)

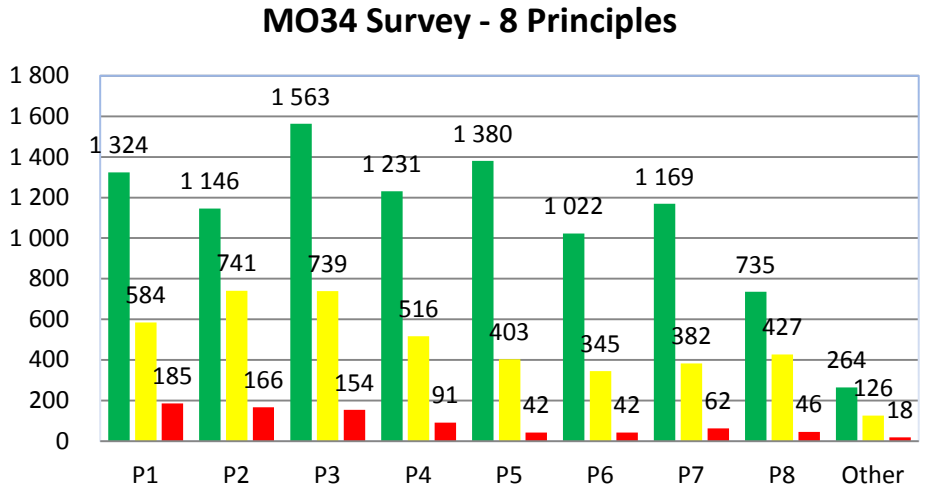
Of the eight Negative Observations identified at Bohunice in 2010, four have improved or been adequately addressed and four still require attention to effectively resolve.

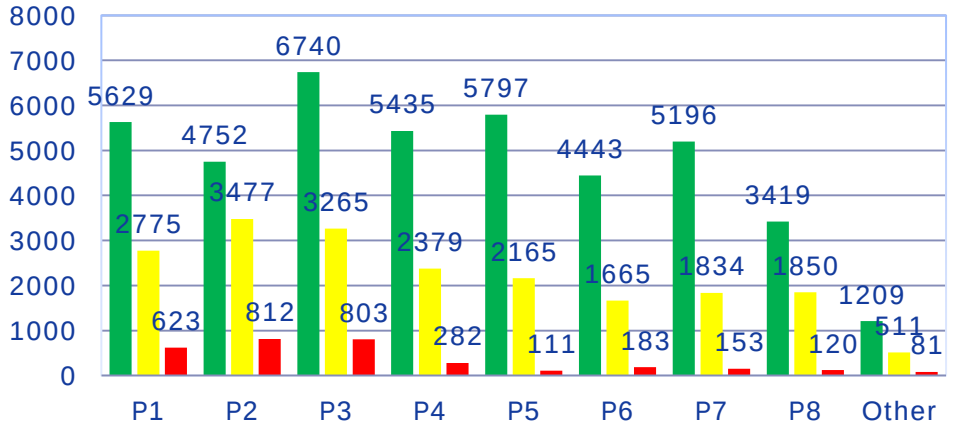
Principle	2010 NSCA Findings	2012 NSCA Findings	Difference
1B / 1C	Strategic business decisions create impact on the working levels of the organization without a full understanding as to the end goals and expected benefits of the changes	Corporate support group activities and decisions do not address technical, human, training, and financial requirements in a timely manner, which could affect safety of NPPs. (1B)	No Change
1H	Rewards and recognition are perceived to be obtained as a result of production related performance and not as the result of displaying behaviors that support a strong nuclear SC.	(This attribute was identified as weak in survey and interview comments, but did not rise to the level of a finding in the 2012 assessment).	Improving
P2a / 2A	Managers and supervisors are not visible in the plant while they coach, mentor and reinforce standards.	Management presence in the field without coaching safety practices does not reinforce desired safety behaviors.	No Change
2E		Management expectations regarding achieving excellent operational performance and reduced outage duration without a strong tie to safety is giving the perception that shortcutting is tolerated.	**New Issue**
3A/ 3D	Some workers do not believe they are treated in a professional manner (lack of respect regarding their worth to the company)		Improved
3F	Leadership communications and change management plans challenge the ability to maintain a high level of trust between management and employees.	The lack of communication related to organizational changes, strategic planning, and evaluation of impact leads to the loss of trust in the organization.	No Change
4A	(The 2010 assessment identified challenges with knowledge management and retention associate with a staff reduction. However, this was characterized as an issue in Principle 1B/1C in 2010.)	The combination of staff approaching retirement and headcount reduction strategies without a comprehensive succession planning will lead to the loss of knowledge.	No Change
5F	Concerns with procedure quality, procedure usage and adherence, and a complicated procedure revision process.		Improved
6B / 6D	CAP process integration.		Improved
7C	Inter-department learning, and the sharing of lessons learned from Operating Experience.		Improved
8D	Sharing of audit and oversight findings and observations.		Improved

Pre-assessment Survey Overall Results (8 Principles Roll-up)

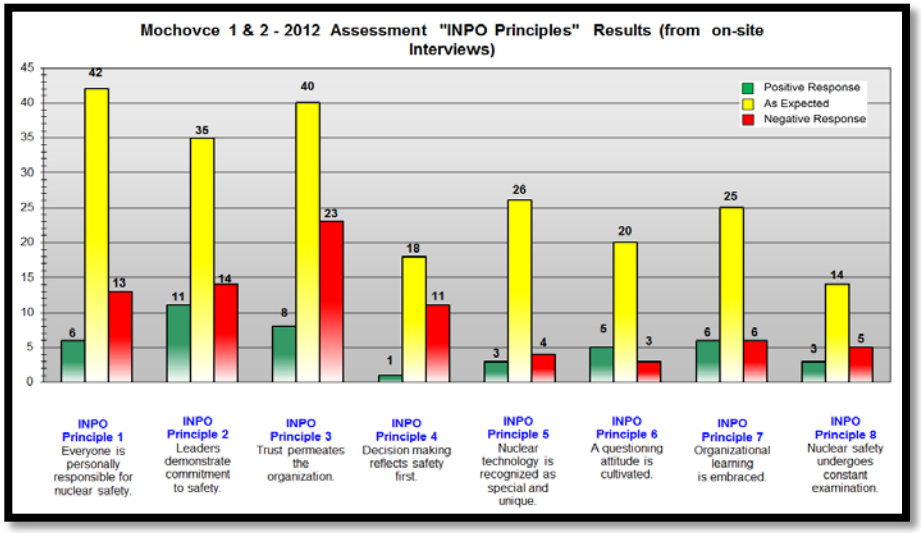


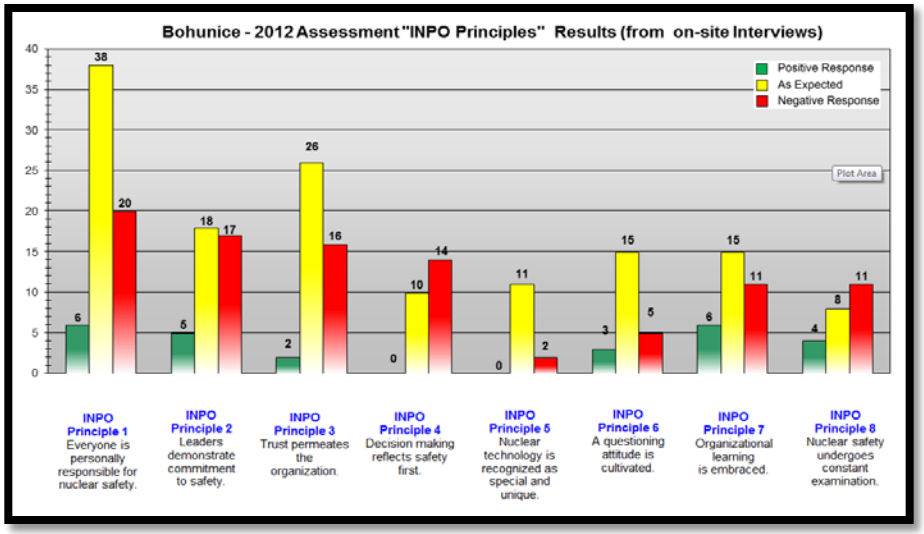


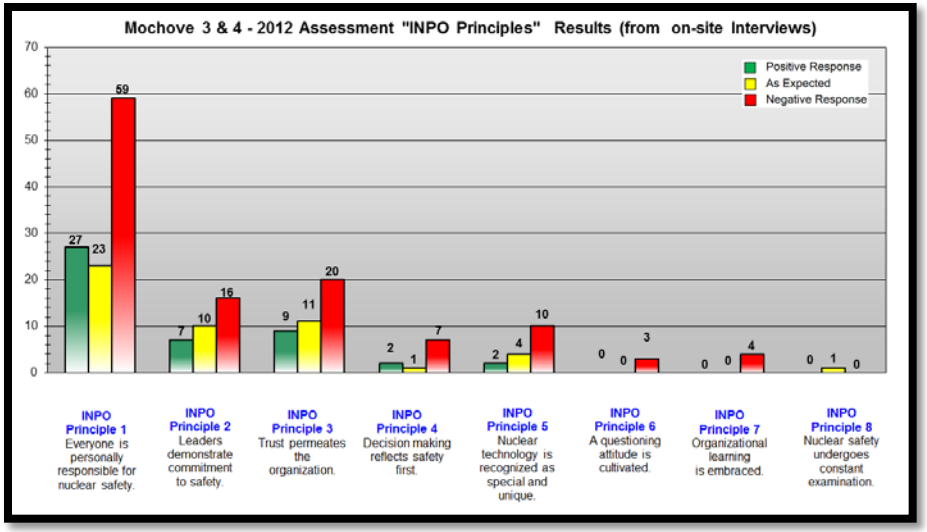


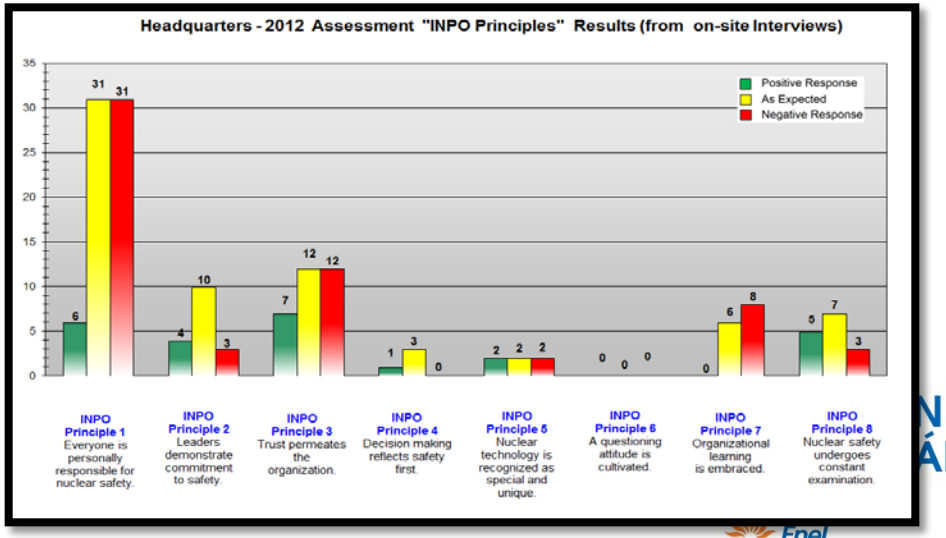


Site Assessment Overall Results (8 Principles Roll-up)









Safety Culture assessment in 2012
Lessons from assessment and main outputs

- The assessment identified improvements compared to 2010 results and positive findings were observed in many areas

- There are still some areas for improvement, in particular in:
  - Principle 1 - Everyone is Personally Responsible for Nuclear Safety
  - Principle 2 - Leaders Demonstrate Commitment to Safety
  - Principle 3 - Trust Permeates the Organization

The development of actions based on insights from the assessment results will contribute in continue to improve the safety culture across the company

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Performance Excellence Initiative & Safety

- Clear & unified safety culture concept
- New safety culture improvement tools

- Behaviors supporting Safety & Health
- Linkage of variable salary part to safety & health behaviors

✓ Weekly Safety Message
✓ Just Culture Program
✓ Positive Reinforcements
✓ Confidential Reporting

Values & Behaviors Model

PEX

One of 3 variable salary part indicators is focused on safety

✓Critical positions
✓Critical knowledge

Human Performance Improvement Program

- Succession Planning Strategy
- Knowledge transfer & retention process

Error Prevention Tools

- Clock Program

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Conclusions

Nuclear Safety as a Top Priority in all activities shall be under continuous Independent Assessment and Monitoring with direct access and reporting to the highest level in the company

Questions? Comments?