Safety Culture Framework for the Laguna Verde NPP

Mr. Antonio Hernández Maldonado
Head of Operation and Certification
Department of Operational Verification
Nuclear Safety Division
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1. Introduction

Technical Meeting on Integration of Safety Culture into Regulatory Practices and the Regulatory Decision Making Process

6-8 October 2014
Vienna, Austria
1. Introduction

Site Description
1. Introduction (cont.)

- The Laguna Verde Nuclear Power Plant is owned by the Federal Commission of Electricity (Ministry of Energy).
- The site is located on the Gulf of Mexico, in the town called Punta Limon in the Alto Lucero County, in the State of Veracruz.
1. Introduction (cont.)

- One site with 2 Boiling Water Reactors 5 (General Electric) and Mark II Containment
- Thermal power per unit 2027 MWt
- Each unit produces 682.44 MWe
- Unit 1 began commercial operation in 1990, License for 30 Years
- Unit 2 began commercial operation in 1995, License for 30 Years
2. History of Safety Culture (Summary)

i. Legal framework

Legal requirements relating to the safety of nuclear facilities are:

• Regulatory Law of Article 27 of the Constitution in Nuclear Matter.
  No specific requirement on Safety Culture is established, however, is required to have procedures, qualified personnel, training and accountability for the tasks performed in Laguna Verde NPP

• Mexico is a signatory to the Convention on Nuclear Safety of IAEA, confirmed the commitment to that body July 26, 1996.

• Requirement number 19 of the Operating Licenses for Laguna Verde Units 1 and 2, issued on December 8, 1999
ESTADOS UNIDOS MEXICANOS
SECRETARÍA DE ENERGÍA
COMISIÓN NACIONAL DE SEGURIDAD NUCLEAR Y SALVAGUARDIAS

NÚMERO DE LICENCIA: CNLV-1/1

LA SECRETARÍA DE ENERGÍA OTORGA LA PRESENTE LICENCIA A:

LA COMISIÓN FEDERAL DE ELECTRICIDAD

PARA LA OPERACIÓN DE:

LA CENTRAL NUCLEOELECTRICA LAGUNA VERDE UNIDAD 1
A UNA POTENCIA TÉRMICA MÁXIMA DE 2027 MWt

LOCALIZADA EN:

PUNTA LIMÓN MUNICIPIO DE ALTO LUCERO
ESTADO DE VERACRUZ

TIPO DE INSTALACIÓN:

REACTOR DE AGUA EN EMBOLICIÓN, CONTENEDOR TIPO MARK-II E INSTALACIONES ASOCIADAS,
SEGÚN SE DESCRIBE EN EL INFORME FINAL DE SEGURIDAD

FECHA DE EXPEDICIÓN: 8 DE DICIEMBRE DE 1999

CONDICIONES:

LAS QUE SE ADJUNTAN A LA PRESENTE LICENCIA COMO PARTE INTEGRANTE DE LA MISMA

SUFRAGIO EEFECTIVO, NO REELECCIÓN.

LUIS TELLEZ KUENZLER
SECRETARIO

LA PRESENTE LICENCIA DE OPERACIÓN SE OTORGA CON FUNDAMENTO EN LO DISPUESTO EN EL
ARTÍCULO 26 DE LA LEY REGLAMENTARIA DEL ARTÍCULO 27 CONSTITUCIONAL EN MATERIA NUCLEAR, ASÍ
COMO EN EL ARTÍCULO 5° FRACCIÓN XX DEL REGLAMENTO INTERIOR DE LA SECRETARÍA DE ENERGÍA, EN
BASE AL DICTÁMEN TÉCNICO Y OPINIÓN REALIZADOS POR LA COMISIÓN NACIONAL DE SEGURIDAD
NUCLEAR Y SALVAGUARDIAS. LA PRESENTE LICENCIA REVOCÓ LA OTORGADA EL 24 DE JULIO DE 1990
PARA ESTA INSTALACIÓN.
"The Laguna Verde NPP should reinforce the elements of Safety Culture, with special emphasis on conservative decision-making and strict adherence to procedures, which should be reflected in a substantial improvement of all safety indicators, as these are defined in the international environment"
Hierarchy of Regulatory Framework

CONSTITUTION
INTERNATIONAL AGREEMENTS AND TREATIES
REGULATORY LAW OF ARTICLE 27 OF THE CONSTITUTION IN NUCLEAR MATTER
10 CFR 50 GENERAL RULES OF RADIATION SAFETY
COMMERTIAL OPERATING LICENSES FOR LAGUNA VERDE UNITS 1 AND 2
STATEMENT ON SAFETY CULTURE (NUM. 19 REQUIREMENT)
SAFETY STANDARDS AND GUIDELINES IAEA, ASME, IEEE, ASTM, etc.
TECHNICAL SPECIFICATIONS, QUALITY ASSURANCE PROGRAM
FOR LAGUNA VERDE UNITS 1 AND 2:
COMMITMENTS REGULATORS: PERMANENT, PRE-REFUEL, REFUEL, POST-REFUEL AND DURING THE OPERATING CYCLE
ii. Activities of the licensee

• In 1996 the first activities for collecting and analyzing information on the concepts of Safety Culture, as well as efforts to receive technical assistance from IAEA were made.

• Subsequently dissemination activities of the concepts of safety culture were performed.

• Derived from these activities and technical assistance from the IAEA in November 1996 it was developed the “Comprehensive Continuous Improvement Program”, which contained the Plan for Strengthening Safety Culture.

• It is considered that this preliminary implementation of Safety Culture stage ends with the visit of OSART mission in February 1997, in which it was reviewed the Plan for Strengthening Safety Culture, concluding it was not appropriate because priority it was on productivity goals instead the safety.
ii. Activities of the licensee

- OSART issued a Recommendation for Plant Manager in order to emphasizes the safety as their highest priority.
- The recommendation was met by licensee so that within achievements include the definition of the Political Safety Culture and the process of awareness regarding the mission, vision and objectives that safety has the highest priority.
- Subcommittee on Strengthening Safety Culture was established, which prepared a study of applicability of INSAG-3, INSAG-4 and ASCOT Guides and performed a self-assessment based on INSAG-4.
- As a result of the self-assessment some actions for Improving weak areas were obtained; and finally a process for identifying indicators of Safety Culture for Laguna Verde NPP was performed.
ii. Activities of the licensee

- Safety Policy was established in March 1997, being as follows: "Management of Laguna Verde NPP states that safety (Nuclear, Radiological, Physics and Industrial) has the highest priority, to fulfill its mission of producing kw-h in a safe, reliable and cost-effective manner with a deep respect for the surrounding environment".
- The implementation of a Plan on Strengthening Safety Culture with the aim of promoting teamwork, communication and self-evaluation as essential tools to maintain and constantly improve the levels of safety and quality during plant operation was promoted.
- This Plan was approved on August 11, 1998 by the Committee of Total Quality Management, thus initiating the step of diffusion and mass dissemination of the concepts of Safety Culture to all staff of the Organization.
ii. Activities of the licensee

- By end of 1998 the activities were focused primarily on supervisory staff (middle and senior management) to improve their attitudes, decisions and operational methods to provide the highest priority for issues on safety.
- In order to maintain a chronological reference in advancing reinforcement activities it is appropriate to establish the visit of one expert in safety culture from IAEA, during 12th to 16th May, 1998, as the point marking the end of this initial reinforcement stage and the beginning of a second stage in which should to continue the implementation of pending activities and give a firm and decisive impulse towards dissemination and training at all levels of management about the concepts of Safety Culture.
In this second stage, from 17 to 21 August 1998, during the follow-up visit of Mission OSART the experts expressed their satisfaction due to the great effort made by all plant staff to accommodate their recommendation and the conviction of the plant staff which would be valuable to enrich the Plan on Strengthening Safety Culture.

During 1998 and 1999, a continuing dissemination and training on Safety Culture at all levels of management were implemented and in the fourth quarter of 1999 it was conducted a survey to obtain valuable insights from the interviews of all plant staff and the answers were analyzed to provide feedback to strengthen the Plan of Safety Culture.
A Safety Culture Workshop was held in November 2000, in which the IAEA specialists, provided the basics of self-assessment methodology and the Committee of Total Quality Management decided to integrate professionals from different plant areas to be part of the Self-Assessment Team and they were trained in the fundamentals for implementing such methodology.

During March 2001 the IAEA experts provide the training to the members of the Self-Assessment Team to lead the self-assessment process entirely.

After the training received, the Self-Assessment Team met weekly during the period April-September 2001 to develop the activities of the self-assessment process, the first step was to conduct a series of interviews on safety culture to management personnel.
For this purpose was designed and implemented a semi-structured interview format in which various questions related to indicators of safety culture defined previously for the Laguna Verde NPP with the help of IAEA experts were integrated.

The interviews were conducted in May and June 2001 and as result was obtained a qualitative measure of the main concerns regarding the plant staff about in which way they perceive the safety culture.

Then it was developed a questionnaire based on the specific safety culture indicators.
This questionnaire was subjected to a pilot test with a group of workers from different areas of the Organization in order to validate and improve such questionnaire.

Mainly sought that questions were well made and understandable for most plant staff.

The resulting survey first section included a collection of general data, such as age / experience of staff in the NPP, age, sex, education, etc.

The 80 questions survey was grouped into the 22 selected features according to aspects of interest to the management personnel.
The survey was conducted for all areas of the NPP, inviting all permanent and temporary plant staff and including contractors to participate in the survey. The implementation period was from 6 to 17 August 2001.

The total number of valid questionnaires was 1142, which represents an approximately 45% of the total plant staff.

In this process of self-evaluation all plant staff was focused first know the most pressing areas of opportunity and second the initiatives to be taken to improve the safety culture.
THE SURVEY PROCESS OF SAFETY CULTURE

- Identify key objectives
- Initial data gathering
- Develop survey database
- Conduct core survey
- Analysis and interpretation
- Follow-up
- Assess costs and benefits
- Build ownership
- Piloting
- Feedback
- Action Plan
• In order to further strengthen the safety culture in the Laguna Verde NPP and evaluate continuous improvement, during June of 2006 started the implementation of a survey considering the 8 principles of the document WANO-INPO "Principles for a strong Nuclear Safety Culture" and "Status and physical condition of the facilities" as main objectives to carry out the self-assessment for safety culture.

• A manual pocket on Safety Culture Principles was prepared and provided to the all plant personnel.

• In 2012 the self-assessment for safety culture was limited for considering only the 8 principles of the document WANO-INPO. In such way the "Status and physical condition of the facilities“ indicator was not considered anymore as part of the self-assessment of safety culture.
History of Safety Culture (Summary)

iii. Activities of the Regulatory Body

- On December 8, 1999, the Regulatory Body established as part of the conditions to maintain valid the Operating Licenses for Laguna Verde Units 1 and 2 a requirement oriented for strengthen the elements of the safety culture. So, the requirement number 19 of license conditions was established to define and implement a continuous monitoring program through a self-assessment every 12 months from February 2000.

- On March 22, 2001, the RB followed up the activities developed by plant management to meet the conditions of the Operating License.
iii. Activities of the Regulatory Body

- The plant management personnel made a presentation giving a historical overview of its activities on the safety culture topic and a presentation on its Mission, Vision, Values, Redefining Strategies, Improvement Actions and Results.
- The document "Policy Statement on Safety Culture" was shown.
- Details of his 4 goals were given: (1) Seminars and Workshops, Diffusion; (2) Review and Analysis of Indicators; (3) Assessment Process; and (4) Implementation of Actions to strengthen safety culture.
- Finally, they showed graphs of the results of how the staff believes that the Safety Culture had improved.
History of Safety Culture (Summary)

iii. Activities of the Regulatory Body

- From 2003 to present the RB has made only activities of follow-up of the self-assessment on safety culture, but not in periodic basis.
RB EVALUATION PROCESS FOR SAFETY CULTURE

Surveys and Reports of SC
- Revision of Documentation And Results
- Meetings for Follow-up Strengths of SC
- Monitoring of Implementation of the Plan for Strengths SC

Safety Culture Evaluation from RB
- Evaluation of Findings and Observations
- Revision of the Results from Inspections

SC: Safety Culture
Time Line for Safety Culture Framework for the Laguna Verde NPP

1996
- LVNPP: Collect Information on SC (January)
- LVNPP: Request IAEA Assistance (November)

1997
- LVNPP: Change Safety Policy
- OSART Mission: Change SC
- LVNPP: Request IAEA Assistance (November)

1998
- LVNPP: Collection on SC (January)
- OSART Mission: Expert Provides Training on SC for all Staff levels
- LVNPP: Issues Safety Policy

1999
- CTQM: Plan for Strength SC (August)
- LVNPP: Issues Safety Policy
- OSART: Follow-up Visit (great results) [August]

2000
- LVNPP: To continue the diffusion and mass dissemination of SC fundamentals for all plant staff (January to September)
- IAEA: Workshop for Self-assessment of SC (November)
- LVNPP: Survey To collect Information To prepare PSSC (Oct-Dec)

2001
- IAEA: Training for Self-Assessment Team (March)
- LVNPP: Application of Final Questionnaires (August)

2002
- RB: Follow-up of the SC activities (December)
- LVNPP: Pilot Interviews For preparing Final Questionnaires (May-June)

2003
- IAEA: License condition for SC (December)
- RB: License condition for SC (December)
- LVNPP: Weekly meetings for defining Self-Assessment process (April-September)
- LVNPP: Annual Self-Assessment On Safety Culture (IAEA Methodology)

CTQM: Committee Total Quality Management
PSSC: Plan for Strength of Safety Culture
Time Line for Safety Culture Framework for the Laguna Verde NPP

LVNPP: Annual Self-Assessment On Safety Culture (IAEA Methodology)
LVNPP: Annual Self-Assessment On Safety Culture + Facilities Status (INPO Methodology)
LVNPP: Annual Self-Assessment On Safety Culture - Facilities Status (INPO Methodology)


RB: Follow-up of the SC activities (December)
RB: Follow-up of the SC activities By ROP Inspection Report (Annual/Semi-annual) and Plant Safety Performance Report (Quarterly)

SCART Mission
3. Safety Culture Framework for Laguna Verde NPP

i. The early period

- 22 Characteristics of Safety Culture:
  1. High priority to safety
  2. Senior management commitment to safety
  3. Visible leadership
  4. No conflict between safety and production
  5. Clear roles and responsibilities
  6. Sufficient competent Staff

  7. Involvement of all employees
  8. Compliance with regulations and procedures
  9. Quality of documentation and procedures
  10. Motivation and job satisfaction
  11. Accountability for performance and rewards
3. Safety Culture Framework for Laguna Verde NPP

i. The early period

- **22 Characteristics of Safety Culture (Cont.):**
  12. Good working conditions with respect to time pressure, workload and stress
  13. Openness and communication
  14. Organizational learning
  15. Role of managers
  16. Relations between management and employees
  17. Measurement of safety performance
  18. View of the errors
  19. View of people
  20. Collaboration and teamwork
  21. Relationship between the regulatory body and other external groups
  22. Long-term perspective
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>%</th>
<th>Assessment</th>
<th>Characteristic</th>
<th>%</th>
<th>Assessment</th>
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</thead>
<tbody>
<tr>
<td>High priority to safety</td>
<td>88.99</td>
<td>Good</td>
<td>Good working conditions with respect to time pressure, workload and stress</td>
<td>70.86</td>
<td>Satisfactory</td>
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<tr>
<td>Senior management commitment to safety</td>
<td>74.75</td>
<td>Satisfactory</td>
<td>Openness and communication</td>
<td>71.76</td>
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<td>Visible leadership</td>
<td>70.10</td>
<td>Satisfactory</td>
<td>Organizational learning</td>
<td>70.39</td>
<td>Satisfactory</td>
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<tr>
<td>No conflict between safety and production</td>
<td>78.47</td>
<td>Good</td>
<td>Role of managers</td>
<td>71.71</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Clear roles and responsibilities</td>
<td>75.42</td>
<td>Good</td>
<td>Relations between management and employees</td>
<td>77.50</td>
<td>Good</td>
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<td>Sufficient competent Staff</td>
<td>72.46</td>
<td>Satisfactory</td>
<td>Measurement of safety performance</td>
<td>77.02</td>
<td>Good</td>
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<td>Involvement of all employees</td>
<td>70.91</td>
<td>Satisfactory</td>
<td>View of the errors</td>
<td>70.65</td>
<td>Satisfactory</td>
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<td>Compliance with regulations and procedures</td>
<td>83.64</td>
<td>Good</td>
<td>View of people</td>
<td>75.44</td>
<td>Good</td>
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<td>Quality of documentation and procedures</td>
<td>74.61</td>
<td>Satisfactory</td>
<td>Collaboration and teamwork</td>
<td>70.51</td>
<td>Satisfactory</td>
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<tr>
<td>Motivation and job satisfaction</td>
<td>81.28</td>
<td>Good</td>
<td>Long-term perspective</td>
<td>79.23</td>
<td>Good</td>
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<td>Accountability for performance and rewards</td>
<td>67.72</td>
<td>Satisfactory</td>
<td>Relationship between the regulatory body and other external groups</td>
<td>81.74</td>
<td>Good</td>
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ASSESSMENT CRITERIA

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<tr>
<th>RANK</th>
<th>RESULT</th>
<th>COLOUR</th>
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<tbody>
<tr>
<td>85 % ≤ X&lt; 100 %</td>
<td>Very Good</td>
<td>Green</td>
</tr>
<tr>
<td>75 % ≤ X &lt; 85 %</td>
<td>Good</td>
<td>White</td>
</tr>
<tr>
<td>65 % ≤ X &lt; 75 %</td>
<td>Satisfactory</td>
<td>Yellow</td>
</tr>
<tr>
<td>1 % ≤ X &lt; 65 %</td>
<td>Unsatisfactory</td>
<td>Red</td>
</tr>
</tbody>
</table>

Objectives:
1) To know staff perceptions regarding various aspects of Safety Culture
2) Identify areas for improvement to strengthen the levels of safety in the daily of the plant operation

Results:
1) The table in previous slide shows the results obtained when assessing the responses of all the staff of the plant.
2) Evaluation of the questionnaire for all the staff of the plant indicates that the Safety Culture is “Satisfactory" for 14 characteristics (range 65% to 75%) and the remaining 8 characteristics are “Good" (between 75% and 85%).
3. Safety Culture Framework for Laguna Verde NPP

ii. The middle period 2006

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

<table>
<thead>
<tr>
<th>No.</th>
<th>SAFETY CULTURE PRINCIPLES</th>
<th>2006 %</th>
<th>EVAL</th>
<th>2007 %</th>
<th>EVAL</th>
<th>2008 %</th>
<th>EVAL</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Everyone is personally responsible for nuclear safety</td>
<td>88.7</td>
<td>VERY GOOD</td>
<td>91.9</td>
<td>VERY GOOD</td>
<td>92.6</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>2.</td>
<td>Leaders demonstrate commitment to safety</td>
<td>78.4</td>
<td>GOOD</td>
<td>77.6</td>
<td>GOOD</td>
<td>80.9</td>
<td>GOOD</td>
</tr>
<tr>
<td>3.</td>
<td>Trust permeates the organization</td>
<td>75.2</td>
<td>GOOD</td>
<td>78.6</td>
<td>GOOD</td>
<td>81.0</td>
<td>GOOD</td>
</tr>
<tr>
<td>4.</td>
<td>Decision-making reflects safety first</td>
<td>82.1</td>
<td>GOOD</td>
<td>83.2</td>
<td>GOOD</td>
<td>86.8</td>
<td>VERY GOOD</td>
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<tr>
<td>5.</td>
<td>Nuclear technology is recognized as special and unique.</td>
<td>89.2</td>
<td>VERY GOOD</td>
<td>88.7</td>
<td>VERY GOOD</td>
<td>89.9</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>6.</td>
<td>A questioning attitude is cultivated</td>
<td>82.5</td>
<td>GOOD</td>
<td>88.0</td>
<td>VERY GOOD</td>
<td>90.2</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>7.</td>
<td>Organizational learning is embraced</td>
<td>77.3</td>
<td>GOOD</td>
<td>80.9</td>
<td>GOOD</td>
<td>82.0</td>
<td>GOOD</td>
</tr>
<tr>
<td>8.</td>
<td>Nuclear safety undergoes constant examination.</td>
<td>83.0</td>
<td>GOOD</td>
<td>84.4</td>
<td>GOOD</td>
<td>86.5</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>9.</td>
<td>Housekeeping and material condition</td>
<td>86.5</td>
<td>VERY GOOD</td>
<td>83.0</td>
<td>GOOD</td>
<td>86.2</td>
<td>VERY GOOD</td>
</tr>
</tbody>
</table>

**TOTAL**  
82.5 GOOD 84.0 GOOD 86.2 VERY GOOD

**EVALUATION CRITERIA**

<table>
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<tr>
<th>RANKS</th>
<th>EVALUATION</th>
<th>COLOR</th>
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<tbody>
<tr>
<td>85 % ≤ X &lt; 100 %</td>
<td>VERY GOOD</td>
<td>GREEN</td>
</tr>
<tr>
<td>75 % ≤ X &lt; 85 %</td>
<td>GOOD</td>
<td>WHITE</td>
</tr>
<tr>
<td>65 % ≤ X &lt; 75 %</td>
<td>SATISFACTORY</td>
<td>YELLOW</td>
</tr>
<tr>
<td>1 % ≤ X &lt; 65 %</td>
<td>NON SATISFACTORY</td>
<td>RED</td>
</tr>
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</table>
3. Safety Culture Framework for Laguna Verde NPP (The middle period)
iii. SAFETY CULTURE ASSESSMENT REVIEW TEAM – SCART (16 Nov. to 2th Dec. 2009)

- Second IAEA NPP Safety Culture assessment in a NPP
- Basis for evaluations: IAEA Nuclear Safety Standards and expertise of the team members
- To provide a valid assessment of Safety Culture considering behaviours and attitudes;
- To identify strengths and areas for improvement of Safety Culture;
- To provide recommendations and suggestions for improvement, and
- To provide other Member States with information on good practices in Safety Culture
The Pillars of the SCART Methodology

SCART

INDEPENDENT
TRANSSPARENT
SYSTEMATIC

SAFETY CULTURE CHARACTERISTICS:

A. SAFETY IS A CLEARLY RECOGNISED VALUE

B. LEADERSHIP FOR SAFETY IS CLEAR

C. ACCOUNTABILITY FOR SAFETY IS CLEAR

D. SAFETY IS INTEGRATED INTO ALL ACTIVITIES

E. SAFETY IS LEARNING DRIVEN
### 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

#### (A) SAFETY IS A CLEARLY RECOGNIZED VALUE

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1 High priority to safety is shown in documentation, communications and decision making</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.2 Safety is a primary consideration in the allocation of resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.3 The strategic business importance of safety is reflected in the business plan</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.4 Individuals are convinced that safety and production go hand in hand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.5 A proactive and long term approach to safety issues is shown in decision making</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.6 Safety conscious behaviour is socially accepted and supported</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
## 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

### (B) LEADERSHIP FOR SAFETY IS CLEAR

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B.1</strong> Senior management is clearly committed to safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B.2</strong> Commitment to safety is evident at all management levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B.3</strong> There is visible leadership showing the involvement of management in safety related activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B.4</strong> Leadership skills are systematically developed</td>
<td><strong>S</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B.5</strong> Management ensures that there are sufficient competent individuals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B.6</strong> Management seeks the active involvement of individuals in improving safety</td>
<td><strong>S</strong></td>
<td></td>
<td></td>
</tr>
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### 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

(B) LEADERSHIP FOR SAFETY IS CLEAR (cont.)

<table>
<thead>
<tr>
<th>B.7</th>
<th>Safety implications are considered in change management processes</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.8</td>
<td>Management shows a continual effort to strive for openness and good communication throughout the organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.9</td>
<td>Management has the ability to resolve conflicts as necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.10</td>
<td>Relationships between managers and individuals are built on trust</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

(C) ACCOUNTABILITY FOR SAFETY IS CLEAR

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1 An appropriate relationship with the regulatory body exists, which ensures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>that the accountability for safety remains with the licensee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.2 Roles and responsibilities are clearly defined and understood</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.3 There is a high level of compliance with regulations and procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.4 Management delegates responsibility with appropriate authority to</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>enable accountabilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.5 Ownership for safety is evident at all organizational levels and by all</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>individuals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

(D) SAFETY IS INTEGRATED INTO ALL ACTIVITIES

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.1 Trust permeates the organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.2 Consideration for all types of safety, including industrial safety and environmental safety, and security is evident</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.3 The quality of documentation and procedures is good</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.4 The quality of processes, from planning to implementation and review, is good</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.5 Individuals have the necessary knowledge and understanding of the work processes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

(D) SAFETY IS INTEGRATED INTO ALL ACTIVITIES

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.6 Factors affecting work motivation and job satisfaction are considered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.7 Good working conditions exist with regard to time pressures, work load, and stress</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.8 Cross-functional and interdisciplinary cooperation and teamwork are present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.9 Housekeeping and material conditions reflect commitment to excellence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S indicates a strength.
### 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

#### (E) SAFETY IS LEARNING DRIVEN

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strengths</th>
<th>Neither strengths, nor areas for improvement</th>
<th>Areas for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.1 A questioning attitude prevails at all organizational levels</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.2 Open reporting of deviations and errors is encouraged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.3 Internal and external assessments, including self-assessments, are used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.4 Organizational and operating experience (both internal and external to the facility) are used</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.5 Learning is enabled through the ability to recognize and diagnose deviations, formulate and implement solutions, and monitor the effects of corrective actions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.6 Safety performance indicators are tracked, trended, evaluated, and acted upon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.7 There is systematic development of individual competences</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IAEA CHARACTERISTICS</td>
<td>PRINCIPLES LVNPP (INPO/WANO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. SAFETY IS A CLEARLY RECOGNISED VALUE</td>
<td>1. EVERYONE IS PERSONALLY RESPONSIBLE FOR NUCLEAR SAFETY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. LEADERSHIP FOR SAFETY IS CLEAR</td>
<td>2. LEADERS DEMONSTRATE COMMITMENT TO SAFETY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. ACCOUNTABILITY FOR SAFETY IS CLEAR</td>
<td>3. TRUST PERMEATES THE ORGANIZATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. SAFETY IS INTEGRATED INTO ALL ACTIVITIES</td>
<td>4. DECISION-MAKING REFLECTS SAFETY FIRST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. SAFETY IS LEARNING DRIVEN</td>
<td>5. NUCLEAR TECHNOLOGY IS RECOGNIZED AS SPECIAL AND UNIQUE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

37 Attributes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. A QUESTIONING ATTITUDE IS CULTIVATED</td>
<td>7. ORGANIZATIONAL LEARNING IS EMBRACED</td>
</tr>
<tr>
<td>8. NUCLEAR SAFETY UNDERGOES CONSTANT EXAMINATION</td>
<td></td>
</tr>
</tbody>
</table>

56 Attributes
### 3. Safety Culture Framework for Laguna Verde NPP – SCART Results for LVNPP

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Suggestion</th>
<th>Recommendation</th>
<th>Good Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Safety is a clearly recognized value</td>
<td>A3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Leadership for safety is clear</td>
<td>B4, B6</td>
<td>B7</td>
<td>B2</td>
</tr>
<tr>
<td>C Accountability for safety is clear</td>
<td>C2, C4</td>
<td>C3</td>
<td></td>
</tr>
<tr>
<td>D Safety is integrated into all activities</td>
<td>2 D2, 2 D7, D9</td>
<td>D3</td>
<td></td>
</tr>
<tr>
<td>E Safety is learning driven</td>
<td>E1, E4, E7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>13</strong></td>
<td><strong>3</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

- Policy/Vision/Mission (Safety Culture)
- Site Wide Communication
- Observation Programme
- Continuous Learning Organization
  - Corrective Action Programme
  - Human Performance Programme
  - Operation Experience Programme
  - Benchmarking Programme
  - Self Assessment Programme
- Safety Culture Survey
- Work Management Process
- Conservative and Effective Decision Making Process
- Operable/Operability Determination Process
- Systematic Approach to Training
- House Keeping and material condition
- International Agreement (INPO, WANO, NEI)
- Mexican Regulatory Body (CNSNS)
- Operation licensing and Technical Specification Compliance
- Safeguard International Agreement (IAEA)
- Convention on Nuclear Safety (IAEA)

Performance Improvement Process

Regulatory Driving

SAFETY CULTURE

Reactor Oversight Process
- Quality Assurance Programme
- 50:59 Evaluation Programme
- Quality Control Programme
- Independent Safety Engineering Unit

#### CONTRIBUTION TO THE SAFETY CULTURE SURVEY 2013

<table>
<thead>
<tr>
<th>AREA</th>
<th>POLLS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Manager/IUIS/Legal/Phy. Sec.</td>
<td>GCN 102</td>
<td>9</td>
</tr>
<tr>
<td>Administrative Assistant Manager</td>
<td>SA 124</td>
<td>10</td>
</tr>
<tr>
<td>Engineering Assistant Manager</td>
<td>SI 123</td>
<td>10</td>
</tr>
<tr>
<td>Maintenance Assistant Manager</td>
<td>SM 300</td>
<td>25</td>
</tr>
<tr>
<td>Operations Assistant Manager</td>
<td>SP 131</td>
<td>11</td>
</tr>
<tr>
<td>Nuclear Safety Assistant Manager</td>
<td>SSN 117</td>
<td>10</td>
</tr>
<tr>
<td>Services Assistant Manager</td>
<td>SS 153</td>
<td>13</td>
</tr>
<tr>
<td>Operations Manager</td>
<td>SGO 76</td>
<td>6</td>
</tr>
<tr>
<td>Coordination and linkage Dep.</td>
<td>CyV 73</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1199</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

- GCN 9%
- SA 10%
- SI 10%
- SM 25%
- SS 13%
- SGO 6%
- SP 11%
- CyV 6%
- TOTAL 100%

SC Survey 2013
Rated Global

86.2%
81.6%
82.6%
85.5%
93.3%
89.2%
87.3%
88.0%

PRINCIPIO 1
Everyone is personally responsible for nuclear safety

PRINCIPIO 2
Leaders demonstrate commitment to safety

PRINCIPIO 3
Trust permeates the organization

PRINCIPIO 4
Decision-making reflects safety first

PRINCIPIO 5
Nuclear technology is recognized as special and unique

PRINCIPIO 6
A questioning attitude is cultivated

PRINCIPIO 7
Organizational learning is embraced

PRINCIPIO 8
Nuclear safety undergoes constant examination

EVALUATION CRITERIA

<table>
<thead>
<tr>
<th>RANKS</th>
<th>EVALUATION</th>
<th>COLOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 % ≤ X &lt; 100 %</td>
<td>VERY GOOD</td>
<td>Green</td>
</tr>
<tr>
<td>75 % ≤ X &lt; 86 %</td>
<td>GOOD</td>
<td>Yellow</td>
</tr>
<tr>
<td>65 % ≤ X &lt; 75 %</td>
<td>SATISFACTORY</td>
<td>Orange</td>
</tr>
<tr>
<td>1 % ≤ X &lt; 65 %</td>
<td>UNSATISFACTORY</td>
<td>Red</td>
</tr>
</tbody>
</table>

TREND RATING PRINCIPLES OF SAFETY CULTURE

- Principle 1. Everyone is personally responsible for nuclear safety
- Principle 2. Leaders demonstrate commitment to safety
- Principle 3. Trust permeates the organization
- Principle 4. Decision-making reflects safety first
- Principle 5. Nuclear technology is recognized as special and unique
- Principle 6. A questioning attitude is cultivated
- Principle 7. Organizational learning is embraced
- Principle 8. Nuclear safety undergoes constant examination
4. Regulatory Body Actions Concerning the Safety Culture

Actions for monitoring Safety Culture in LVNPP

*Reactor Oversight Process Inspection Report (semi-annual and annual):*

- Use of the criteria established in IAEA Technical Report Series No. 369 to classify inspection and observations from inspections performed at LVNPP:
  1. Effective assignment authority and responsibility
  2. Anticipate, identify and correct their own mistake
  3. Achieving and maintaining a safety culture
  4. Optimize the use of resources
  5. Interfaces between organizations
  6. Maintain a performance level long term
4. Regulatory Body Actions Concerning the Safety Culture

Main results from the 2013 annual report:

1. Effective Assignment Authority and Responsibility:
   - Weakness in plant procedures revision

2. Anticipate, identify and correct their own mistake
   - Deficiencies in Corrective Action Program

3. Achieving and Maintaining a Safety Culture
   - Repetitive failure to comply with the rules and regulations
   - Deficiencies in the application of procedures
   - Known issues are not properly resolved

4. Optimize the Use of Resources
   - There is no effective teamwork between different areas
   - Works are not made on time, which is due to poor planning or coordination
   - There are delays in obtaining technical information from the plant
4. Regulatory Body Actions Concerning the Safety Culture

5. Interfaces between Organizations
   - Plant staff does not meet the commitments with RB
   - Documentation, training and field work not carried out because the organizational responsibilities have not been fully understood
   - Responsibilities are not defined to ensure that the recommendations from one organization to another, are adequately addressed, and systematically evaluated and resolved

6. Maintain a performance level long term
   - No due attention to staff training is given
   - Uncertainties exist to meet the requirements of the design basis configuration

Criteria: 0 to 40% of Inspection Reports documents such problem
   - Green
41 to 60% of Inspection Reports documents such problem
   - Yellow
61 to 80% of Inspection Reports documents such problem
   - Orange
81 to 100% of Inspection Reports documents such problem
   - Red
4. Regulatory Body Actions Concerning the Safety Culture

Actions for monitoring Safety Culture in LVNPP

*Performance Evaluation Report for Laguna Verde Units 1 and 2 (quarterly):*

- Summary of Operating Unit 1
- Power movements Unplanned (main equipment failure and out-age)
- Power movements Planned (gathering of plant parameters in Extended Power Uprate)
4. Regulatory Body Actions Concerning the Safety Culture

Actions for monitoring Safety Culture in LVNPP

- Plant Performance Plant Based on Indicators

Unit 1 is in column "Licensee Response" from the performance evaluation methodology of nuclear facilities (ROP). The previous rating was based on the installation presents all indicators in Green.
4. Regulatory Body Actions Concerning the Safety Culture

Actions for monitoring Safety Culture in LVNPP

- Plant performance based on findings issued during inspections of RB

Findings affecting a safety fundamental are evaluated by Significance Determination Process.

Human performance, safety culture and identification and correction of plant problems are included as cross-cutting elements.
4. Regulatory Body Actions Concerning the Safety Culture

Challenge for establishing a robust structure for assess and monitor the safety culture for LVNPP:

1. RB STRATEGIC AND ACTION PLAN (2013 – 2018)
   • Strengthening of Safety Culture elements, with special emphasis on conservative decision making and strict procedure compliance
   • RB will focus on continuously improving its own safety culture to ensure that the CNSNS’s mission (motto “safety first”) is at the forefront of all activities and decisions.
   • Strive for continuous improvement of the nuclear and radiological facilities safety by controlling that the licensee has implemented appropriate organization and processes and is fostering safety culture.
4. Regulatory Body Actions Concerning the Safety Culture

Challenge for establishing a robust structure for assess and monitor the safety culture for LVNPP:

2. Assign a technical advisor as a responsible to gather documentation regarding with safety culture
3. To participate in forums and technical meeting for exchanging experience in safety culture
4. To integrate a small group to propose a structure for assessment and monitoring of safety culture
5. Present the new structure for assessment and monitoring of safety culture to the management staff
5. Conclusions

1. IAEA support for the initiation of the project for defining the contents of the survey for safety culture was very valuable.

2. Application of the INPO/WANO principles for safety culture by LVNPP have been proved to be suitable for establish a frame for safety culture.

3. SCART Mission represented a challenge for assess the safety culture in LVNPP which can be see as an opportunity to improve the safety culture.

4. RB has maintained a passive role for assess and monitor the safety culture in LVNPP.

5. RB has the opportunity to readdress his role for assess and monitor the safety culture in LVNPP according with the Strategic and Action Plan (2013-2018).

6. Participation in the Technical Meeting on Safety culture will provide experience from other countries which can be used for Integration of Safety Culture into Regulatory Practices and the Regulatory Decision Making Process.
Safety culture is something that you can not see and neither touch with your own hands but you can feel it. So, you must be open for using your senses to discover that both is permeating through your organization. And be reactive to make the necessary improvements.

Mr. Antonio Hernández (02.10.2014)

¡¡THANKS FOR YOUR ATTENTION!!

¿Questions, Remarks or Comments?