National Report presented by Mexican United States to fulfil the obligations of the Convention on Nuclear Safety. Period 1998-2000.

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CONTENTS

ARTICLE 17. SITING

ARTICLE 18. DESIGN AND CONSTRUCTION

ARTICLE 19. OPERATION

ABBREVIATION AND DEFINITIONS

ABBREVIATION	DEFINITION
AC	Alternating Current Power
ADS	Automatic Depressurisation System
ALARA	As Low As Reasonable Achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute
AOO	Anticipated Operational Occurrences
ASME	American Society of Mechanical Engineers
ASSET	Assessment of Safety Significance Event Team
ASTM	American Society of Testing Materials
ATWS	Anticipated Transient Without Scram
BOP	Balance of Plant
BSS	Basic Safety Standards
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owner's Group
CADER	Centre of Storage of Radioactive Wastes (Centro de Almacenamiento de Desechos Radiactivos)
CENAPRED	National Centre for Disaster's Prevention (Centro Nacional de Prevención de Desastres)
CFE	Federal Commission of Electricity (Comisión Federal de Electricidad)
CFR	Code of Federal Regulations
CIRO	Independent Operation Review Committee (Comité Independiente de Revisión de Operaciones)
CLV	Laguna Verde Nuclear Power Station or LVNPS (Central Nucleoléctrica Laguna Verde)
CNA	National Commission of Water (Comisión Nacional del Agua)
CNSNS	National Commission of Nuclear Safety and Safeguards (Comisión Nacional de Seguridad Nuclear y Salvaguardias)
COPERE	External Radiological Emergency Planning Committee (Comité de Planeación de Emergencias Radiológicas Externas)

ABBREVIATION	DEFINITION
CROS	Operational Review On-Site Committee (Comité de Revisión de Operaciones en el Sitio)
CSN	Convention on Nuclear Safety
DICONSA	Distributor and Commercial Promoter “CONASUPO” (Distribuidora e Impulsora Comercial CONASUPO)
DC	Direct Current Power
DG	Diesel Generator
ECCS	Emergency Core Cooling Systems
EHC	Electro hydraulic Control
ESPEC	Design Specifications (Especificaciones de Diseño)
ETO	Technical Specifications for Operation (Especificaciones Técnicas de Operación)
FSAR	Final Safety Analysis Report
GCN	Nuclear Power Plant Division (Gerencia de Centrales Nucleoléctricas)
GE	General Electric
GEV	State Government of Veracruz (Gobierno del Estado de Veracruz)
GIIS	Independent Safety Engineering Group (Grupo Independiente de Ingeniería de Seguridad)
HIC	High Integrity Containers
IAEA	International Atomic Energy Agency
INES	International Nuclear Event Scale
ININ	National Institute for Nuclear Research (Instituto Nacional de Investigaciones Nucleares)
INPO	Institute of Nuclear Power Operations
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination for External Events
IRS	Incident Reporting System
JIT	Just In Time
KV	Kilovolts
LER	Licensee Event Report

ABBREVIATION	DEFINITION
LOCA	Loss of Coolant Accident
LVNPS	Laguna Verde Nuclear Power Station, same as Laguna Verde NPP
MCPR	Minimum Critical Power Rate
NCCW	Nuclear Closed Cooling Water System
NEA	Nuclear Energy Agency
NOM	Mexican Official Standard (Norma Oficial Mexicana)
NPP	Nuclear Power Plant
NSW	Nuclear Service Water
NUPIC	Nuclear Procurement Issues Committee
OBE	Operating Basis Earthquake
OECD	Organization for Economic Co-operation and Development
OSART	Operational Safety Assessment Review Team
OSRWSF	Temporary Onsite Radioactive Waste Storage Facility
PARE	Same as STAR (Stop, Think, Analyse, Review)
PCPA	Set Point Change Package (Paquete de Cambio de Punto de Ajuste)
PEI	Internal Emergency Plan (Plan de Emergencia Interna)
PERC	Component Replacement Evaluation Package (Paquete de Evaluación de Reemplazo de Componente)
PERE	External Radiological Emergency Plan (Plan de Emergencia Radiológico Externa)
PEMEX	The Mexican Petroleum Company (Petróleos Mexicanos)
PFP	Preventive Federal Police (Policía Federal Preventiva)
PM	Modification Package (Paquete de Modificación)
PMDT	Technical Documentary Modification Package (Paquete de Modificación Documental Técnica)
PMM	Minor Modification Package (Paquete de Modificación Menor)
PMMD	Documentary Minor Documentation Package (Paquete de Modificación Menor Documental)
PMRC	Component Replacement Modification Package (Paquete de Modificación por Reemplazo de Componente)

ABBREVIATION	DEFINITION
PMS	Software Modification Package (Paquete de Modificación de Software)
PROC	Procedures (Procedimientos)
PROFEPA	Federal Attorney Office for Environmental Protection (Procuraduría Federal de Protección al Ambiente)
PSA	Probabilistic Safety Analysis
PyD	Jumper and Disconnection (Puente y Desconexión)
RADWASS	Radiation Waste Management
RASCAL	Radiological Assessment System for Consequences Analysis
RASSAC	Radiation Safety Standards
RAW	Risk Achievement Worth
REA	Event Report to be Analysed (Reportes de Eventos a Analizar)
REI	Internal Event Report (Reporte de Evento Interno)
RHR	Residual Heat Removal System
RG	Regulatory Guide
RPV	Reactor Pressure Vessel
RRW	Risk Reduction Worth
SBO	Station Black Out
SAT	Systematic Approach to Training
SC	Safety Culture
SCRAM	Sudden Control Rod Action Movement
SCT	Secretariat of Communications and Transportation (Secretaría de Comunicaciones y Transportes)
SENER	Secretariat of Energy (Secretaría de Energía)
SEDENA	Secretariat of Defence (Secretaría de la Defensa Nacional)
SEGOB	Secretariat of the Interior (Secretaría de Gobernación)
SESEVER	State of Veracruz Secretariat of Health (Secretaría de Salud del Estado de Veracruz)
SHCP	Secretariat of Treasure (Secretaría de Hacienda y Crédito Público)
SM-AM	Secretariat of the Navy (Secretaría de Marina y Armada de México)
SMT	Temporary Modification Request (Solicitud de Modificación Temporal)

ABBREVIATION	DEFINITION
	Temporal)
SPDS	Safety Parameter Display System
SRLR	Supplemental Reload Licensing Report
SSE	Safe Shutdown Earthquake
STAR	Stop, Think, Act and Review
TMVB	Trans Mexican Volcanic Belt
TQM	Total Quality Management
UAM	Metropolitan Autonomous University (Universidad Autónoma Metropolitana)
USA	United States of America
USNRC	United States Nuclear Regulatory Commission
VARIOS	Miscellaneous Document (Varios)
WANO	World Association of Nuclear Operators

INTRODUCTION

ELABORATION AND SCOPE OF THE NATIONAL REPORT

In agreement with the Article 5 from the Convention on Nuclear Safety, the present National Report summarizes the measures adopted in the period 1998 to 2000, related to the only (for the shake of the Convention on Nuclear Safety) nuclear power plant existing in Mexico: Laguna Verde Nuclear Power Station (LVNPS).

This National Report is organized according to the structure of the Articles (from 6 to 19) of the Convention. It includes the original National Report (Annex I) presented during the First Meeting of Contracting Parts that was held at the IAEA headquarters in Vienna in April 1999.

This report was prepared following the instructions of the Secretariat of Energy (SENER), by the National Commission on Nuclear Safety and Safeguards (*Comisión Nacional de Seguridad Nuclear y Salvaguardias, CNSNS)*, the Mexican regulatory body for nuclear matters, and the Federal Commission of Electricity (*Comisión Federal de Electricidad, CFE)* through its Nuclear Power Plant Division *(Gerencia de Centrales Nucleoeléctricas).* This latter is the responsible for the LVNPS operation.

By means of this document and its annexes, the Mexican Government totally recognizes its commitment to continue applying all basic principles on nuclear safety, radiological safety and physical security to its national nuclear installations in order to maintain and increase their level of safety.

From the information given in this document it can be concluded that The Mexican United States comply with the obligations of the Convention.

NOTE: This document was originally written in Spanish, therefore in case of misunderstanding, the reader is referred to the Spanish version for guidance.

ARTICLE 6. EXISTING NUCLEAR INSTALLATIONS

6.1 NUCLEAR INSTALLATIONS IN THE MEXICAN UNITED STATES

There are no additional nuclear installations in Mexico to the ones already declared at the First National Report (Annex I).

6.2 MAIN ACTIVITIES PERFORMED FROM 1998 TO 2000 IN ORDER TO ENHANCE SAFETY.

Based on the technical opinion of the CNSNS, in the period covered by the present report, CFE was granted from the Secretariat of Energy, the new License of Commercial Operation at increased thermal power of 5% for both units of Laguna Verde Nuclear Power Station (LVNPS), so the maximum authorized power now is 2027 MWt.

In December 1999, as part of the License for Commercial Operation at this new power, CNSNS included a set of requirements, which contain commitments to be satisfied by the LVNPS owner.

According to this new License for Operation, LVNPS must be periodically reviewed (Periodic Safety Review) against the current standards, norms and regulations from the country that provided the reactor as well as the ones form the International Atomic Energy Agency (IAEA). The above with the view to maintain LVNPS updated in the “Regulatory State of the Art”. This periodic review was originally established by CNSNS to be performed every 5 years after initial commercial operation, however the experience of the industry in this type of evaluations suggests a 10 years period. As a result of the licensing process for LVNPS for a 5 % power uprate condition, the current License of Operation for both Units establishes a period review on a ten-year basis. At the end of 1999, CFE submitted the First Periodic Safety Review report.

Since 1998 LVNPS has implemented a program to deal with and solve the most relevant safety issues; this program will be effective from 1998 to 2006 and pursues five objectives: Safety, Environment, Generation, Human Resources and Costs. The upper management has single out as the most relevant, above all, the enhancement of nuclear safety. The topics covered by this program, among others, are as follows:

1. Collective dose reduction (in progress, see Article 15 of this National Report).

2. Intergranular stress corrosion cracking control (in progress, see Article 19 of this National Report).

3. Replacement of Emergency Core Cooling Systems (ECCS) suction strainers to avoid plugging (implemented).

4. Improvement of reactor pressure vessel instrumentation to avoid degasification problem during RPV depressurization (implementation during refueling outages in 2001).

5. Installation of an automatic detection and suppression system for core instabilities (under evaluation).

6. Containment Hard Vent Piping (implemented).

7. Low Voltage Second Level Protection (implemented).

8. Replacement of Improved Recirculation Discharge Isolation Valves (implemented).

During the period covering of this National Report, LVNPS has concluded the Probabilistic Safety Analysis (PSA) Level 2, in addition to the Level 1 analysis previously developed and whose results were presented in the First National Report.

An internal flooding analysis has been completed by LVNPS and submitted to CNSNS as part of the Individual Plant Examination in accordance with the requirements to satisfy the USNRC Generic Letter 88-20.

The main conclusions from the PSA Level 1 and 2 for Laguna Verde Nuclear Power Station make clear that the plant does not pose an undue risk to the public health and safety and that, at present, there is no basis for any action or regulatory requirement. The study concludes that the station blackout (loss of all AC power) accidents, loss of offsite power accidents with successful operation of at least one emergency diesel generator and loss of coolant accidents outside the containment (Interfacing LOCA) are the dominant contributors to the core damage at Laguna Verde NPP.

The possibility of successful containment venting and realistically allowing for successful core cooling after containment failure have reduced the significance of the loss of long term heat removal accidents originally found to be important in the WASH-1400.

As an example of safety improvements performed, as result of the PSA Level 1 study, it can be mentioned.

1. Installation of a hard pipe cross tie between the Fire Suppression System (with a driven diesel pump) and the Residual Heat Removal System (RHR), allowing water injection into the reactor vessel and containment spray under blackout conditions.

2. Preventive maintenance of backup pneumatic supply components for the Automatic Depressurization System (ADS), which are not verified when normal supply is operating.

In addition to the above improvements, an extensive participation in PSA task of personnel from operations, engineering, maintenance and training, has taken place. This has resulted in the dissemination of PSA insights into key plant activities and procedures.

6.3 FIRST REVIEW MEETING COMMITMENTS

In accordance with the contracted commitments by Mexico when the Convention on Nuclear Safety was signed and ratified, encourage the involved institutions to make efforts to take into account all the recommendations made by the Member States during the First Review Meeting.

a) Independence of the Regulatory Body

As today the independence between the Regulatory Body and the Secretariat of Energy, is still under the review of the Mexican Government. Even though, as shown in this National Report, it is considered that the actual status does not compromise the effectiveness of the regulatory mission and activities, mainly because CNSNS as a desconcentrated (semi-autonomous) agency of the government, holds a higer level in the Federal Public Administration and therefore has full authority over all the activities on nuclear and radiological safety matters, including CFE as owner and operator of a nuclear power installation.

Independently of the above mentioned, negotiations made at the end of the year 2000 have resulted in the elimination of the budget dependency of the Regulatory Body from the Federal Commission of Electricity (operator of LVNPS). See section 8.4.2 of this National Report.

b) Safety Improvements Programs

Refer to the following sections of this National Report for the various programs and activities that have been developed by CFE and CNSNS to improve safety:

6.2 Main current safety issues

10.2 Safety Culture

11.2.2 Human resources for CFE/GCN

12.3 Further Steps Contributing to Prevent Human Errors and Improve Man Machine Interaction

12.4 The Role of the Regulatory Body in Reducing Events Caused by Human Factors

13.3.1 Periodic Evaluation of the Adequacy of the Quality Assurance Plan

13.6 Regulatory Body Activities

14.3 Safety Assessment, Operation Stage

14.4 Safety Assessment, Actions for its Continuous Improvement

19.10.5 Radioactive Waste Production – Reduction Program

c) Containment Efficiency

Refer to Section 19.9.1.1 of this National Report.

d) Probabilistic Safety Analysis

Refer to the following sections of this National Report:

6.1 Main Current Safety Issues

12.3 Further Steps Contributing to Prevent Human Errors and Improve Man Machine Interaction

14.5 Probabilistic Safety Analysis (PSA)

e) Collective Doses and Radiological Effluents

Refer to Section 15.3.1 Radiological Protection Program of this National Report.

f) Emergency Preparedness

Refer to Section 16.1.5 Emergency Plan Activation Exercises / Drills of this National Report.

6.4 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

According to what is generically described in this Article and the provisions in other Articles conforming this National Report, to satisfy the obligations derived from the Convention on Nuclear Safety, it is considered that in the Mexican United States there are laws, regulations and means for the adequate surveillance and supervision by a Regulatory Body which is independent of the utilities, and therefore ensures that the operation of Laguna Verde Nuclear Power Station does not represent an undue risk to public health or safety, nor to the environment.

In relation to the specific compliance with the obligations of the Convention on Nuclear Safety, the level of fulfilment attained for each one of such obligations is described in subsequent Articles.

The conclusion that can be reached from the existing objective evidence, a summary of which is given in this Report, is that Laguna Verde Nuclear Power Station meets a comparable level of safety to that of similar type of plants located in countries with greater nuclear experience. Up to now, there are no conditions that could be identified as adverse to a safe operation and therefore, there is no plan to anticipate the installation's shutdown prior to the completion of its lifetime.

ARTICLE 7. LEGISLATIVE AND REGULATORY FRAMEWORK

7.1 INTRODUCTION

In this article it is presented a resume of the Legal, Standards and Rules that have been developed by CNSNS during the period 1998-2000, as part of the regulatory process.

7.2 NATIONAL REQUIREMENTS AND PROVISIONS

The legislative and regulatory framework under which the principles and obligations deriving from the Convention on Nuclear Safety are supported, is based on the Political Constitution of the Mexican United States (hereinafter denominated “the Constitution”) from which a series of laws, regulations and standards are derived.

The Constitution, in its Article 27, establishes that nuclear energy must be only used for pacific applications and that the utilization of nuclear fuels for the generation of nuclear energy corresponds to the Nation.

Up to December 2000, closing date for information to be included in this national report to fulfil the commitments of the Convention on Nuclear Safety, the fundamental regulatory framework has not changed. That is, the CNSNS is the regulatory body on nuclear matters, with full authority on the activities of the radioactive material users on both the industry and medicine. In the case of devices for generation the ionising radiation for diagnostic the Secretariat of Health authorities in Mexico regulates these activities.

7.3 REGULATORY AUTHORITY

The regulatory authority remains the same so the information that was presented in the First National Report is still valid (See Annex I in its section 7.3).

7.4 LICENSING PROCESS

The licensing process for nuclear installations has not been modified so the information that was included in the First National Report remains valid (See Annex I in its section 7.4).

7.5 ASSESSMENT SYSTEM AND REGULATORY INSPECTIONS

The process of assessment and regulatory inspections has not changed so the information that was presented in the First National Report remains valid (See Annex I in its section 7.5).

7.6 ASSURANCE OF COMPLIANCE WITH SUSPENSION, MODIFICATION AND REVOCATION MEASURES

The assurance of compliance with suspension, modification and revocation measures has not changed so the information that was included in the First National Report remains valid (See Annex I in its section 7.6).

7.7 LAWS, REGULATIONS AND REQUIREMENTS RELATED TO NUCLEAR SAFETY

The laws, regulations and requirements related to nuclear safety have not changed so the information described in the First National Report remains valid (See Annex I in its section 7.7); however, in addition to the once already mentioned, in the period 1998-2000 the following norms were issued:

- Official Mexican Standard NOM-031-NUCL-1999 ”Requirements for the Qualification and Training of the Occupational Exposed Personnel to Ionising Radiation”.

- Official Mexican Standard NOM-034-NUCL-2000 ”Requirements for the Qualification and Training of the Personnel of Nuclear Power Stations”.

- Official Mexican Standard NOM-035-NUCL-2000 ”Limits to Consider a Solid Remainder as Radioactive Waste”.

7.8 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As shown in the preceding sections, the Mexican United States relies on a legislative and regulatory framework that adequately rules the safety of nuclear installations in the national territory.

The legal and regulatory framework anticipates the establishment and application of:

i) The national requirements and provisions applicable to safety matters; including those related to the implementation of International Treaties and Conventions signed on this subject;

ii) A license awarding system related to nuclear installations as well as the prohibition of the exploitation of a nuclear installation without a license;

iii) A nuclear installation regulatory evaluation and inspection system to verify compliance with applicable provisions and those stipulated in the licenses;

iv) Measures to ensure compliance with applicable provisions and those stipulated in licenses, inclusively suspension, modification or revocation measures.

Based on the aforementioned, it is concluded that the obligations in Article 7 of the Convention on Nuclear Safety are fully satisfied.

ARTICLE 8. REGULATORY BODY

8.1 INTRODUCTION

In as much the mission and the vision of the Mexican Regulatory Body have not changed during the period 1998-200, the information that was provided in the First National Report is still valid (See Annex I in its section 8.1).

Therefore, the mission of CNSNS stays as follows: ***To ensure that activities involving nuclear materials, radioactive materials and ionising radiation sources be carried out exclusively for pacific uses and with maximum safety for the public and environment, considering the current technological development.***

8.2 ATTRIBUTIONS AND RESPONSIBILITIES

The attributions and responsibilities of the Mexican Regulatory Body have not changed so the information that was included in the First National Report remains valid (See Annex I in its section 8.2).

8.3 REGULATORY BODY ORGANISATION

Essentially the organisation structure of the Mexican Regulatory Body is the same as was presented in the First national Report (See Annex I in its section 8.3), however, to assure the implementation of an Internal Quality Assurance Program, a Quality Committee has been appointed. This Committee has the following responsibilities:

a) To co-ordinate and help to the development and implementation of the Quality Assurance System.
b) To verify that the requirements established in the Quality Assurance Manual are being applied.
c) To notify the general direction and the specific Division, the results of the audits. Furthermore, it assess the corrective actions proposed by the Division audited.

Figure 8.1 shows the actual organisation structure of CNSNS. The position occupied by CNSNS in the Federal Government and the Emergency Committee have not been modified, so the figures presented in the First National Report remain valid (See Annex I in its Article 8).

8.4 HUMAN RESOURCES

During this period 1998-2000, a reduction of 13.3% in the total of technical personnel of the Mexican Regulatory Body was experienced. Currently, CNSNS has the following technical personnel:

	NUMBER	%
Specialised Technicians or equivalent.	15	14.4
Professionals with a Bachelor's Degree or equivalent	53	51.0
Professionals with a Master's Degree or equivalent	33	31.7
Professionals with a Ph. D.	3	2.9
TOTAL	104	100

To date efforts are being made and actions taken to prevent the causes that originated this reduction. Independently of what has been said, the programs of assessment and inspection to the nuclear installations have not been negatively impacted.

8.4.1.1 Training of Personnel of the Regulatory Body

In relation with the training of personnel, CNSNS encourages its personnel and their work teams to take part in diverse international programs developed by the IAEA, the Nuclear Energy Agency of the OECD and the Research and Development projects sponsored by CNSNS.

Currently the CNSNS is a member of the SCDAP development and training program managed by Innovative Systems Software, Inc. The program is accountable for the development, improvement and validation of SCDAPSIM; a SCDAP/RELAP5 based nuclear plant analyzer. The National Institute for Nuclear Research (ININ) is developing, on behalf of CNSNS, a standard procedure to carry out biological dosimetric studies of individuals involved in radiation accidents, also they are carried out the safety assessment of LVNPS containment and its systems for the requested 5% power uprate and improved technical specifications.

A private contractor was also implementing a one-dimensional kinetic model for the TRAC-BF1 code, based on a two-group formulation, which made use of an analytical

model of the nodal method. Efforts are being continued in the determination of radiation levels resulting from inside housing Radon concentration all over the country, this project is partially supported by the IAEA. Finally, a program on reactor stability analysis of BWR's is on going at the Universidad Autónoma Metropolitana (UAM) under the sponsorship of the CNSNS.

8.4.2 Financial Resources

Up to the year 2000, the financial resources of CNSNS were composed as follows:

80% of the budget came from the payment under covenant with CFE for the concept of the Operation License for both LVNPS1-& 2.

20% of the budget came from funds from the Federal Government Budget.

Furthermore, the CNSNS cash in about $ 1,000,000 U.S. dollars to the Federal Government on the payment of the licensing process (issuing, renovation and modification) of radioactive installations and on the transportation, exportation and importation of radioactive material, as well as the payment of fines by violation of applicable requirements.

At the end of the year 2000, the negotiations of the CNSNS budget yield two results:

- The total budget was increased in 70 %, that is from $ 4,000,000 to $ 6,800,000 US dollars.
- 100 % of the budget comes now from Federal funds.

Therefore, the resources granted to the Regulatory Body are considered sufficient to satisfy its responsibilities as assigned in the Nuclear Law.

On the average the CNSNS has devoted about 6% of its total annual budget to technical support, research and development. In previous years funds were applied to deal with, among others:

- The ECCS strainer blockage due to LOCA generated debris.
- The development of a containment model for LVNPS.
- The safety assessment of proposals addressed to modify technical specifications, and
- The determination of natural radiation levels.

8.5 INTERNAL QUALITY ASSURANCE IN THE REGULATORY BODY

The Quality Assurance Programme, developed since 1997, has defined a number of tasks to incorporate Quality Assurance Management in the activities of CNSNS. The first task consisted in the revision of the existing guides and procedures and then the development, when needed, of new ones at all levels of the organisations of the Regulatory Body.

In 1998 the CNSNS set up a Quality Committee. For 1999 this committee developed a Quality Assurance Manual which was distributed to the staff for its implementation and furthermore the Committee developed its own Organisation Manual and procedures for performing audits. Up to November 2000, the Quality Committee had performed 15 “diagnostic” audits covering a wide spectrum of CNSNS Divisions as well as the Department of Legal and International Affairs, and the Financial Administrative Unit.

8.6 RESULTS FROM THE IRRT MISSION TO THE REGULATORY BODY

From January 15-26, 2001 an International Regulatory Review Team (IRRT) mission from the IAEA, to the Regulatory Body was hosted.

The mission paid attention to the following areas: A “Legislative and Governmental Responsibilities”, B “Authority, Responsibilities and Functions of the Regulatory Body”, C” Organisation of the Regulatory Body”, D ”Authorization Process”, E “Review and Assessment”, F “Inspection and Enforcement for Nuclear Facilities”, G “Development of Regulations and Guides”, H ”Emergency Preparedness”, I “Radioactive Waste Management and Decommissioning” and J “Radiation Protection”.

Table 8.1 shows the corrective actions undertaken by CNSNS to answer the recommendations issued by the IAEA inspectors as result of the mission IRRT.

8.7 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As described in this Article, CNSNS is a semi-autonomous federal organism depends from the Secretariat of Energy and designated as the National Regulatory Body in matters of nuclear safety. Furthermore responsible for applying the legislative and regulatory standards described in Article 7 of this National Report. It has adequate authority, competence, financial and human resources to fulfil its responsibilities as conferred by The Regulatory Law of the Constitutional Article 27.

Based on the aforementioned, it is concluded that the obligations contained in Article 8 of the CSN are fully satisfied.

Table 8.1 Results of the IRRT Mission to CNSNS

No.	Recommendation	Corrective actions	Deadlines
R-1	The legislative framework should be expanded to address the regulation of activities related to nuclear safety, radioactive waste management and emergency response at the same regulatory level as radiological safety. This review should give adequate consideration to the technical capabilities of different institutions to make efficient use of the available resources when assigning regulatory responsibilities.	The Nuclear Law will be modified to include as part of the fundamental articles the suggested recommendations. This corrective action started in March 2001 and it is in now in the process of compiling the comments from all the sectors of the government.	December 2002
R-2	A specific legal mechanism should be established to ensure adequate funding of the regulatory body.	The Nuclear Law will be modified to grant CNSNS the means to establish the payment rates of licensing services for both nuclear and radioactive installations.	December 2002
R-3	The legislative framework should be expanded to define how the public potentially affected by the uses of nuclear energy may be involved in the regulatory process.	The Nuclear law will be modified to include as part of its articles the suggested recommendation.	December 2002
R-4	The legislative framework should be reviewed to ensure consistency with the international treaties and conventions ratified by Mexico and, in particular, with the Nuclear Safety Convention	The Nuclear Law will be modified to include as part of its articles the suggested recommendation.	December 2002
R-5	The legislative framework should be modified to ensure effective independence of the regulator from the institutions in charge of promoting the use of nuclear energy and establishing the energy policy and from those responsible for the operation of nuclear facilities	The Nuclear Law will be modified to include as part of its articles the suggested recommendation.	December 2002
R-6	The legislative framework should be reviewed to assign the authority to the regulator of informing the public, other national and international institutions and regulators of foreign countries about regulatory decisions and other issues considered of interest	The Nuclear Law will be modified to include as part of its articles the suggested recommendation.	December 2002
R-7	A review of the personnel resources of the individual CNSNS Divisions should be performed taking into account the duties and responsibilities of these Divisions. After such review a re-allocation of staff and training should be considered as a first step to cover the regulatory needs in view of the frequent staff turnover and the	CNSNS will make a proposal to SENER and SHCP to increase, at least by four workers, the staff of the Department of Operative Supervision from the Radiological Safety Division in order to have the capability to perform inspections according to the risk classification	December 2001

No.	Recommendation	Corrective actions	Deadlines
	knowledge of the professional staff. As a second step, the recruitment of new staff to cover those areas where skills and knowledge are lacking is essential to be able to carry out the regulatory work.	A, B, or C, as defined in the General Regulations on Radiological Safety. Furthermore, the Radiological Safety Division will be re-structured to transfer the activities out of CNSNS scope to other organizations of the mexican government.	
R-8	Salary improvements for the lowest professional positions should be promoted taking into account the technical qualification of personnel and the need to recruit and retain well qualified staff.	Currently (June 2001) a submittal for a salary increase is in process, an it is addressed to amend this deficiency.	August 2001
R-9	The CNSNS should implement and complete the internal guidance framework in line with a general review and assessment procedure in connection with the licensing process	The Organization Manual of the CNSNS will be modified as well as its related procedures.	June 2002
R-10	The CNSNS should directly link the review and assessment activities with the inspection and enforcement and activities for follow-up on evaluation findings.	The Organization Manual of the CNSNS will be modified as well the related procedures.	June 2002
R-11	The CNSNS should assess organizational staffing and resources in a manner that takes into the account the integrated nature of their nuclear safety inspection responsibilities and, in addition, should fill the vacancies in the Nuclear Safety Division.	According to this recommendation, the Procedure AI-DVO-01 “Programming of Inspections” will be reviewed and modified for the areas of Physical Security and Radiological Safety. Right now there are no vacancies in the Nuclear Safety Division.	June 2001
R-12	The CNSNS should implement the new programme for qualification and training to improve the capabilities of the inspection staff and ensure that the personnel who perform inspections are appropriately trained and qualified in effective methods of inspection of integrated plant operations and to maintain technical competence.	The Procedure AI-GSN-04 will be issued for the establishment of a training program.	December 2001
R-13	The CNSNS should carry out reactive inspections in response to unexpected unplanned or unusual situations or events in order to assess the significance and implications and the adequacy of corrective actions. Experts from other Departments should be included in the team.	The number of non- announced inspections will be increased and the strategy of special inspections will be maintained. An evaluation of this issue will be performed in December 2001.	SOLVED

No.	Recommendation	Corrective actions	Deadlines
R-14	The CNSNS should assess inspection programme planning and resource allocation to ensure development of an integrated inspection programme. Such a programme would include objectives and would result in a consistent and effective verification of the level of operational safety performance. Programme development should ensure that all appropriate operational inspection attributes are covered, including performance in the management effectiveness, self-assessment and safety culture areas.	The areas of performance in the management effectiveness, self-assessment and safety culture will be incorporated to the regular program of inspections.	August 2001
R-15	The CNSNS should generate an Enforcement Policy that clearly lays out the practices and procedures to be followed by CNSNS personnel for the implementation of enforcement actions that are to be used to ensure compliance with regulatory requirements	The Nuclear Law will be modified to grant CNSNS the means to impose fines due to deviations from the Operation License, for both nuclear and radioactive installations.	December 2002
R-16	The CNSNS should address all programmatic failures by the licensee in a manner that references existing commitments.	The necessary databases will be developed in order to maintain a registry of licensee performance and behavior. This for both nuclear and radioactive installations.	July 2002
R-17	The CNSNS should consider whether there is an alternative process or other resource that could be used to shorten the time taken to produce a draft regulation.	CNSNS has considered and analyzed the possible alternatives to reduce the time for the issuance of regulations. However, the whole process is not solely determined by CNSNS and therefore in the short term, this will not be possible.	SOLVED
R-18	The CNSNS should pursue the development of the necessary nuclear regulation in order to complete the regulatory framework as a high priority activity.	A policy to develop, with the highest priority, those lacking nuclear regulations needed to complete the national regulatory framework will be established. This policy will be launched by the CNSNS Director General with the endorsement of the SENER's undersecretary accountable for regulatory matters.	December 2002
R-19	The CNSNS should consider undertaking a strategic review of the development of technical guidance and corresponding regulatory criteria in order to improve its development across the Divisions.	Modify the Organization Manual of CNSNS.	December 2001

No.	Recommendation	Corrective actions	Deadlines
R-20	The CNSNS should approve and participate in all emergency plans affecting nuclear and radiological safety.	In the case of LVNPS, the approval is done through the assessment and inspection of the PERE drills and documents. For radioactive installations, the emergency plan is one of the requirements that the licensee has to comply in order to obtain the corresponding license, therefore the issuance of the license implies the approval of the emergency plan. The latter involves the integration of all emergency procedures into the procedures manual. Furthermore, if any one accident goes beyond the capacity of the licensee to deal with it and the public safety is endangered then according to the procedures the CNSNS acts immediately overriding the licensee.	SOLVED
R-21	The CNSNS should define its role as an independent and credible authority during nuclear emergencies with respect to providing independent public information.	The Nuclear Law will be modified to include as part of its articles the suggested recommendation.	December 2002
R-22	The CNSNS should ensure that all required actions in the Nuclear Contingency Plan are implemented in both emergency drills and exercises and during real events.	The training exercises of CNSNS Nuclear Contingency Plan will be modified as to include integration activities at the Center of Nuclear Contingencies without previous notice. In this way the training will be suitable to face any alarm level at LVNPS.	December 2001
R-23	The CNSNS should assure that all emergency response staff receive emergency response training and have adequate procedures and guidance available in emergency centers in order to carry out their responsibilities.	The training exercises of CNSNS Nuclear Contingency Plan will be modified as to include integration activities at the Center of Nuclear Contingencies without previous notice. It will include all the participants and the Residents too.	December 2001
R-24	A national comprehensive full-scope exercise should be conducted as soon as possible and the findings and recommendations which were generated during previous exercises and drills should be resolved in a timely manner.	A full scope exercise PERE, was programmed for April 2001. The results of it will made available shortly. It is proposed to regulate the time for solving the detected deficiencies and the penalties for no fulfillment.	SOLVED
R-25	The CNSNS should establish agreements with neighboring States under the	Currently there are Information Exchange Agreements on nuclear	March 2002

No.	Recommendation	Corrective actions	Deadlines
	provisions of the Convention on Early Notification of a Nuclear Accident or Radiological Emergency.	safety with USA and Cuba. Regarding Guatemala and Belize there are no signed agreements. However the office for International Affairs from SENER will be invited to look for mechanisms to establish such agreements.	
R-26	The Minister of Energy should initiate measures to establish a national disposal facility for low level radioactive waste from Laguna Verde NPP and research, medical and industrial practices, according to the criteria established by the CNSNS.	The Nuclear Law will be modified to include as part of the its articles the suggested recommendation.	December 2002
R-27	The Ministry of Energy should undertake the appropriate steps to sign and ratify the International Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.	Since April 2001, in conjunction with the Office of Legal Affairs from SENER, CNSNS started a working program in order to propose to the Secretariat of Foreign Affairs the convenience that our country adheres to the International Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.	December 2002
R-28	The CNSNS should evaluate the consistency of the Mexican legal framework with all IAEA recommendations mentioned above and with the safety requirements included in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management..	Since April 2001, in conjunction with the Office of Legal Affairs from SENER, CNSNS started a working program in order to propose to the Secretariat of Foreign Affairs the convenience that our country adheres to the International Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.	December 2002
R-29	The CNSNS should develop and implement a programme in order to harmonize the Mexican regulations concerning radioactive waste management and decommissioning with the internationally accepted practices as recommended in the IAEA RADWASS Series and in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.	CNSNS will review the current regulatory framework regarding radioactive waste and standards issued by IAEA recently to promote the addition of NOM's through the Radiological Safety Sub – Committee of the Office of Standards from the Secretariat of Economy..	December 2001

No.	Recommendation	Corrective actions	Deadlines
R-30	The CNSNS should ensure that the National Policy and Strategy establishes the basic components of a Radioactive Waste Management System: It should set out the legal basis and responsibilities with respect to radioactive waste management, and include the plan for collection, treatment, conditioning and final disposal of all types of radioactive waste and the corresponding research programme. It should include the setting up of an institution with the directly responsibility for executing the strategy. Specifically, the CNSNS should ensure that the future national system for radioactive waste management contains the basic requirements as stated in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and in paragraph 306 of IAEA Safety Standards, Establishing a National System for Radioactive Waste Management.	CNSNS has collaborated in editing the document “National Policy on Radioactive Waste”. This document was originally prepared by SENER and is in agreement with the most recent publications of IAEA.	SOLVED
R-31	The SENER should provide the CNSNS with appropriate resources for establishing a formal group within the CNSNS with the responsibility to plan decommissioning regulatory activities.	Modify the Organization Manual of CNSNS.	December 2001
R-32	The CNSNS should identify the necessary standards and documents that are required to support the licensing requirements for decommissioning. As a minimum, the CNSNS should develop regulatory guidance for the format and content of key regulatory documents such as the decommissioning plan and the cost estimates.	With the participation of the Division of Radiological Safety, the CNSNS will establish the criteria associated with radiation protection for decommissioning of radioactive and nuclear installations. CNSNS believes that this issue is not a limiting condition for restraining the current operation of radioactive and nuclear installations.	December 2001
R-33	The CNSNS should establish a training programme by making use of bilateral agreements with other countries and in co-operation with the IAEA and other international institutions.	The training program is working properly through bilateral agreements with USA, Spain and the IAEA. The scope of cooperation will be expanded to cover among others, decommissioning.	December 2001

No.	Recommendation	Corrective actions	Deadlines
R-34	The CNSNS should harmonize the Mexican licensing process regarding radioactive waste management and decommissioning with the internationally accepted practices. The Radiation Safety Standards Advisory Committee (RASSAC) series of the IAEA Safety Standards for radiation safety and the RADWASS series for radioactive waste management provide guidance for a licensing process for radioactive waste management and decommissioning.	CNSNS will review the fundamental criteria contained in the publications RASAC and RADWASS to identify those applicable which are missing from the licensing process. Then, actions will be taken to incorporate them into the latter.	August 2002
R-35	In order to permit the CNSNS to reach a decision with respect to licensing, the CNSNS should request the ININ to carry out a safety assessment including, where necessary, the long term safety of the CADER, Peña Blanca, La Piedrera and Baja California radwaste facilities.	CNSNS will develop a project addressed to set up the licensing requirements for the existing facilities and then to proceed to request ININ the respective safety assessment for the CADER, Peña Blanca, La Piedrera and Baja California radwaste storage facility, respectively. The safety assessments would not be take into account the specific features of each site as for instance wastes origin, activity concentration and so on.	July 2002
R-36	The CNSNS should review the licences for the “Low level radioactive waste and disused radioactive sources treatment plant at National Institute for Nuclear Research, Salazar Centre”, the “Treatment and conditioning facilities at Laguna Verde NPP site”, and the “Storage facilities at Laguna Verde NPP site”, in order to ensure that these licences include all required components.	The CNSNS reviewed has already started and it will be finished al the end of 2001.	December 2001
R-37	The CNSNS should enhance and strengthen the entire regulatory process governing the inspection and enforcement of compliance with the legal requirements related to radioactive waste management practices. The CNSNS should also establish specific inspection procedures, including those for quality assurance, to ensure an effective control of the different types of radioactive waste management facilities.	A new review of for the General Regulations on Radiological Safety is currently in process with a view to include these issues. Furthermore specific procedures will be worked out to attend the recommendation.	September 2002, issuance date for the General Regulations on Radiological Safety
R-38	The CNSNS should monitor and enforce compliance with the established legal framework. In particular, the CNSNS	A new review of for the General Regulations on Radiological Safety is currently in process with a view	September 2002, issuance date for the

No.	Recommendation	Corrective actions	Deadlines
	should: (1) Develop and update the standards, criteria and guidelines required to implement the legal framework, and (2) Ensure that activities generating radioactive waste are not initiated without provision for adequate treatment, conditioning, storage and disposal.	to include these issues.	General Regulations on Radiological Safety
R-39	The process for the revision and final promulgation of the General Regulations for Radiological Safety as well as the associated National Official Standards should be accelerated as much as possible so as to achieve consistency with the IAEA Safety Standards Series N° 115, International Basic Safety Standards (BSS) for Protection against Ionizing Radiation and for the Safety of Radiation Sources.	A new review of for the General Regulations on Radiological Safety is currently in process with a view to include these issues.	September 2002, issuance date for the General Regulations on Radiological Safety
R-40	Based on the potential magnitude and nature of the hazard associated with the facility or activity and the legal requirements in Mexico, the Division of Radiation Safety should upgrade its regulatory programme to cover the licensing, inspection and enforcement activities with adequate resources, including the licensing and inspection of the LVNPP as far as radiation safety issues are concerned.	In accordance with the response R-7 concerning the revision of the human resources at the CNSNS divisions, it will be proposed an internal re- organization of the Division of Radiological Safety in order to increase the resources for inspections of nuclear and radioactive installations.	August2001
R-41	The CNSNS in co-ordination with the relevant authorities at the State as well as at the Federal level, should develop a national emergency plan for radiological emergencies involving radiation sources which should define the role and the responsibilities of all concerned parties including the CNSNS.	The modification to the Nuclear Law must contain this kind of attributions for the CNSNS. This recommendation will be included.	December 2002
R-42	The planned new legislation should include the requirement for all dosimetry services to be authorized or accredited by the Regulatory Authority.	A new review of for the General Regulations on Radiological Safety is currently in process with a view to include these issues.	September 2002
R-43	The CNSNS should review its training programme for consistency with new International Standards (BSS).	The technical divisions of CNSNS will undertake the task to define the scope of this training program for their personnel.	December 2001

NUCLEAR COMMISSION ON NUCLEAR SAFETY AND SAFEGUARDS (CNSNS)

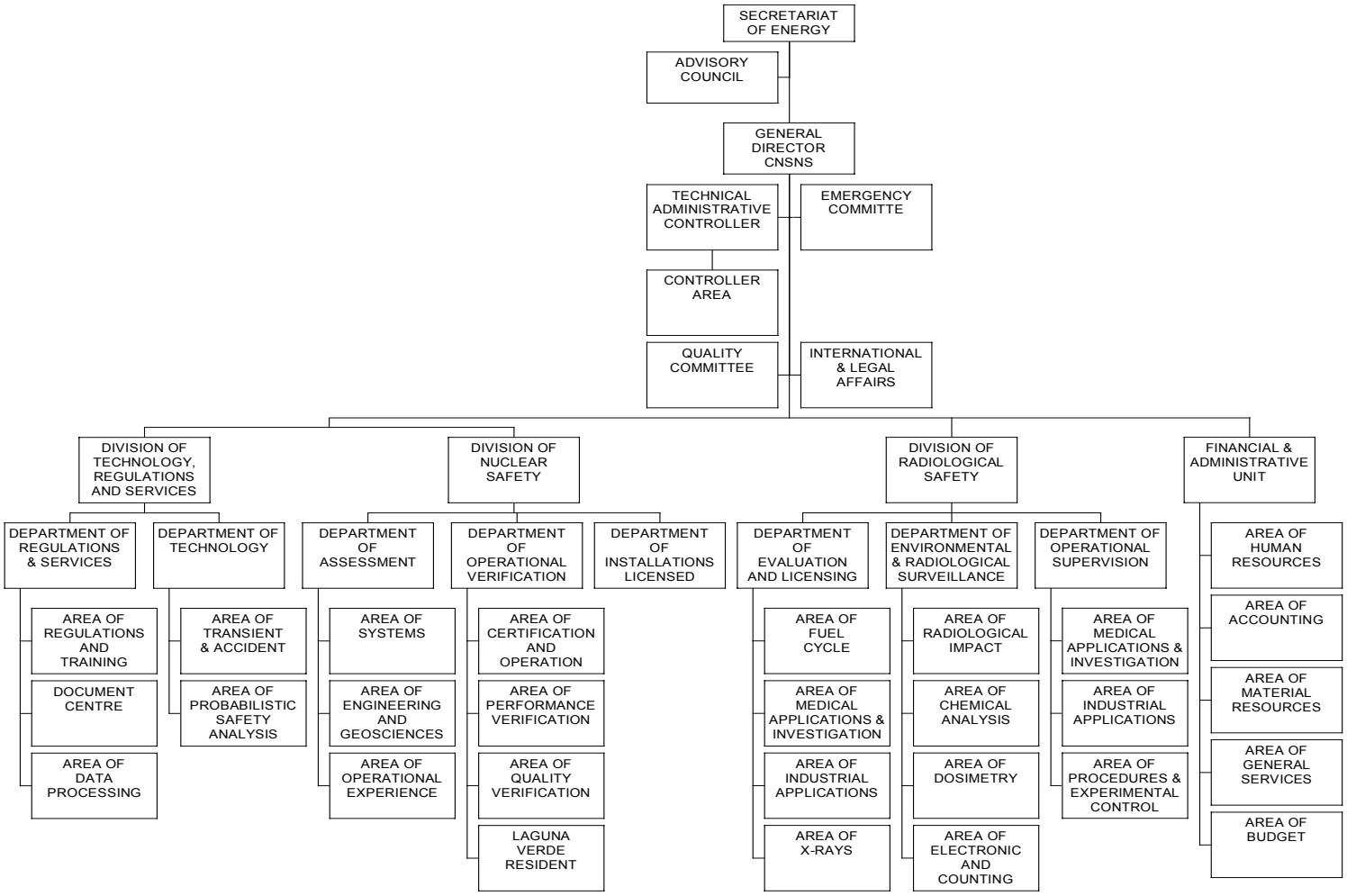


FIGURE 8.1

ARTICLE 9. RESPONSIBILITY OF THE LICENSEE

9.1 INTRODUCTION

As it is required by The Regulatory Law of the Constitutional Article 27 on Nuclear Matters, the owner of nuclear installations has the responsibility to guarantee the safe operation, so there is no risk of dilution of the responsibility on nuclear safety. The CNSNS activities are devoted to demonstrate that all the organisations that work for CFE, including contractors, develop theirs activities under agreed norms and regulations. No matter how many inspections, audits or safety assessments are performed by the Regulatory Body, the scope of its work is the surveillance and prosecution, so it represents a portion of all the needed activities to fulfil the safety commitment required to the licensee.

9.2 RESPONSIBILITY OF THE LICENSEE

The main responsibilities defined by the National Commission on Nuclear Safety and Safeguards, to be satisfied by the Federal Commission of Electricity (owner of Laguna Verde NPP), are contained in the document named “Conditions of the License for Commercial Operation of Laguna Verde Nuclear Power Station Unit 1 (and 2)” for each installation. Additionally, as integral part of these Licenses of Operation for LVNPS Unit 1 and 2, it was issued the document “Technical Specifications of Operation” that contains the limiting conditions for operation, surveillance requirements and the immediate actions that the owner must adopt.

9.3 MEASURES ADOPTED BY THE REGULATORY BODY TO ENSURE THE FULFILLMENT OF THE LICENSEE’S RESPONSIBILITIES

The measures adopted by the regulatory body to ensure the fulfilment of the licensee’s responsibilities have not changed, so the information that was established in the First National Report is still valid (See Annex I in its section 9.3).

9.4 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE OBLIGATIONS IMPOSED BY THE CONVENTION.

Considering the mentioned in previous sections of this Article, it is observed that the CFE is the main responsible for the safety of LVNPS and that CNSNS, as a Regulatory Body, verifies that CFE fulfils its responsibilities. Therefore, it is concluded that those obligations in Article 9 of the Convention on Nuclear Safety are fully satisfied.

ARTICLE 10. PRIORITY TO SAFETY

10.1 INTRODUCTION AND SAFETY POLICIES

There are no significant changes since the issuance of the First National Report (Annex I) regarding the commitments derived by the signature of Mexico to the Convention on Nuclear Safety.

10.2 SAFETY CULTURE AND GOOD PRACTICES

CFE, as proprietary of LVNPS, has maintained during the period 1998-2000 the membership for several International Organisations that have been created to exchange experiences to improve the safe operation of nuclear installations. As it was described in the First National Report, these organisations are INPO ("Institute of Nuclear Power Operations"); WANO ("World Association of Nuclear Operators"), and BWROG ("BWR Owners Group"); additional to this voluntary incorporation, Mexico is part of the International Nuclear Event Scale (INES) and the Incident Reporting System (IRS).

As part of these international efforts to improve safety, during 1997 an OSART (Operational Safety Assessment Review Team) mission was developed at LVNPP. In this 1997 mission, and the follow up mission 18 months later (October 1988) , it was emphasized the necessity to reinforce the Safety Culture (SC) at all levels of the organisation. Since then, several activities have been developed in order to improve the understanding of the Safety Culture concepts in accordance with IAEA/INSAG-4.

As a first step, the CFE-GCN actions were refocused to emphasize that safety is an overriding principle, this resulted in the development in August 1998, of the Safety Culture Policy through which the management states that the plant safety has the highest priority over the electricity generation.

Also in 1998 a Safety Culture Reinforcement Plan was developed to conduct the implementation of improvement actions throughout all areas of LVNPP. Currently this Reinforcement Plan provides guidance and orientation to reach the following goals:

M1 Implementation and continuous improvement of SC.

M2 Sensitization to all the personnel towards the high-priority of Safety (Through Seminaries, Workshops, etc)

M3 Surveillance on the performance of SC indicators

M4 Assessment, analysis and prioritization of improvement areas of SC.

The way to assure the achievement of theses goals is based on the use of the STAR (Stop, Think, Act and Review) cycle of the Total Quality Management (TQM). This TQM methodology is also being implemented in LVNPS as a way to improve the six dimensions of Quality: Safety, Intrinsic Quality, Costs, Delivery, Environment and Moral.

The CFE considers that the TQM methodology is the way through which we are walking towards excellence.

The following are some good practices, recognised by OSART after the mission at LVNPS:

1) Safety Culture Seminaries

The Objective of the seminaries has been the Reinforcement of the Safety Culture by means of:

- The high respect to the Nuclear Technology
- The knowledge and comprehension of the Defense in Depth Concept
- The motivation to the development and implementation of Good Practices

All the GCN / CFE personnel have attended these seminaries including the managers.

2) Survey to Measure the Safety Culture level

A survey to measure the Safety Culture level was applied as part of the Safety Culture seminaries. The results of these surveys were widely coincident with those areas of Improvement detected during the 1999 WANO Peer-Review and indicate several weaknesses, which have been attended with actions such as:

- Strong leadership and proactive attitude of managers towards the Safety Culture. (review of the strategic planning considering safety culture as a fundamental factor to achieve a high level of performance).
- To promote high priority and importance to the actions of reinforcing the Safety Culture and Conservative Decisions.
- Area's Heads and supervisors are participating actively in the activities of reinforcing the Safety Culture.
- A specific group of facilitators are coordinating the SC activities in all areas of the CFE organization, under the responsibility of the SC coordinator and with the support of all the managers.
- Human performance has been recognized as a very important methodology to achieve zero events, and it is being considered as a strong tool to reinforce Safety Culture.

- Promotion of the application of conservative decisions to operate the LVNPS.

3) Safety Culture Performance Indicators

Through electronic means such as INTRANET, the safety performance indicators are displayed to all personnel. Actually this set of indicators are being complemented with indicators of a more active nature towards Safety Culture as:

- Percentage of suggestions of employees related to improvements towards Safety.
- Number of safety inspections made by managers and supervisors during the month.

With the Technical Assistance of the IAEA, the GCN / CFE is in the process of defining and integrating this new set of Safety Culture indicators.

4) Assessment of the LVNPS Personnel Perception of Safety Culture

In year 2000 a change was made to the application of surveys which we were applied since 1998. A brief questionnaire It was developed with the aim to measure the level of perception of the personnel about the Safety Culture. This approach has allowed to re-orient attention and resources for identified areas that need improvement, as well as to provide a way to verify the effectiveness of actions taken in those areas.

The following actions implemented have been the result of the improvement achieved so far:

- A best Planning of activities
- An effective supervision by managers
- Team work and Communication.
- Training
- Change of managers' attitude
- Application of Human Performance tools

5) Implementation and continuous improvement of Safety Culture

Several relevant actions have been taken in order to provide a continuous improvement of Safety Culture aspects. Some of them are listed below:

- Safety Culture policy, (2000 edition)
- Collective Radiological Dose reduction goal during outages

- Commitment to prevent requests to the CNSNS for Technical Specifications exceptions in the allowance outage times
- Conservative decisions application
- Human Performance training to all GCN / CFE personnel
- Development of procedure for prioritization of activities
- Integration of a special Group of Root-Cause Analysis
- Upper management commitment with the of Radiological Safety responsible to halt unsafe works
- Development of the STAR acronym to induce the self-questioning attitude
- Integration of the Total Quality Management Council, to establish policies, rules and their follow-up actions to improve accountability, communication and teamwork
- Support of the IAEA to implement the Safety Culture Self-Assessment methodology

10.3 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

During this period, the Regulatory Body and LVNPS activities show their commitment to maintain as an overriding priority the nuclear safety over any other concept. This permits to ensure the fulfilment of the obligations in Article 10 of the Convention on Nuclear Safety.

ARTICLE 11. FINANCIAL AND HUMAN RESOURCES

11.1 FINANCIAL RESOURCES

As it was mentioned in the First National Report (Annex I) the necessary funds for the operations of Laguna Verde NPP come from the Federal Resources and they do not depend on the incomes as a result of the electricity produced.

Comision Federal de Electricidad (CFE) is a government owned company. Its budget is assigned to be applied in an adequate and transparent way. The Laguna Verde NPP investment and operation expenses have privileges with regards to other Mexican electricity installations. This is the result of the requirements imposed by the Mexican Regulatory Body.

11.1.1 Financial Resources for CNSNS

CNSNS, as a semiautonomous organisation , defines its budget annually through the Finance and Administration Unit, based upon specific needs identified by its different departments and areas.

Details about the distribution of the financial resources of CNSNS in the 1998-2000, period are presented in section 8.4.2 of this National Report.

As it was mentioned in section 8.4.2 of this National Report, since 2001, the CNSNS budget comes completely from the federal resources, assigned as part of the Secretariat of Energy budget.

11.1.2 Financial Resources for CFE

The information provided regarding the financial resources for CFE have not changed so the details included in the First National Report are still valid (See Annex I in its section 11.1.2).

11.2 HUMAN RESOURCES

There are not important modifications in the legislation and applicable regulations as it was presented in the First National Report; however, two new Mexican Official Standard were generated in the 1998-2000 period (See section 7.7 of this National Report).

11.2.1 Human Resources for CNSNS

Section 8.4 of this National Report presents the information regarding to human resources at CNSNS.

11.2.2 Human Resources for CFE/GCN

11.2.2.1 Organisational Structure at CFE

Nowadays CFE organisation involves a Director General and Directors of Projects of Investment, Finances and Administration, Operation, and Modernisation. This new organisation substitutes to the one presented in the First National Report of the Convention on Nuclear Safety. (Annex I).

Figure 11.1 shows the current CFE's structure.

- **Production**

During 1990, LVNPS-1 initiated commercial operation with 654 MWe. By 1993, the capacity installed ascended to 29,204 MWe, 28% corresponding to Hydroelectric Plants and 72% to Thermoelectric Plants, including LVNPS, which contributed with 3% of the total generation.

In 1995, LVNPS-2 initiated commercial operation, contributing with additional 654 MWe. Currently, due to the 5% of power uprate of both units of LVNPS the capacity of each unit is 687 MWe.

Therefore, currently the total CFE effective capacity installed ascends to 35,869 MWe contributing the LVNPS with 3.76%. This installed capacity is distributed as follows:

THERMOELECTRIC	**21,657.1 MWe**	**60.37%**
HYDROELECTRIC	**9,389.8 MWe**	**26.18%**
COAL FIRED	**2,600 MWe**	**7.25%**
NUCLEAR	**1,364.9 MWe**	**3.71%**
GEOTHERMAL	**854.9 MWe**	**2.38%**
EOLIC	**2.2 MWe**	**0.01%**
T O T A L	**35,869 Mwe**	**100%**

- **Transmission and Transformation**

During 2000, the National network system counted on 35,271 km of lines of transmission of voltages of 400, 230, 161 and 150 kV, with 39,627 km of sub-transmission lines of voltages of 138, 115, 85 y 69 kilovolts (kV), and 539,755 Km

of distribution lines at levels of 34.5, 23, 13.8, 6.6, 4.16 y 2.4 kV. As a whole, there were 614,653 Km of transmission, sub-transmission and distribution lines nation-wide.

For the year 2000, the transformation capacity was of 139,519 MVA, which 77.3% corresponds to Sub-stations of transmission and the rest 22.7% to Sub-stations of distribution.

The National Electric System of Energy has been divided into 8 areas of control, each one co-ordinated by the National Centre of Energy that is in charged of establishing operation policies, criteria and standards as well as planning and analysis of installation and organisation matters.

11.2.2.2 LVNPS Direction and Organisation

CFE is proprietary of LVNPS, and through the GCN, CFE is totally responsible for its design, engineering, construction, operation, maintenance and decommissioning.

The Director General of CFE is the responsible for conducting the operation and modifications of LVNPS-1 & 2 in compliance with the operation license requirements. Since 1989, as result of the CFE reorganization, this responsibility is carried out by the Director of Operation that is now responsible for the Nuclear Power Plants Division before the General Director.

In order to fulfil this responsibility, the Nuclear Power Plants Division (GCN) is organised as in Figure 11.2. This figure indicates the lines of authority and communication among the organisations forming part of such division are indicated. This organization has been in place since the second part of 1998 in order to provide independence between the production area and the technical support areas, including the training centre.

Technical and support services for the LVNPS Operation during the useful life of both Units are provided by the . Engineering and Technical Services branches. Engineering personnel have the needed qualification, experience and knowledge required to carry out their responsibilities.

Personnel qualifications are in accordance with applicable requirements in Standard ANSI/ANS 3.1-1981 “Selection, Qualification and Training of Personnel for Nuclear Power Plants”.

In addition to the Technical Support Organisation, the GCN counts on the Nuclear Safety sub- Division (conformed by the Departments of Licensing, Quality Assurance, Quality Control and Operative Surveillance and Operational Experience) that it is independent from the Production Organisation, and performs audits, surveillance and independent reviews to all operation, maintenance and support service activities.

This new organization has been in place since the second part of 1998. The independence between the technical support organizations and the operation organization resulted in weakness of the proper support, therefore since the end of year 2000, it was decided to incorporate a functional position “Plant Manager” which report to the General Manager of GCN and has as a primary responsibility the improvement of coordination between the organizations of Operation and Technical Services. Currently, in order to fulfil the license requirements (*“all changes in the organisation must be approved by CNSNS”*) CFE submits to the CNSNS this proposal of modification to the GCN organization.

11.2.2.3 Manager of Production

The Manager of Production reports to the General Manager of the Nuclear Power Plants Division (GCN). He is responsible for the operation, control of plant functioning, electromechanical maintenance, instrumentation & control, water chemistry, and correct operation of the reactor core.

The main functional areas under direct supervision of the Manager of Production are the Operation U-I, Operation U-2, Maintenance, Reactor and Chemical Engineering and Physical Security. (See Figure 11.2 of this National Report).

The line of command and issuance of special orders in the presence of contingencies of temporal nature is as follows:

a) Manager of Production

b) Head of Production (U-1 and U-2)

c) Shift Supervisor (U-1 and U-2)

As it was presented in the First National Report, Operation Groups are assigned both for Unit 1 and Unit 2 based on shift roles. Personnel are not shared between Units (except yard personnel); however, they may be completely transferred if training requirements are previously satisfied.

There are 6 shift groups per unit to cover the 24 hours of the day, 7 days of the week, the Continuous Retraining Program, vacations and unpredicted situations that may arise.

11.2.2.4 Manager of Technical Support

The Manager of Technical Services reports to the General Manager of the GCN. He is responsible of providing day by day technical support to the Manager of Production as well as to the coordinator of Refuelling and Management Control during refuelling outages and planed outages

He is also responsible for the Radiological Protection Program, the ALARA Program, training, In-service Inspection Program, Special Tests, Modification

Program, and the Spare Parts Program. In order to satisfy these responsibilities, he counts on the Plant Engineering, Radiological Protection, Planning and Control, Training, Industrial Safety, Medical Services and Housekeeping Departments (See Figure 11.2 of this National Report).

To carry out the responsibilities related to Training he counts on the Head of Training Centre, which is responsible to plan, co-ordinate and carry out training programs for LVNPS licensing and non-licensing personnel, and for the use and maintenance of the simulator's software and hardware.

11.2.2.5 Manager of Engineering

The Manager of Engineering reports to the General Manager of GCN. He is responsible of providing the engineering support to Production Manager as well as to the Technical Services Manager and Nuclear Safety Manager. He is responsible of maintaining the Design Engineering Basis of LVNPS, Configuration Control, Modification Program, Investment Protection (equipment and components aging program), Radwaste Disposition, and Environmental Surveillance. In order to satisfy these responsibilities, he counts on the System Support, Operating System, Technical Assistant, In-site Engineering, Radwaste Disposal and Environmental Engineering Departments (See Figure 11.2 of this National Report).

11.2.2.6 Manager of Nuclear Safety Organization

The Manager of Nuclear Safety Manager reports to the General Manager of GCN. He is responsible of performing the surveillance through assessment, review and audits of all the activities related to safety or covered by the Quality Assurance Program. The review and audit program is aimed to review important changes proposed to systems or procedures, tests and experiments and for the prompt investigation and correction of the probable recurrence of unusual events having an operational safety meaning as well as to detect tendencies unnoticed during casual observations. In order to satisfy these responsibilities, he counts on the Quality Assurance, Quality Control, Licensing, Operating Verification and Operational Experience Departments (See Figure 11.2 of this National Report).

11.2.2.7 Review and Assessment Committees

In order to review safety related operational activities, the review program has been developed on three levels. First, on an operation level of the plant: Site Operations Review Committee (CROS). Second, on a corporate level: Independent Operation Review Committee (CIRO) and third, as an independent self-assessment from the organization that conform the GCN: the Independent Safety Engineering Unit (GIIS). The CROS is composed by plant, technical services, engineering and nuclear Safety personnel, and performs an operation review and advises the Operation Manager of LVNPS. The CIRO is composed mainly by members (managers) not directly responsible for the operation of

LVNPS, and acts as an independent peer review organisation performing reviews, assessments and audits.

❑ Site Operations Review Committee (CROS)

The CROS is a Committee chaired by the Production Manager, with the following members: Head of Training Centre, Chief of Production U-1, Chief of Production U-2, Head of Reactor Engineering and Chemistry, Head of Maintenance, Head of Plant Engineering, Head of Radiological Protection, Head of Planning and Control, Head of Quality Control, Head of Engineering at site and Head of Operative Surveillance and Operational Experience that acts as Secretary. Their responsibilities are described at the corresponding paragraph of the First National Report.

❑ Independent Operation Review Committee (CIRO)

The CIRO is a Committee chaired by the General Manager of GCN. The Manager of Engineering, the Manager of Production, the Manager of Technical Services, the Manager of Nuclear Safety, the Head of the Independent Safety Engineering Unit, the Head of Quality Assurance and the Head of the Department of Licensing are permanent members of this Committee.

The Independent Review Committee (CIRO) delegates on the Quality Assurance department to carry out all those audits, with the exception of those applicable to Physical Security activities which are performed in behalf of CIRO by the Department of Licensing.

The CIRO provides independent reviews and audits to activities designated in the areas described at the First National Report.

❑ Independent Safety Engineering Unit (GIIS)

The Head of the GIIS reports directly to the General Manager of GCN. This Unit examines the plant operating characteristics, the Regulatory Body issuances, the industry advisories, the Licensee Events, and other sources of plant design and operating experience information, including plants of similar design which may indicate areas of improving safety.

The GIIS is composed by five dedicated, full time engineers located onsite, with an engineering or science degree and with professional level experience in nuclear power plant operation, engineering, safety review, assessment and auditing of nuclear maters. The GIIS provides independent verification that the activities at the LVNPS are performed correctly and human errors are reduced and controlled.

The GIIS is not authorized for approval since this could involve responsibility in the operating and support organizations.

The GIIS makes detailed recommendations to the General Manager of GCN for revised procedures, structures, systems and equipment modifications, maintenance activities, operations activities or other means of improving unit's safety.

11.3 TRAINING AND RETRAINING PROGRAM

The training and retraining program have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 11.3).

11.3.1 Initial Training Program

The initial training program has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 11.3.1).

11.3.1.1 Training of Licensed Personnel

This section presents additional information to the one described in the First National Report (Annex I), regarding the process to obtain license granted by the CNSNS.

CNSNS verifies the process of licensing of LVNPS personnel through inspections carried out at the Laguna Verde Training Center at least once every 2 years. The following verifications are carried out specifically for licensed personnel:

1 Review of the operational experience of the facility to verify the significant licensed personnel errors identified since the last evaluation/inspection or exam in order to determine whether these errors are due to weaknesses or lack of training effectiveness.

2 Review of the requalification examinations prepared by the facility to assess their adequacy and eventually to require additional operational and written exams.

3 Review of the practices used by the licensee during the application of requalification exams (operational and written exams).

4 Review of the backfitting process used by the licensee during training to estimate the effectiveness of the review and updating process of the continuous Training Program.

5 Review of the implementation of improvements to the training program proposed by the LVNPS or required by the CNSNS as a result of either the failures detected or the requirements of evaluations carried out by CNSNS.

6 Review of the fulfillment of the license conditions to maintain the license in force and to assure the operator health conditions according to 10CFR55.

11.3.1.2 Training of Non-Licensed Personnel

The training of non-licensed personnel has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 11.3.1.2).

11.3.2 Retraining Program

11.3.2.1 Licensed Personnel

Essentially, there is no change in the information presented in the First National Report (See Annex I) regarding the retraining program for licensed personnel. However, in the following paragraphs it is stressed the requirements for personnel retraining.

Retraining of licensed personnel is initiated at least one month, after the granted of the license by CNSNS. It is carried out in a continuous two-year cycle in order to maintain the license in force. In other words, the period in which the operator's license is in force (Senior Reactor Operator, Reactor Operator and Shift Engineer) is two years.

It is important to mention that the retraining programmes are approved for a two-year period by CNSNS. Basic initial training was agreed for the first time, but it is reviewed to include different important topics in addition to basics, and the inclusion of these topics is informed by CFE to CNSNS.

The minimum retraining requirements established by the Regulatory Body for the licensed personnel are 40 hours, but in Laguna Verde NPP the Training Department has implemented double simulator time, covering 80 hours annually.

To obtain the license renewal for licensed personnel the following is required:

a) A license renewal request, which should be certified by a representative of the facility.

b) Satisfactory completion of each of the re-training cycles.

c) All the operational and written requalification exams approved.

d) Maintain good physical and mental capabilities so as to carry out all activity duties.

e) Undergo every 6 months requalification operational exams applied by CNSNS. In addition, CNSNS approves the Initial Training program and Continuous Training Program applied to license personnel.

On the other hand currently the Systematic Approach to Training (SAT) is being implemented in the Laguna Verde training programs. The technicians of the following five disciplines started the formal SAT training courses in 1999: Instrumentation and Control, Mechanical Foreman, Electricians, Chemists and Radiological Protection. With the enrichment of the experience gained with these first groups, the SAT methodology will be used to develop all the training programs to most of the technical disciplines within the NPP.

11.3.2.2 Non-Licensed Personnel

Retraining of non-licensed personnel is developed based upon their specific responsibility needs, including recommendations from Radiological Protection, ALARA and Emergency Planning Areas.

11.3.2.3 Substitute Program

The substitute program information has not changed so the details that were established in the First National Report are still valid (See Annex I in its section 11.3.2.3).

11.4 FUNDS FOR HANDLING LVNPS RADIOACTIVE DISPOSAL AND DECOMMISSIONING

Since January 1999 the Laguna Verde NPP is integrating a fund that is equivalent to 0.00026 U.S. Dollars for each generated kWh, as part of the production cost, to the future storage of high radwaste and to the decommissioning.

CFE has proposed to CNSNS to follow the procedure SAFSTOR established in NUREG-6174, defining five work stages:

a) Planning, Regulatory Review, Engineering and Preparation for the definitive shutdown of the reactor.
b) Deactivation of the plant and preparation for dismantling.
c) Safe dismantling period of the spent fuel, with operation of the fuel pool (5 to 6 years).
d) Extended period for safe fuel storage (approximately 60 years).
e) Decontamination and dismantling at the end of the Dismantling License period.

This proposal is being reviewed by the Regulatory Body.

On the other hand, the CNSNS has imposed in the new Licenses of Commercial Operation of the LVNPS, two requirements to deal with the radioactive waste and dismantling:

1. "*LVNPS should establish and submit to CNSNS strategic plans for the definitive storage of medium and low level radioactive waste or in case the temporary options of solution to the necessity of storage space. Additionally it must have an installation specially dedicated to the equipment decontamination and segregation of radioactive material*."

2. "*The CFE-LVNPS should establish the strategy and the financial mechanisms to guarantee that therewill be the necessary and enough economic resources to achieve the dismantling of the installation at the end of its useful life*."

For the second case, CFE has fully complied with. For the first case, a program has been established with the Secretariat of Energy (SENER) to define the Policy for Radwaste Handling and the modifications to the Nuclear Law. In the case of radioactive waste, Mexico has received the advisory support of the IAEA.

11.5 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As a result of the information provided in previous sections, it is concluded that the Mexican United States has adopted the adequate measures to ensure the availability of sufficient financial resources to enable the preservation and continuous improvement of nuclear facilities, as well as thetraining and permanent development of personnel. At the same time, ensuring a high level in the quality and actualisation of its installations and the qualification of its human resources during its lifetime.

Based upon the above, it is concluded that both the regulatory standards and their implementation fulfil the obligations in Article 11 of the Convention on Nuclear Safety.

COMISION FEDERAL DE ELECTRICIDAD

C.F.E. ORGANIZATION CHART

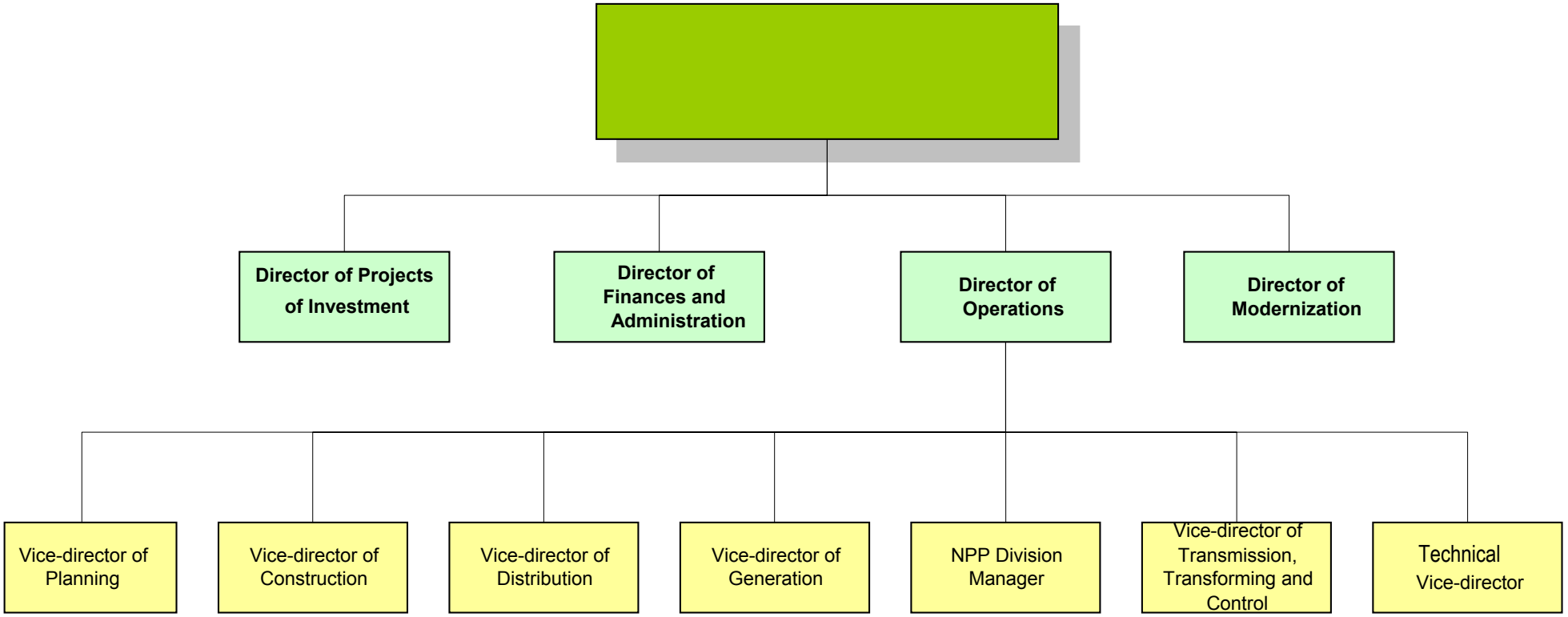


FIGURE 11.1

COMISION FEDERAL DE ELECTRICIDAD

NPP DIVISION ORGANIZATION CHART

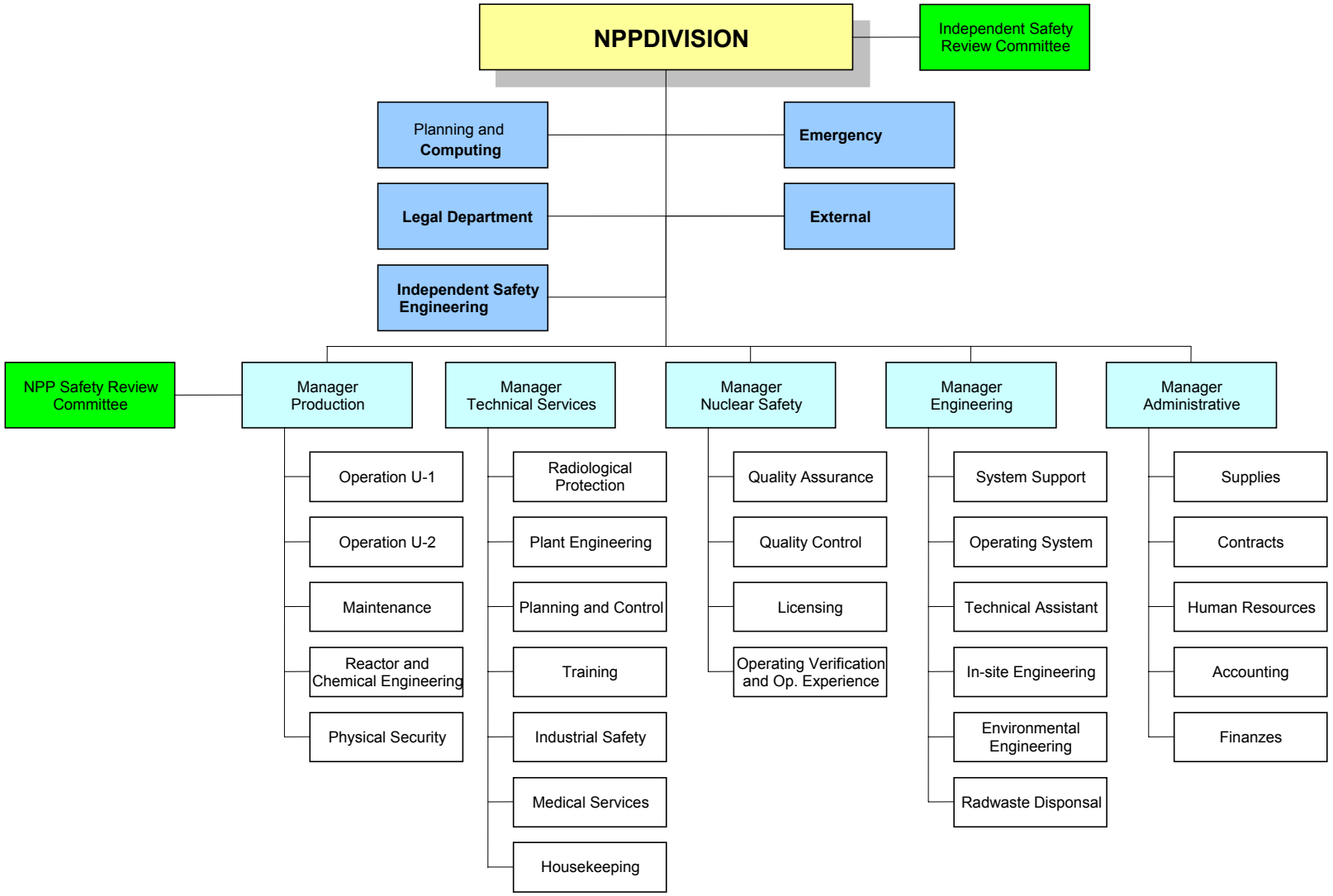


FIGURE 11.2

ARTICLE 12. HUMAN FACTORS

12.1 BACKGROUND

This section has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 12.1).

12.2 CURRENT SITUATION

This section has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 12.2).

12.3 FURTHER STEPS CONTRIBUTING TO PREVENT HUMAN ERROR AND IMPROVE MAN-MACHINE INTERACTION

The LVNPS has a human factor multidisciplinary review group devoted exclusively to the determination of the human factor behavior in the generation, development and result of all the operational events. This group is composed of the following members:

One Operation specialist (licensed Senior Reactor Operator)

One Plant Engineering specialist

One Design Engineering specialist, and

One Training specialist

The PSA (Probabilistic Safety Analysis) Level 1 and 2results, particularly the analysis of human reliability has been used to identify accident sequences where the human factor is a major contributor to the core damage frequency. The application of these results as regards to this particular topic has been through the use of dominant accident sequences in LVNPS' simulator to train and test appropriate operator responses.

In addition, and what may be considered as a LVNPS good practise related to human performance, it has been implemented the following operative aids:

- There are procedures to handle operational transients and accidents based on symptoms, including flow charts and operational support devices to allow the operators an adequate response in this kind of events.
- Currently, the SPDS is being installed as part of the simulator and the training on its use under anomalous or emergency conditions is being prepared.
- Use of self-assessment an self cheeking verification card (golden cart)

- Since 2000 there is an special group to perform the root cause analysis for al the events that occurred at LVNPS
- Since 1999 the Systematic Approach to Training has been incorporated for the training of LVNPS personnel.
- Since 1998 the Independent Safety Engineering Unit (GIIS), carries out an assessment of the plant staff performance to identify improvements needed on human performance (see Article 11 for details of the GIIS activities).
- Since 1998 up to date, more than 700 people from the different functional areas of the Nuclear Division and in particular from the LVNPS (operations, maintenance and engineering support) have been trained on human performance principles (INPO / WANO course on Human performance to prevent incidents at NPP) and on Conservative Decision Making
- Also, almost the total of the permanent personnel has approved the courses on defense in depth principles among some other courses of the Safety Culture Reinforcement Program that is described in Article 10 of this National Report.

12.4 THE ROLE OF THE REGULATORY BODY IN REDUCING EVENTS CAUSED BY HUMAN FACTORS.

Since 1999, the Mexican Regulatory Body (CNSNS) has instrumented a System for the Evaluation of the Human Performance, with the primordial objective of identifying and corrects the causes that induced the human error. This methodology evaluates aspects like: Environmental Conditions, Interface with the Design or the Condition of the Equipment, Verbal and Written communication, Methods of Training/ Qualification of Personnel, Planning and Practical of Work, Methods of Supervision and Management Methods

Based on the results of these evaluations the Regulatory Body verifies all aspects from the Human Factors conditions point of view that could be indicative of the deterioration of the performance of personnel and the safety of the plant. As a result of this methodology, improvements to the review process of Review of Control Room Design of the LVNPS have been carried out and it has been required a mayor diffusion of the concepts of Safety Culture and of Self-Checking.

In addition, during 2000 the Regulatory Body had performed an Evaluation of the Impact of the Organization and Management factors to the Safety of the NPP in order to identify the influence that the factor of organization has in the human performance.

The CNSNS activities related to human performance were commissioned to a Specialist in Human Factors and Operation, supported by the following personnel: A specialist in operation and Probabilistic Safety Analysis (PSA) and a specialist in systems of plant and instrumentation & control

Among these mechanisms, the following can be identified; the establishment of requirements to improve LVNPS´s simulator operability conditions to full scale (the program is known as New Simulator Platform); a detailed Control Room Review of both LVNPS-1 & 2 identifying discrepancies as regards to the Job and Task Analysis presented; the establishment of requirements for the improvement of the training program for technicians and instrumentalists by means of work mock-up´s; and a systematic re-evaluation of operational events by means of appropriate root cause searching techniques and the follow-up of the corrective actions proposed by the plant.

In order to guarantee that the requirements of minimisation of human factors in the operational events are part of the operational philosophy, additionally to the above mentioned mechanisms, CNSNS has imposed at the current LVNPS Units 1 &2 Operation License (to 2027 MWt), two requirements to maintain these licenses:

a) Condition of the license No. 2. "*LVNPS simulator must fulfil the requirements of fidelity in response and reliability. Furthermore, this simulator must have the Safety Parameter Display System (SPDS).*

   Additionally, LVNPS must review and verify the lessons and scenarios in order to minimise the errors in the personnel training and to get a more complete training.

   The instructors (in any discipline) must be actualised in the current technologies, considering the current national and international technologies."

b) Condition of the license No. 6. "*LVNPS must continue and conclude, during 2000, the Alarm Cleaning Program in the main Control Room establishing the needed changes*".

12.5 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As it is appreciated in the previous sections, the consideration of Human Factors through the execution of a detailed review of the control room, its resulting modifications, the implementation of a Safety Parameter Display System (SPDS), the development and implementation of symptom based emergency procedures, the alarm cleaning program and the practise of tasks on the simulator as well as the inclusion of operational experience on human errors and the results of surveillance and inspection activities performed by CNSNS, allow to consider that the Human Factor for LVNPS has been taken into account since its design, during routine operation and during the eventual occurrence of transients and operational incidents. Therefore, it is considered that the obligation in Article 12 of the Convention on Nuclear Safety is met.

ARTICLE 13. QUALITY ASSURANCE

13.1 QUALITY ASSURANCE POLICIES

The quality assurance policies have not changed so the information that was established in the First National Report (See Annex I in its section 13.1).

13.2 QUALITY ASSURANCE PLAN DURING THE CONSTRUCTION STAGE

The information concerning the quality assurance during the construction stage has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 13.2).

13.3 QUALITY ASSURANCE PLAN DURING THE OPERATION STAGE

The information concerning the quality assurance during the operation stage has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 13.3).

13.3.1 Periodic Evaluation of the Adequacy of the Quality Assurance Plan During the Operation Stage

The GCN management, in compliance with the Condition 12 of LVNPS Units-1 & 2 operation licenses and by means of qualified independent personnel, evaluates at least every two years, the effectiveness of the Quality Assurance Operation Plan and assess Plant staff performance, and reports its results to the General Manager of the CFE Division of Nuclear Power Generation

Since 1998, these assessments are carried out by the Independent Safety Engineering Unit, which reports directly to the General Manager and is totally independent from all the functional areas of the Nuclear Division organization, including the Department of Quality Assurance. Basically its objective is to verify that the Quality Management is effective in assuring safe and reliable operation, and to determine what improvements are required to promote a successful operation.

The determination of the Quality Assurance effectiveness is based on the revision of the following:

Review and Evaluation:

- Performance Indicators. - Data of equipment and organizational and individual personnel performance.
- Non- performance Indicators. - Related with conditions adverse to quality.
- Audits and reviews results.

Identification of Symptoms that signal shortcomings on:

- Failure to effectively assign responsibilities and authority.
- Inability to anticipate, identify and correct by itself the owns problems.
- Failure to achieve and maintain quality culture.
- Failure to optimise the use of key resources.
- Inadequate interfacing between organisations.
- Inability to focus on long-term performance.

13.3.2 Audits and Surveillance's

The information presented in this section of the First National Report is still valid (See Annex I in its section 13.3.2). In order to add useful information, it can be mentioned that the LVNPS has established a policy that the maximum time interval between audits for the same functional area is two years. However there are areas that require more attention due to the quality of findings or recurrent problems and could receive more audits than once every two years.

13.3.3 Corrective Actions

The information concerning corrective actions has not changed the information that was established in the First National Report is still valid (See Annex I in its section 13.3.3).

13.3.4 Procurement of Parts and Components

CFE's Quality Assurance organisation qualifies all the contractor and vendors that supplies equipment, components and services important to safety for LVNPS. This qualification can be made by direct evaluation of the vendor / supplier quality programs and its implementation or through the Nuclear Procurement Issues Committee (NUPIC) from which CFE a is member. The qualifications are in general based mainly on the ANSI/ ASME N 45.2.12 "Requirements for auditing the Quality Assurance Programs for NPP".

13.4 REPORTABILITY

The information concerning reportability has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 13.4).

13.5 OTHER QUALITY ASSURANCE PROGRAMS

The information concerning other quality assurance programs has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 13.5).

13.6 REGULATORY BODY ACTIVITIES IN THE NUCLEAR INSTALLATIONS

CNSNS has reviewed and approved each one of the LVNPS Quality Assurance Plan versions, both for construction and operation, before their implementation. During the period covered by this National Report (1998-2000), CFE has submitted to the CNSNS modifications to the Quality Assurance Plan Rev. 5, in particular related with organisational changes and with the new definition for the management of procedures.

During the period 1998-2000, the Regulatory Body has followed – up the development of the LVNPS' Quality Assurance Program as regards to suppliers. Initially, the requirement was that the supplier should work with the Quality Assurance Program of the plant. Currently, it is observed that several suppliers and contractors, have been qualified by LVNPS Department of Quality Assurance, and use their own Quality Assurance Plan which has been adapted to their organisation needs, highlighting the criteria required, and always focusing on satisfying the plant's requirements.

13.7 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As it is described in previous sections of this Article, the implementation of the Quality Assurance Programs is a requirement that has been requested, applied and surveyed for all activities important to safety from the early stages of design, to the construction, tests and operation of LVNPS Units-1 & 2.

During the period covered by this National Report and in order to fulfil the commitments of the Convention on Nuclear Safety, the Mexican Regulatory Body (CNSNS) has evaluated the modifications submitted by CFE / Laguna Verde NPP to the Quality Assurance Plan. Additionally, CNSNS has assessed the Adequacy of the Quality Assurance Operation Plan and has found that these activities are adequate and fulfil the applicable standards and regulations.

Therefore, it is concluded that the obligations established in Article 13 of the Convention on Nuclear Safety have been fully met.

ARTICLE 14. SAFETY ASSESSMENT AND INSPECTION

14.1 INTRODUCTION

In the second half of 1995, CFE started the preliminary negotiations regarding a 5% up rate in the thermal power for both units of Laguna Verde NPP. In 1999 CFE presented the official application for the mentioned up rated power. After the review of the safety analysis report and documentation submitted as support of this application, CNSNS approved a testing phase program in order to verify the LVPNS units stable behaviour under this uprate condition. Based on the successful results and on the CNSNS favourable opinion, in December 1999, CFE received from the Secretariat of Energy the new Licence of Operation for both units of LVNPS for a power uprate of 5%.

The regulatory framework related with this Article has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.1).

14.2 SAFETY ASSESSMENT - CONSTRUCTION STAGE

The First National Report (See Annex I) presents the methodology followed by CNSNS for the assessment of activities before and during LVNPS construction stage.

14.2.1 LVNPS Internal Audits/Inspections

The information regarding Laguna Verde NPP internal audits and inspection has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.2.1).

14.2.2 Regulatory Activities Performed by CNSNS

The information regarding the regulatory activities performed by CNSNS has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.2.2).

14.2.3 External Assessments

The information regarding the external assessments in Laguna Verde NPP has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.2.3).

14.2.4 Pre-operational Test Program

The information regarding the pre-operational test program in Laguna Verde NPP has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.2.4).

14.3 SAFETY ASSESSMENT, OPERATION STAGE

As it was mentioned in section 14.1 of this National Report, from November 1995 to March 1999, CFE presented to CNSNS the project and the official submittal for amendment the Operation License and Technical Specifications for LVNPS-1 & 2. This submittal was presented to request an increase in the original thermal power in 5% based in an increase of steam flow while maintaining the same original dome vessel pressure.

14.3.1 Evaluations/Surveillance by LVNPS Organisations

As part of the actions to enhance safety and additionally to the assessments and verifications performed by external organizations to GCN (reported in the First National Report, Annex I) the CFE has created the Independent Safety Engineering Group (GIIS). This Group reports directly to the General Manager of GCN and has as main objective, the identification of areas for improving the safety performance. The functions and responsibilities of this Group are described in the section 11.2.2.7 of this National Report.

Regarding the process of modifications in the LVNPS, the Regulatory Body keeps on demanding the fulfilment of the 10CFR50.59 “Changes, Test and Experiments”. As a result of this, the following information is presented:

Figures 14.1 and 14.2 show a summary of the evaluations performed for the LVNPS-1 & 2 since the beginning of commercial operation up to December 2000 for the following type of modifications:

PM-	Modification Package
PMM-	Minor Modification Package
PMMD-	Minor Documental Modification Package
PERC-	Component Replacement Evaluation Package
PMDT-	Technical Documentary Modification Package
PCPA-	Set Point Change Package
PyD-	Jumper and Disconnection
PROC-	Procedures
PMRC-	Component Replacement Modification Package
SMT-	Temporary Modification Request
ESPEC-	Design Specifications
PMS	Software Modification Package

VARIOS Document Miscellaneous

14.3.2 External Evaluations/Verifications to LVNPS

14.3.2.1 External Evaluations/Verifications Performed by CNSNS

A) Start-up Tests

The information regarding start-up testing in Laguna Verde NPP has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 14.3.2.1 A).

B) Commercial Operation

There are two main activities that CNSNS performed to assure that the LVNPS operation do not represent an undue risk to the safety and health of the public: Licensing assessment and Inspection / enforcement.

- Assessment of activities related with design modifications, operation of systems, human performance and operational events in LVNPS, including:

  - Review of Technical Specifications for Operation based on international operational experience.
  - Proposal of changes to Technical Specifications or to the Operation License.
  - Results of Pump & Valve Operability Programs under ASME Code, Section XI.
  - Results of In-service Inspection Programs under ASME, Section XI for active and passive components.
  - Licensing of reactor cores for each fuelling cycle.
  - Assessment of Event Reports that are delivered to the Regulatory Body.
  - Assessment of maintenance programs for qualified lifetime of equipment important to safety (Environmental Qualification).
  - Assessment of the applicability of Internal and External Operational Experience.
  - Assessment of design modification to systems, structures and components important to safety.
  - Review of test and experiments to be performed al LVNPS.
  - Review, development, and implementation of new regulations.

In the current operational stage of LVNPS 1 & 2, detailed assessments have been performed in the period 1998-2000 for special issues with relevance for nuclear safety. Examples of these assessments are:

a) Substitution of discharge isolation recirculation valve at the Reactor Recirculation Core System, due to vibrations induced by hydro-dynamic phenomena.

b) Change of the Emergency Core Cooling Systems suction strainers, due to the potential clogging of LOCA generated debris.

c) New fuel designs for both units of LVNPS. See section 14.4 of this National Report.

The mayor assessment effort since the date when the operation license was granted for each unit of the LVNPS (1990 for Unit 1 and 1995 for Unit 2), has been during the period 1998 – 2000, the evaluation of the request to up rate the thermal power in 5%.

The assessment covered almost all topics addressed in the FSAR including: Reactor Core and Fuel Performance, Reactor Coolant System, Engineered Safety Features, Instrumentation and Control, Electrical Power and Auxiliary Systems, Power Conversion Systems, Radwaste Systems and Radiation Sources, Design Basis Accidents, Environmental Qualification, Start up and Testing Program etc.

Based on the assessment results, CNSNS authorised the testing phase program. Furthermore, CNSNS witnessed the entire test during the power increase in 1% steps. Finally, it was established by CNSNS that these tests were satisfactory and that the system reactor – turbine had an adequate behaviour.

The assessment process generated 55 questions to CFE and 39 technical meetings, besides the Technical Specifications were modified due to this increase. In general terms, CNSNS confirmed that there was not necessity to implement any physical change at the structures, systems and components of LVNPS 1 & 2, due to this power increase.

The results of the assessment and inspections were documented in a Safety Evaluation Report that was presented to the Secretariat of Energy to grant the new operation licenses.

- Inspection/ Enforcement

To verify the compliance with the license requirements and commitments, the CNSNS carry out the following Inspection and verification activities:

a) Day to day LVNPS operations by the resident inspectors assigned to each Unit.

b) Inspections in accordance with a bi-annual program that cover safety related activities for structures, systems, components and processes.

c) Unannounced Inspections.

Independently of the type of inspection, all their results are documented in the corresponding inspection reports which are filed in CNSNS headquarters. Findings generated were informed to the organisations involved for their closure; the way in which this findings are closed, takes into consideration the previous approval of CNSNS. Continuously, and up to this date, CNSNS keeps a special control on a six-month basis to follow up on issues important to safety. Within such control, priority levels are assigned to these issues according to their impact on safety.

14.3.2.2 External Assessments Performed by Others

LVNPS is subject to two types of external assessment.

The first, is in compliance with the license as required by Technical Specifications. At least every 12 months an external inspection and audit of the fire protection program is carried out.

This inspection can be performed either by qualified personnel from CFE that do not belongs to the LVNPS or by a specialized firm on fire protection. If the option of using CFE qualify personnel is chosen, then at least every 3 year the inspection and audit must be performed by a specialized firm on fire protection.

The second type corresponds to external assessments that go beyond the regulatory requirements such as the OSART and ASSET missions from de IAEA, the peer review by WANO and by others. Since 1997 LVNPS is a Level 3 member of WANO.

The following is a summary of the main external assessments that were carried out from 1997 up to December of 2000.

- The World Association of Nuclear Operators – Atlanta Center conducted a Level 3 peer review of CFE's LVNPS during November 1 through 8, 1999. The review covered the following areas: Operation, Maintenance, Radiological Protection, Chemistry, Engineering, Work Control, Organization and Administration, Training (including simulator), Operational Experience and Safety Culture. The assessment identified several areas for improvement, the following were considered to be the most significant (the report is restricted according to WANO policies):

- Safety Culture,
- Identification and correction of key equipment problems,
- Use of Industry operating experience, and
- Effectiveness of management.

All the assessment findings, depending on the related adverse condition identified, were addressed in the 5 years LVNPS Strategic Plan or in the Corrective Action Program

- As requested by the Mexican Congress and with the consent of the Secretariat of Energy, from November 27, 2000 to January 24, 2001, the company TUV ANLAGENTECHNIK GmbH from Germany carried out an independent audit at LVNPS. The purpose of the audit was to review the safety of the plant, its status and the operating practices in both units of LVNPS for the following main aspects:

  - Management and organisation
  - Actual condition of equipment
  - Radiation protection
  - Emergency preparedness and
  - Accident risk

  The general statement of the audit with respect to the safety and regulatory compliance was: taking the applicable norms and standards (that in most of the cases are the same as in the USA 10CFR) as the minimum level of legal requirements, the team reaches the conclusion that "*LVNPS is operating in a safe manner and in compliance with the current regulatory framework, and it have not been found any indications that its operation pose an undue risk to the safe and health of the public*".

  All the assessment findings, depending on the related adverse condition identified, were addressed in the 5 years LVNPS Strategic Plan or in the Corrective Action Program to be addressed.

14.4 SAFETY ASSESSMENT, ACTIONS FOR ITS CONTINUOUS IMPROVEMENT

The Mexican Regulatory Body and the GCN / CFE are aware of the importance of being actualised in the current knowledge in nuclear safety and of the promotion of development of improvements issues in order to have nuclear installations with minimum risk levels. The results of various tasks, during the period 1998-2000, are described in the next paragraphs. It must be considered that the issues contained in the First National Report (Annex I) remain valid:

a) Loose Parts Monitor. Even though the requirement did not impose as a unique option, the installation of a loose parts monitor to solve potential problems of loose or detached components within the primary circuit, the Regulatory Body requested for the possibility of installing such system; CFE determined that an event of this nature could occur, causing potential damage to the fuel or distortion to the cooling flow patterns, this is why such system was installed. Personnel were specifically trained for the interpretation of the graphical results.

   The Loose Parts Monitor System has been in use in Unit-1 since the start of commercial operation. The system has shown many problems and spurious signals, causing undue stress to operational personnel and a lack of attention to diverse alarms. Therefore it has been decided to not install it in Unit-2 and it was removed from Unit-1.

b) At the end of 1999, CFE submitted to CNSNS the Periodic Safety Review Report (10 years) for Unit 1 of LVNPS. To this respect, CNSNS initiated the assessment of this report giving special emphasis to those issues that can challenge the safety. The first conclusion confirms the results of previous assessment and inspections: The plant has maintained the license basis.

c) As part of the new Operation License that was granted to LVNPS in order to increase 5% the thermal power, CNSNS established instead of the “Specific Conditions” for the original licenses, “Requirements to Maintain the Operation License” with deadlines for compliance with, in the following topics:

   - Assessment of the fulfilment with the ALARA objectives.
   - Requirements of fidelity in the response and reliability of the simulator.
   - Establishment of a strategic plan for the definitive storage of radioactive wastes of low and medium level.
   - Financial mechanisms in order to have enough economical resources for the dismantling.
   - Exercises and drills of the external radiological emergency plan.
   - Conclusion of the alarm cleaning program.
   - Maintenance of the Environmental Qualification.
   - Quality list for the safety related equipment and components.

- Verification of the operability of motor operated valves and local leak criteria for check valves.
- Implementation of the Maintenance Rule.
- Program of preventive maintenance and its modifications resulting from the activities during fuel reloading shutdown.
- To complete the implementation of the administrative procedures and to review the operating procedures.
- To develop procedures including the participation of the Reactor Engineering Group.
- Maintenance of the configuration control.
- Actualisation and results of the Water Chemistry Enhancement Program.
- Analysis of the effectiveness of the Loose Part Monitoring system.
- Conclude the Individual Plant Examination.
- To conform a Root Caused Analysis Team.
- To reinforce the Safety Culture elements giving special emphasis to the conservative decision-making and the strict fulfilment to procedures.
- Reduction of the adverse quality conditions.
- Results of individual and collective radiological doses, personnel contamination, generation of solid dry waste, unplanned exposition to radiation from shutdown fuel reloading.

CFE has submitted response to all the mentioned requirements and CNSNS has implemented a particular program to assess them.

14.5 NEW FUEL DESIGNS FOR LAGUNA VERDE NPP

14.5.1 Historical Conformation of LVNPS Core

The core of both units at LVNPS contains 444 fuel bundles and 109 control rods. The fuel supplier is General Electric Co.

The first cycle for both units of LVNPS was conformed by GE6 (8X8) fuel type, which contains 62 fuel rods and 2 water rods. Cycle 1 of Unit 1 started on July 1990 and finished on August 1991, while for Unit 2 started on April 1995 and finished on June 1996.

At Unit 1, from cycle 2 to cycle 5, it was introduced the GE9B (9X9) fuel type, which contains 60 fuel rods and one large centrally located water rod, so the core was mixed with these two types of fuel. This period covers from November 1991 until September 1996. For Unit 2 the same case occurred from cycle 2 to cycle 4, September 1996 until March 2000.

The core for cycles 6 and 7 for Unit 1 was loaded only with the GE9B fuel type, since December 1996 until August 1999.

Since cycle 8 of Unit 1 (September 1999 through May 2001) and cycle 5 of unit 2 (which started from June 2000 up to October 2001) it was introduced the GE12 (10X10) fuel type, so both units have mix cores again. This fuel type contains 92 fuel rods (fourteen being partial length rods) and two large central water rods.

The cycle 9 of unit 1, which will start in August 2001, will be a mix core again conformed by 212 GE9B fuels and 232 GE12 fuels. Cycle 5 for Unit 2 is conformed by 320 GE9B fuels and 124 GE12 fuels.

14.5.2 Licensing of New Core Configurations

With the objective of licensing the new core configurations for each cycle of both units of LVNPS, CFE submits to CNSNS for assessment a set of specific analysis reported in the document “Supplemental Reload Licensing Report” (SRLR), these analysis include:

- Core Effective Multiplication Factor.
- Standby Liquid Control System Shutdown Margin.
- Anticipated Operational Occurrences Analysis (AOO).
- Local rod withdrawal error.
- Thermal limits (MCPR: safety and operational limits).
- Over pressurization Analysis.
- Loading error

About control rod drop, stability and LOCA analyses, they appear in the SRLR and the references and the documents where they were analyzed were provided, and licensed also by CNSNS.

14.5.3 Problems Originated in LVNPS Core

A) Power Oscillations

On January 1995, power oscillations were detected at Unit 1. With regard to this event, the CNSNS sent an Augmented Inspection Team to the site. As a result of this effort, it was required to the utility to follow the applicable recommendations of the USNRC Bulletin No. 88-07 “Power oscillations in BWR’s” and its supplement 1, along with the USNRC Generic Letter 94-02 “Long term solutions and upgrade of interim operation recommendations for thermal hydraulic instabilities in BWR’s”. Nowadays, CFE studies the possibility to implement the so called Option III of the BWR’s Owners Group, which implies modifications in software and hardware of the Average Power Monitoring System, to incorporate the possibility to alarm and shutdown automatically the plant when the power oscillations reaches +/- 10 %.

B) Fuel Failures (Leakages)

In Unit 1 it has been detected 5 failed fuels: 2 GE6, 2 GE9B and 1 GE12; In Unit 2 it has been detected 5 failed fuels: 2 GE6 and 3 GE9B.

In all the cases, CNSNS required to the CFE to perform a root cause analysis. For all the failed fuel a visual inspection and Eddy Current tests have been performed. Two of these fuels were repaired and reloaded to the core, the rest are in the spent fuel pool.

14.6 PROBABILISTIC SAFETY ANALYSIS (PSA)

The scope of the Laguna Verde Nuclear Power Plant PSA Level 1 and 2 is the analysis of the severe accident sequences that could occur at the plant only for internally initiated events and that could result in core damage, containment impaired and fission product releases. The internal flooding is included, as part of the Individual Plant Examination requested, however the utility has not submitted the results of this analysis yet. It is considered as initial conditions of the PSA Level 1 and 2 that the plant is operating at full power.

Assessment of externally initiated events (i.e. internal fires, high winds/tornado, transportation accidents, external floods and earthquakes) are not included as today in the PSA Level 1 and 2 for LVNPS. However once the IPE is approved by the Mexican Regulatory Body, the utility will be formally requested to submit an IPEEE (Individual Plant Examination for External Events).

The main conclusion of the PSA Level 1 and 2 for Laguna Verde Nuclear Power Plant is that the plant pose no undue risk to the public health and safety and that there is no present basis for any action or regulatory requirement. The study concludes that the station blackout (loss of all AC power) accidents, loss of offsite power accidents with successful operation of at least one emergency diesel generator and loss of coolant accidents outside the containment (Interfacing LOCA) are the dominant contributors to core damage at Laguna Verde NPP.

The possibility of successful containment venting and realistically allowing for successful core cooling after containment failure have reduced the significance of the loss of long term heat removal accidents originally found to be important in the WASH-1400. The accident sequence with the highest contribution to core damage frequency is a loss of offsite power with failure of the Emergency Diesel Generator Division I, and late failure of the high pressure core spray system.

14.6.1 Probabilistic Safety Analysis Level 1

Since the PSA model was initially developed when the Unit 1 of the LVNPS started commercial operation, there was not operational experience to incorporate in the PSA model, so it was not possible to incorporate plant specific data. However, it has been overcome these failures, per example:

- In the failure models that depend on the time, test intervals are used from plant specific surveillances and from repairing times. Based in actual experience of LVNPS, it has been performed adjustments to the frequencies of event initiating.

- Since 1998, the gathering of reliability and availability data has been useful for multiple uses beyond PSA. This data has been used to fulfill with the Maintenance Rule (10 CFR 50.65).

During 1999 and as result of the CNSNS requirements, a review of the LVNPS PSA was carried out considering minor changes on the models due to a more detail consideration of safety systems initiation signals, removal of recovering cases on some valves failures, improvement of the Boolean modelling for the RCIC system, development of the uncertainties study, improvement on the approach for common cause failures, etc. This has resulted on a better balance of risk contributors from the one previously obtained.

The contribution of different initiating events can be resumed as follows:

CONTRIBUTION CHART PER SCENERY TYPE

SCENERY	CONTRIBUTION
Total Loss of Alternate Current (SBO) Phase 1	34%
Total Loss of Alternate Current (SBO) Phase 2	28%
Anticipated transients without a SCRAM	13%
Loss of Both DC Divisions	0.8%
Loss of BOP	0.5%
Loss of NCCW	0.4%
Intermedia LOCA	0.3%
Total Loss of Alternate Current (SBO) Phase 3	1.6%
Total Loss of External Power with DG´s success	1.2%
Loss of NSW	0.9%
Large LOCA	0.9%

Loss of one DC Division	0.5%

Results of Level 1 PSA have shown that the core damage frequency is 3.63 E-5 which is similar to that obtained by the International Community for this type of reactors.

As examples of the safety improvements performed as result of the PSA study, it can be mentioned:

1. Installation of a hard pipe cross tie between the fire suppression system (with a driven diesel pump) and the Residual Heat Removal System (RHR), allowing water injection into the reactor vessel and containment spray under blackout conditions.

2. Preventive maintenance of depressurization system backup pneumatic supply components, which are not verified when normal supply is operating.

In addition to these physical improvements, an extensive participation of operations, engineering, maintenance and training personnel in PSA tasks has taken place. This has resulted in the dissemination of PSA insights into key plant activities and procedures.

14.6.2 Probabilistic Safety Analysis Level 2

As part of the obligations of the Individual Plant Examination (IPE), the CFE developed a Level 2 PSA, being the objective the determination of the source term and containment response in the event of a severe accident occurrence.

In order to evaluate containment response during a severe accident, LVNPS' containment was analysed, showing several favourable design characteristics, such as its structural capacity, its specific volumetric capacity and its seismic design.

The MAAP Code was the main tool used for LVNPS' Individual Plant Examination to model the severe accident phenomenology occurring in the vessel and containment as well as to determine the release of fission products to the off-site.

From the PSA level 2, its obtained an accident release frequency value of 5.9 E-6 per year, based on considering a truncate frequency value of 1 E-7 that results in a 88.99% of contributing sequences. This release frequency value corresponds to all failure containment modes; magnitude of release (high, medium, low and low-low and not relevant), and the time after containment failure occurred (early, intermediate and late).

Regarding the programs to extend the PSA, as agreed with CNSNS the differences between both units of LVNPS have been identified and will be submitted to CNSNS on April of 2001, then a review of the PSA for Unit -1 will be performed in order to generate the PSA for Unit –2, this have been scheduled for December of 2001.

Regarding the analysis of external events, the Regulatory Body will request the utility an Individual Plant Examination for External Events once the IPE (internal events) is approved. Nevertheless LVNPS has developed an internal flooding probabilistic safety analysis for both units, and will be submitted for CNSNS review on April 2001.

There are some efforts going on within the regulatory agency to analyze the risk associated with the operation of LVNPS during low power and shutdown conditions. At present, no regulatory requirement has been set up to update the PSA models in a regularly basis, however the utility has updated the study to incorporate the plant modifications and procedures changes. Nevertheless there is goal to update the PSA every 5 years. Revision 1 was completed in 1989. Revision 2 in 1994 and the latter review were performed, as mentioned above, in 1999. It is also considered and agreed between CFE (LVNPS) and CNSNS, that models should be updated when major plant modifications are implemented that affect cores melt frequency more than 10 %. No special provisions for identification of this sort of modifications are considered necessary, as risk increase calculations are normally performed in support of decision-making and submitted to CNSNS for evaluation.

14.6.3 Application of Risk Informed Regulation

Based on the knowledge and results of LVNPS 1 & 2 Individual Plant Examination (IPE) and the application of the Maintenance Rule (10 CFR 50.65), it has started the implementation of the Risk Informed Regulation. The scope of the application of the Maintenance Rule (Systems and structures covered by the Rule) was determined by the use of the risk importance defined by the Probabilistic Safety Analysis (PSA) and using the measures of Risk Reduction Worth (RRW) and Risk Achievement Worth (RAW).

In relation with the unavailability of equipment for its maintenance during normal operation, it has been required the determination of the risk associated of core damage from the resulting configurations (10 CFR 50.65 (a)(4)). By the use of the platform of PSA level 1, the GCN / CFE has developed a computerized system for measure the instantaneous risk for plant configuration. Nowadays, this system is under revision by the Regulatory Body.

For shutdown conditions it is applied the determination of configurations based on the defense in depth analysis according to the rules of the Nuclear Energy Institute of USA.

14.7 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

As described in this article, the National Law and regulations adopted and imposed to LVNPS have provided appropriate measures for detailed and systematic safety assessments performed by the Regulatory Body. First the satisfactory results of such assessments enabled the issuance of the corresponding construction and pre-operational test permits and later, the awarding of LVNPS-1 & 2 operation licenses.

Furthermore, the Operation License requires the execution of periodic safety assessments to ensure LVNPS validity in the light of operational experience and of any other new and significant information on safety matters, which may arise during LVNPS' lifetime.

Besides, In-Service Inspection and Test programs for structures and components as well as the Maintenance of the Environmental Qualification of electrical and instrumentation equipment important to safety, prove that the physical condition of nuclear installations and their operation is maintained in accordance with its design, applicable national requirements as well as limits and conditions identified in the Technical Specifications for Operation.

From the above mentioned, it is concluded that the measures adopted within the Mexican United States fully satisfy the obligations in Article 14 of the Convention on Nuclear Safety.

50.59 EVALUATIONS ACCUMULATED LVNPS-1
COMMERCIAL OPERATION - 2000

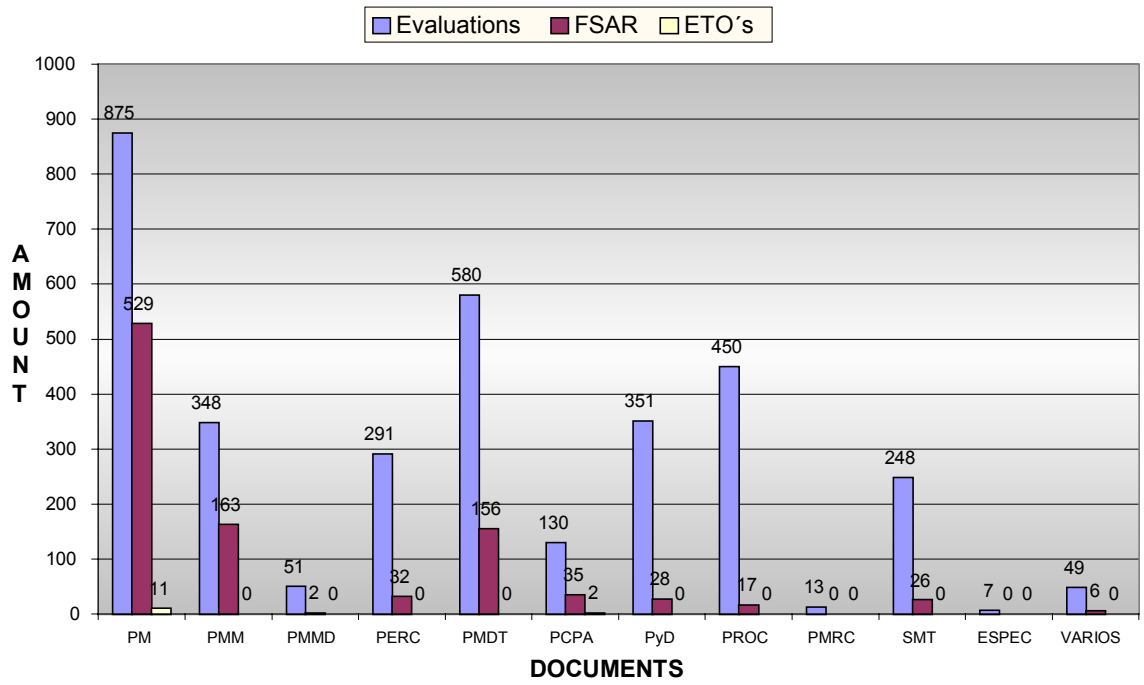


FIGURE 14-1

50.59 EVALUATIONS ACCUMULATED LVNPS-2
COMMERCIAL OPERATION - 2000

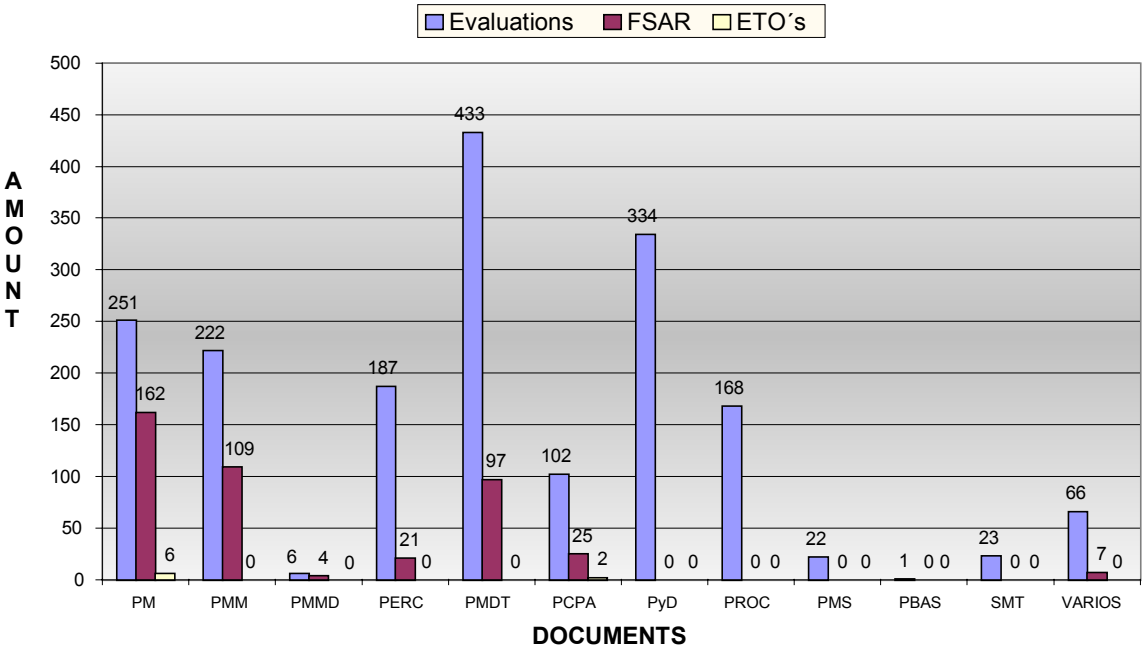


FIGURE 14-2

ARTICLE 15. RADIOLOGICAL PROTECTION

15.1 INTRODUCTION

The spirit of the Regulatory Law of the Constitutional Article 27 on Nuclear Matters as well as the General Regulations on Radiological Safety and its norms, maintains the protection of its employees, civil population and that of their property as its center of attention, establishing that nuclear and radiological safety is an overriding priority for all activities involving the use of nuclear energy.

15.2 DOSE LIMITATION SYSTEM

The fundamental bases on which the dose limitation system relies is still maintained so that all activities are performed with strict control of the workers doses, maintaining them As Low As Reasonable Achievable (ALARA).

15.2 LVNPS RADIOLOGICAL PROTECTION

The means that are essential for the doses control at the LVNPS have not changed from those provided at the First National Report (Annex I) to satisfy the Convention on Nuclear Safety commitments. However, an additional control has being developed and managed by the Regulatory Body to control the integrated doses for the occupational exposed personnel. This control consist on a National database with all the exposure records. Under this procedure the Regulatory Body has a knowledge of the doses of all personnel at the moment it is registered into the radiological protection system at LVNPS.

This mechanism has allowed to identify improper handling of dosimeters, workers whose accumulated doses are approaching their administrative limits, workers that have to other companies, etc.

15.3.1 Radiological Protection Program

The main purpose of the Radiological Protection Program is to establish procedures and practices that in conjunction with the design, generate the radiological protection characteristics required to maintain the radiation exposure dose of personnel working within the site As Low As Reasonably Achievable (ALARA).

In order to fulfill the ALARA criteria in all the activities performed at the LVNPS, a Group of Radiation Analysis has been officially setup to analyze, evaluate control and optimize the radiation exposure of the personnel at their working areas. This group is accountable to the Radiation Protection Manager.

The average occupation al doses and the maximum exposure values for the LVNPS personnel, as well as the collective doses per unit are shown in Table 15 and Figures 15.1 and 15.2, for LVNPS Unit 1 and 2, respectively.

TABLE 15.1

COLLECTIVE AND INDIVIDUAL RADIATION DOSE SUMMARY

Year	Collective Annual Dose (person. Sv)		Annual Dose Per MW (person. Sv/MW)		Individual Dose (mSv)	
	Unit 1	Unit 2	Unit 1	Unit 2	Hi (avg)	Hi (max)
1990	11.3444		0.0466		1.161	10.07
1991	5.1475		0.0106		2.052	
1992	5.4402		0.0122		2.451	20.30
1993	1.9660		0.0035		1.746	20.59
1994	6.0213		0.0125		2.402	19.92
1995	4.9307	0.9974	0.0100	0.0025	2.751	24.75
1996	12.5181	3.6390	0.0288	0.0078	5.427	37.97
1997	1.9484	2.5529	0.0031	0.0045	2.114	18.76
1998	5.9553	3.5833	0.0113	0.0067	3.365	31.72
1999	6.2022	1.1332	0.0117	0.0019	2.170	21.54
2000	1.3376	4.3173	0.0025	0.0110	2.580	23.02
TOTAL	**45.27173**	**10.77257**				

15.3.1.1 Reduction of Collective Doses

Since initial commercial operation in 1990, an average of 4.3 men-Sv/year unit has been experimented. As shown in Table 15.1 in 1966, with a 6 months refueling outage, a maximum collective dose of 8.07 men-Sv/year unit was observed. This motivated an investigation to determine the causes of such high doses and to adopt the proper actions for their control and minimization.

The analysis and evaluation was conducted by an Ad Hoc multidisciplinary committee establishing as goal the reduction of collective doses in the middle and long term to level comparable to those of the international BWR industry. The goal was fully supported by the top management by setting up a Reduction Dose Program at LVNPS.

The Reduction Program involves two phases. Phase I comprises the reduction of the source term and the collective time of exposure to radiation. Phase II is related with the means to improve the performance of management, planning, and safety culture at all GCN levels.

a) Phase I Results

a.1) Source Term Assessment

The analysis carried out show that 80% of the exposure was due to the isotope Co-60 which comes out from the neutronic activation of Co-59 present in a proportion of 50 to 60 % in many stellite alloy components from to the primary coolant system. The mechanism of transport of the Co-59 results from the corrosion of:

Source of Co-59	CLV-1 (gr/ year)	CLV-2 (gr/year)
Low pressure turbine blades	319.30	319.30
Internals of valves	139.62	155.59
Reactor internals	63.92	46.92
Piping impurities	5.5	5.5

Based on the analysis results a decision was made to establish the control and reduction of sources of Co-60 by mean of the following actions:

Source of Co Generation	Control Activity	Status	
		CLV-1	CLV-2
Reduction of the amount of Co-59 (stable) entering the reactor	Installation of mechanical filters downstream the main condenser, in both Units	970505	980330
Reduction of the residence time of Co-59 that enters the reactor	Installation of a zinc injection system in both Units	980602	980802
Reduction of the release rate of Co produced by in-core stellite components	Substitution as required of stellite components during the life of the plant	In progress	In progress
Reduction of Co-60 already produced, that has been	Chemical decontamination of the	980528	981115

Source of Co Generation	Control Activity	Status	
		CLV-1	CLV-2
deposed on internals of components in contact with the primary coolant system	recirculation loops and other components of the primary coolant system, in both Units		

Further dose reduction actions have been taken or are in progress:

Action	Status
Installation of semi permanent shielding	In progress
Installation of hydrolyzing ports	In progress
Installation of a stainless steel liner in Unit 2 Main Steam Reheaters to reduce Fe	July 2000
Hot spot removal program	In progress
Addition of noble metals	> 2001

a.1.2) Control of Collective Exposure Time Exposition

To optimize the collective exposure time (man-hours) of workers in the Radiation Controlled Areas the following actions have been taken or are in progress:

- A policy has been established at LVNPS to reduce the collective exposure time in more than 30% in the mid term (1 – 5 years)
- Reduction of field oversized groups
- Improvement in the tasks planning process
- Reinforcement of field supervision
- Increase use of remote control and communication devices
- Enhancement of radiation workers Safety Culture and performance

a.2) Phase I Results

Table 15.1 shows the reduction on collective doses that has been attained so

far.

a.3) Long Term Expectations

Figure 15.3 shows the historic collective doses and its projection to the year 2004 based on the actual behavior and the dose control and reduction actions in place.

The following are the expected goals of performance established for dose control:

a) Reach and maintain Recirculation lines dose rates (BRAC index) about 1/2 of the current values.

b) Reach and maintain a reduction of at least 1/3 of the collective exposure time.

c) Neutralize most of the negative effects on radiation exposure due to the a forthcoming H_2 injection to the reactor (noble metals addition).

d) Reach and maintain a three rolling year average collective dose at levels of 1.7 to 1.4 Person-Sv/Yr (about 1/3 of the current one).

e) Reach the best quartile of the international performance for BWR reactors.

15.3.2 Environmental Radiological Impact

The radioactive material that has been released from LVNPS has resulted in concentrations shown in Figure 15.4 and exposure levels presented in Figure 15.5. In relation to the specific releases for both units, these are shown in:

Figure 15.6.- Historic Annual Data for liquid releases (Units 1 and 2)

Figure 15.7.- Historic Annual Data for Gaseous releases (Unit 1) – Noble Gases

Figure 15.8.- Historic Annual Data for Gaseous releases (Unit 2) - Noble Gases

Figure 15.9.- Historic Annual Data for Gaseous releases (Unit 1) - Tritium, Iodine and particles

Figure 15.10.- Historic Annual Data for Gaseous releases (Unit 2) - Tritium, Iodine and particles

As it is shown in Figure 15.6, since 1996 the annual liquid releases doses have diminish considerably mainly due to an improvement on the management of water reuse

15.3.2.1 Environmental Radiological Surveillance Program at LVNPS

LVNPS has an environmental surveillance program that ensures a permanent continues surveillance on the impact to the environment during normal operation, the Laguna Verde Environmental Surveillance relevance pathway are as follows:

a) GASEOUS RELEASES

- 28 Dosimetric stations to measure external radiation.
- 56 Air sampling stations to measure inhalation exposure.
- 20 Sampling stations to measure particulate radiation deposition on soil, including food chain sampling.

b) LIQUID RELEASES

- 29 Sampling stations of sea water at the discharge channel, marine biota, marine sediment and bioindicators.
- 3 Sampling stations of fresh underground water.

The conclusions are the following:

- The limit concentrations established in Laguna Verde NPS Technical Specifications have never been exceeded by any sample or in average.
- Since the limit concentrations were not exceeded and the exposures measured through TLD remained under the preoperational values, it can be stated that not any member of the general public exceeded the limits for public due to the emissions of the plant.
- The total beta activity detected during 2000 shows the same pattern as in previous years. The variations observed during that year are of the same order of the variations during the previous years, since 1978.
- The results of the Environmental Surveillance Program demonstrate that the population living in the neighborhood of the plant do not increase their radiation doses due to the operation of Laguna Verde, or at least such increase is not perceptible despite the very low detection limits reached in 2000.
- The only artificial radionuclides that have been present with a relatively high frequency in the samples are Sr-90 and Cs-137. However, these radionuclides have been present in the environment of Laguna Verde site even before the startup of the plant, and were originated from nuclear weapons tests having reached LV latitude through the “fallout” mechanism. So, their presence is not due to the operation of Laguna Verde, and they show a tendency to diminish slowly.
- During this period, 1998-2000 some radionuclides were detected due to the

operation of LVNPS, they are Zn-65, Mn-54 and Co-60 with the concentrations mentioned before.

15.3.3 Regulatory Body Radiological Protection Verification

Regarding to surveillance of public exposure from the normal operation of the plant, CNSNS has several independent means by which compliance with the normative on matter of environmental impact is verified:

a) Analysis of the radioactive emission section of the daily exploitation report in which actual time data from process instrumentation and radiological effluent is contained.

b) Assessment of biannual effluent accounting reports remitted by LVNPS, containing data resulting from isotopic sampling and analysis of liquid and gaseous emissions during the period informed of. Actually, the reports for each second semester are annual compendiums also including dose calculations and meteorological information of interest. A part of CNSNS' assessment consists of an independent reproduction of such dose calculations in order to verify their consistency. These assessments are carried out in compliance with Regulatory Guide 1.109 of the USNRC.

c) Evaluation to the Annual Environmental Radioactive Surveillance Program Report containing information on isotopic sampling and analysis from different environmental strata and performed at LVNPS' off-site laboratory.

d) Independent isotopic analysis of samples collected periodically by CNSNS from locations around the plant site to be process and analyse at CNSNS laboratory. This program has worked as a mean of additional verification. Furthermore, with this program the Regulatory Body has strengthened the consistency of the information presented by the licensee.

Both CFE and CNSNS laboratories take part in International Programs of Inter-comparison to ensure the reliability of their measurements.

CNSNS, as the National Regulatory Body, carries out periodic audits, surveillance's, inspections and assessments to radiological protection activities at LVNPS-1 & 2.

At the present time, discussions are held with the owner of LVNPS to value the impact of the modification to the General Regulation on Radiological Safety to be based on ICRP 60.

15.4 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION

OBLIGATIONS

Based on what has been established in previous sections of this Article, as well as to the fact that until now, no occupational exposed person has exceeded the specified regulatory limits and that radioactive material releases and the resulting doses have remained very much below corresponding regulatory limits, it is concluded that both the regulatory framework and its implantation as regards to the requirement and establishment of a program to maintain occupational or public radiation exposure to the lowest level as reasonably achievable fulfill the obligations stated in Article 15 of the Convention on Nuclear Safety.

FIGURE 15.1
COLLECTIVE ANNUAL DOSE HISTORICAL DATA (UNIT 1)
JANUARY 1989 - DECEMBER 2000

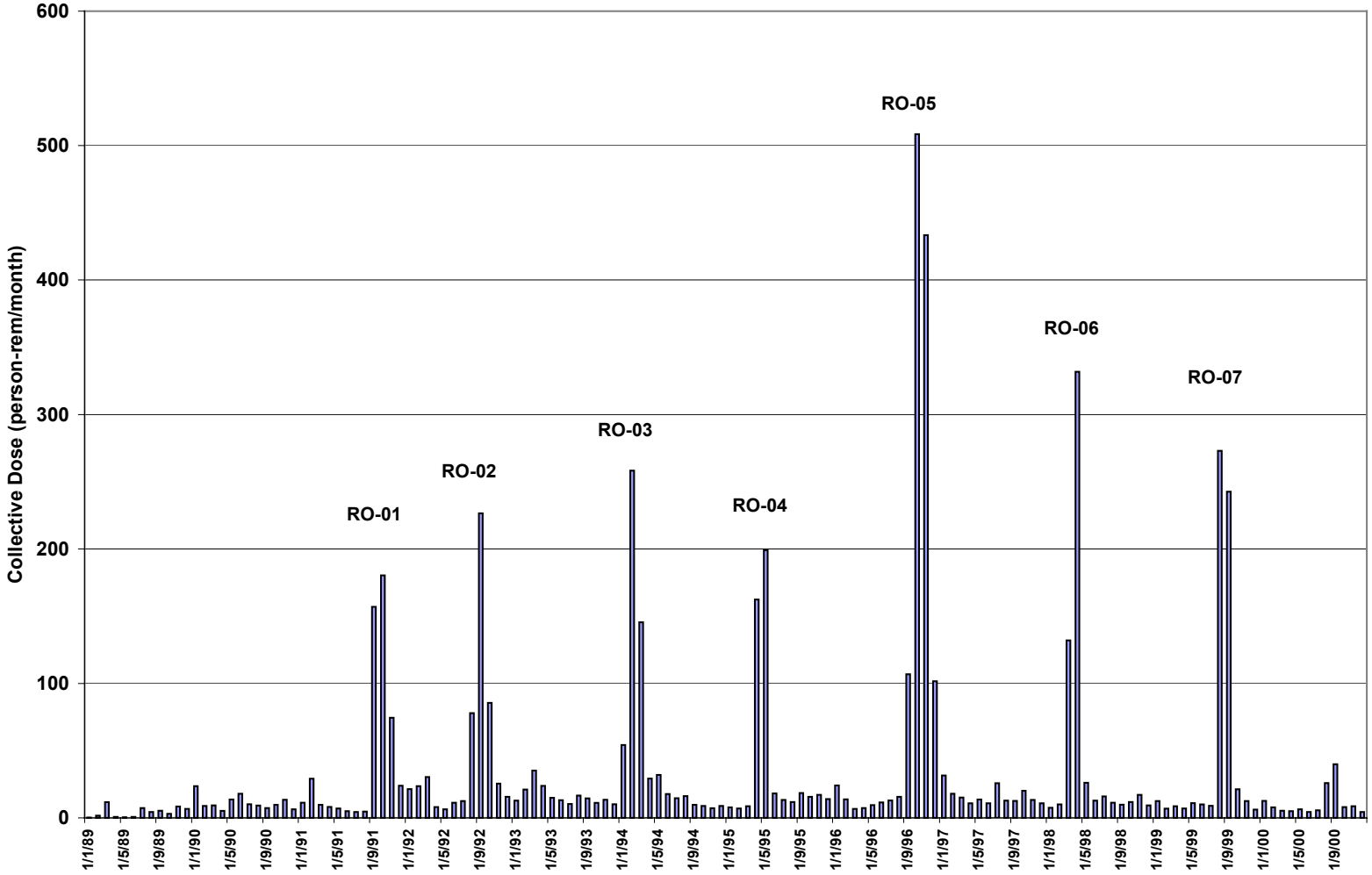
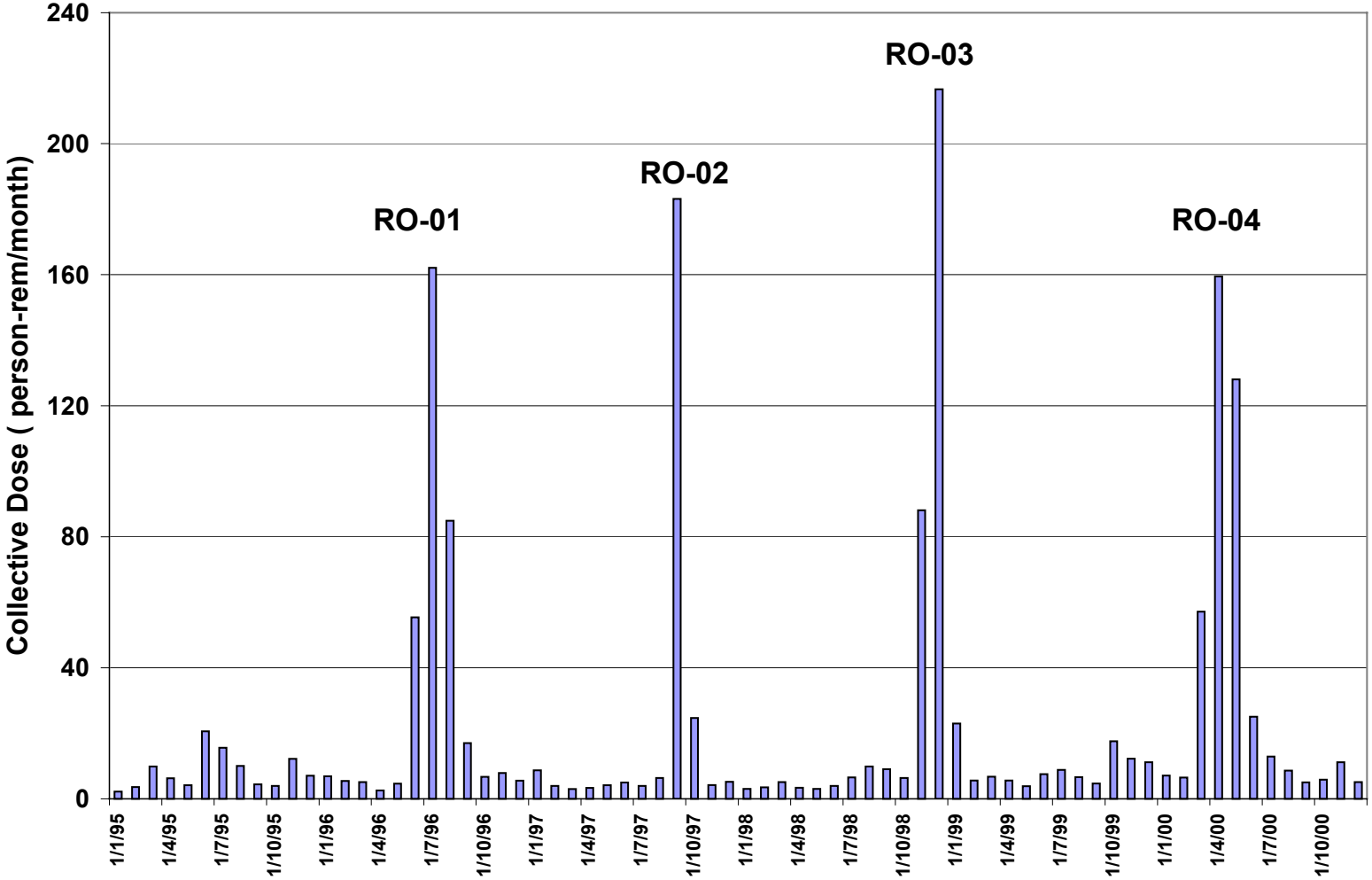


FIGURE 15.2
COLLECTIVE ANNUAL DOSE HISTORICAL DATA (UNIT 2)
JANUARY 1995 - DECEMBER 2000



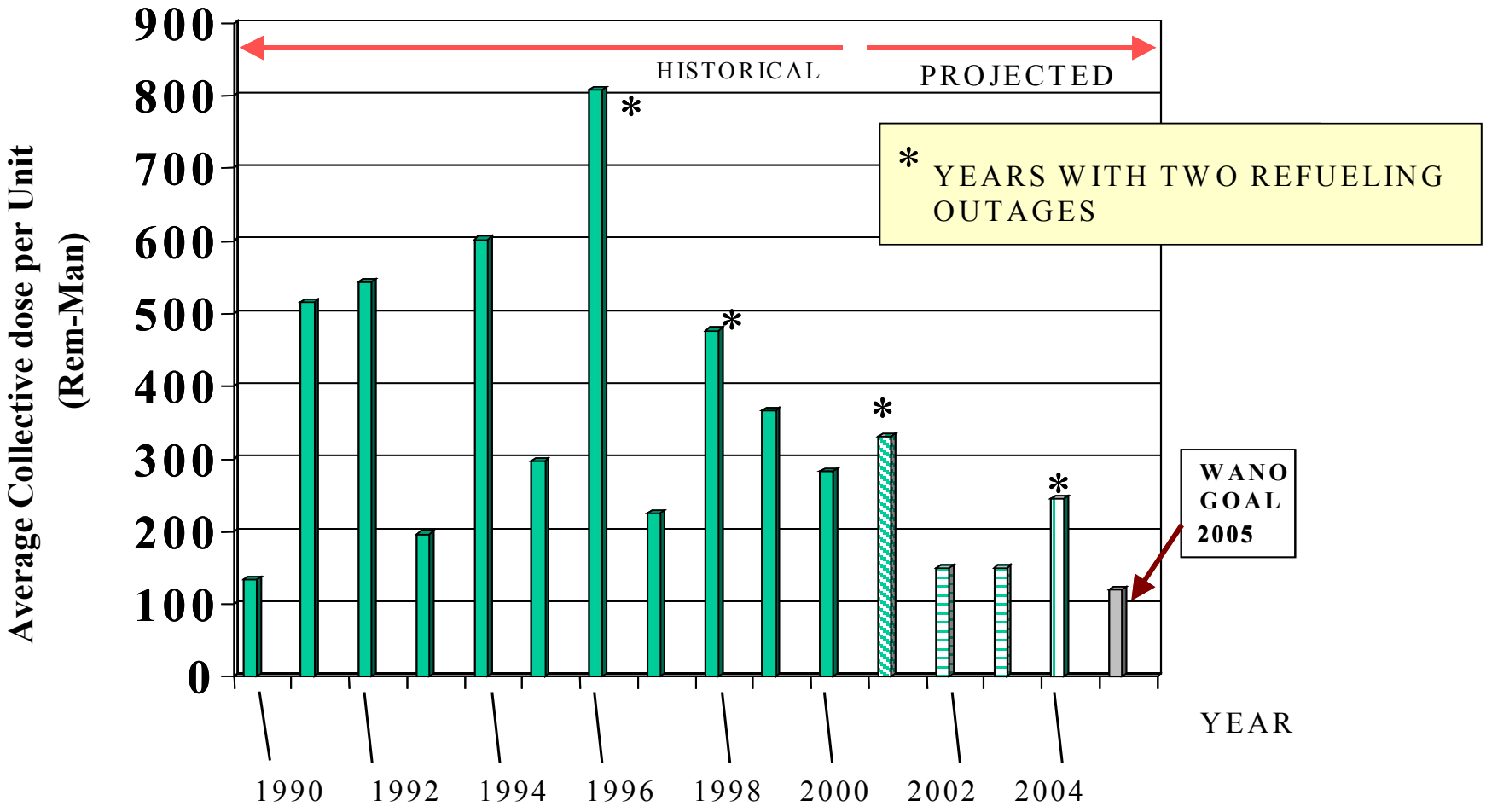

Average Collective dose per Unit
(Rem-Man)
900
800
700
600
500
400
300
200
100
0
HISTORICAL
PROJECTED
* YEARS WITH TWO REFUELING OUTAGES
WANO GOAL 2005
YEAR
1990
1992
1994
1996
1998
2000
2002
2004

FIGURE 15.3

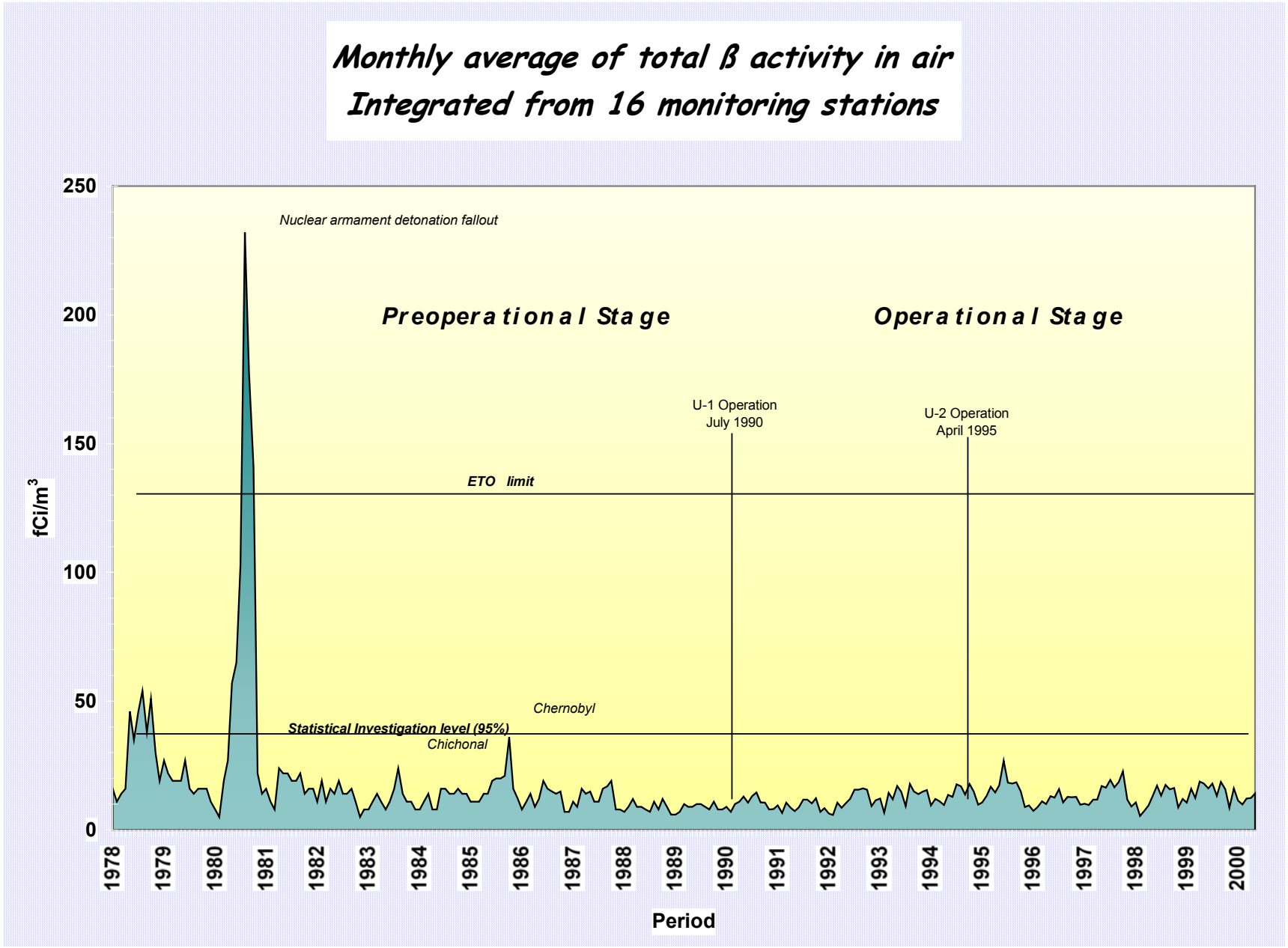

Monthly average of total ß activity in air
Integrated from 16 monitoring stations
250
200
150
100
50
0
fCi/m3
Nuclear armament detonation fallout
Preoperational Stage
Operational Stage
U-1 Operation
July 1990
U-2 Operation
April 1995
ETO limit
Chernobyl
Statistical Investigation level (95%)
Chichonal
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Period

FIGURE 15.4

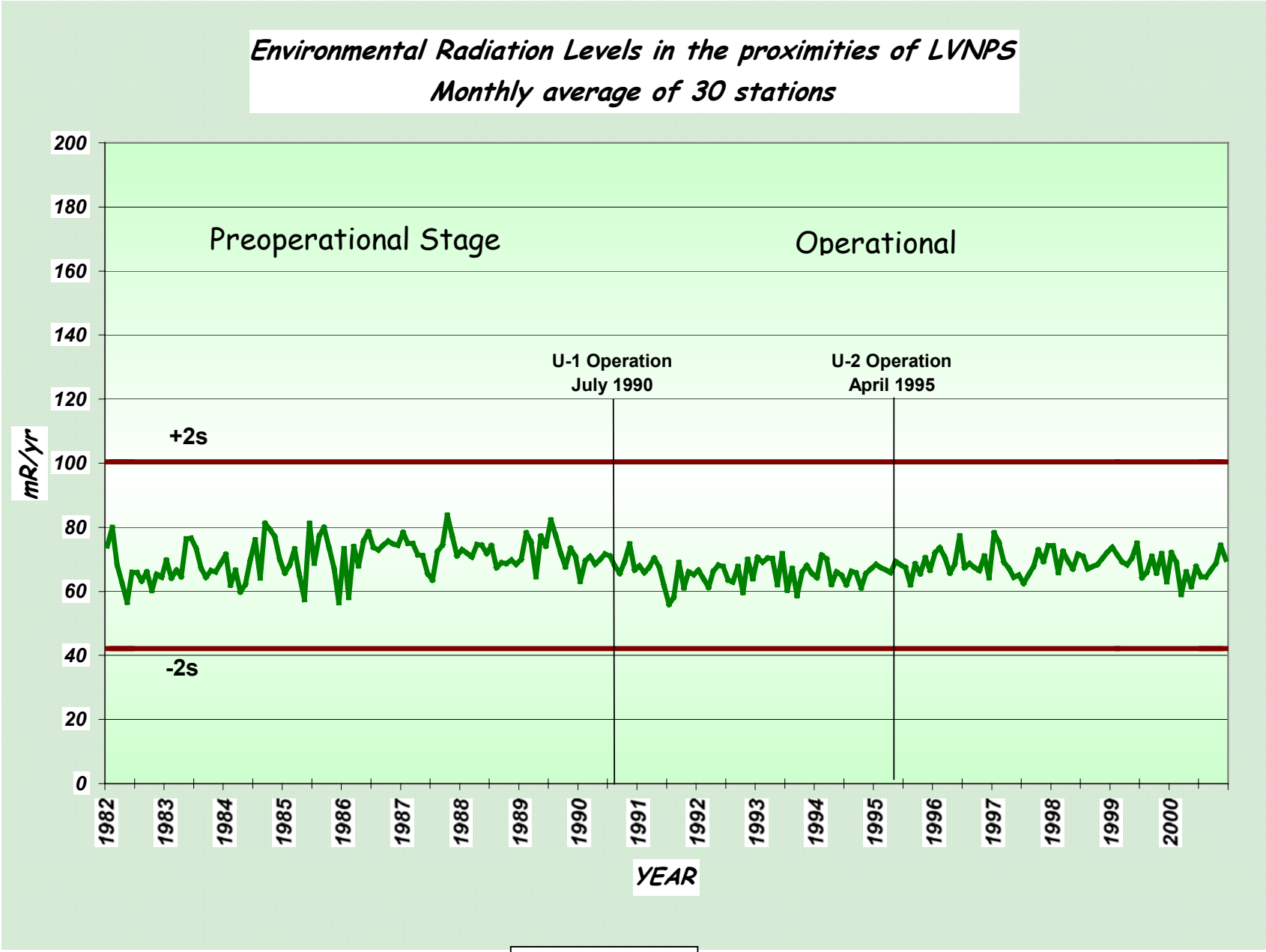

Environmental Radiation Levels in the proximities of LVNPS
Monthly average of 30 stations
Preoperational Stage
Operational
U-1 Operation
July 1990
U-2 Operation
April 1995
+2s
-2s
mR/yr
200
180
160
140
120
100
80
60
40
20
0
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
YEAR

FIGURE 15.5

FIGURE 15.6
~~FIGURE 15.5~~
ANNUAL LIQUID RELEASES HISTORICAL DATA (UNITS 1 & 2)

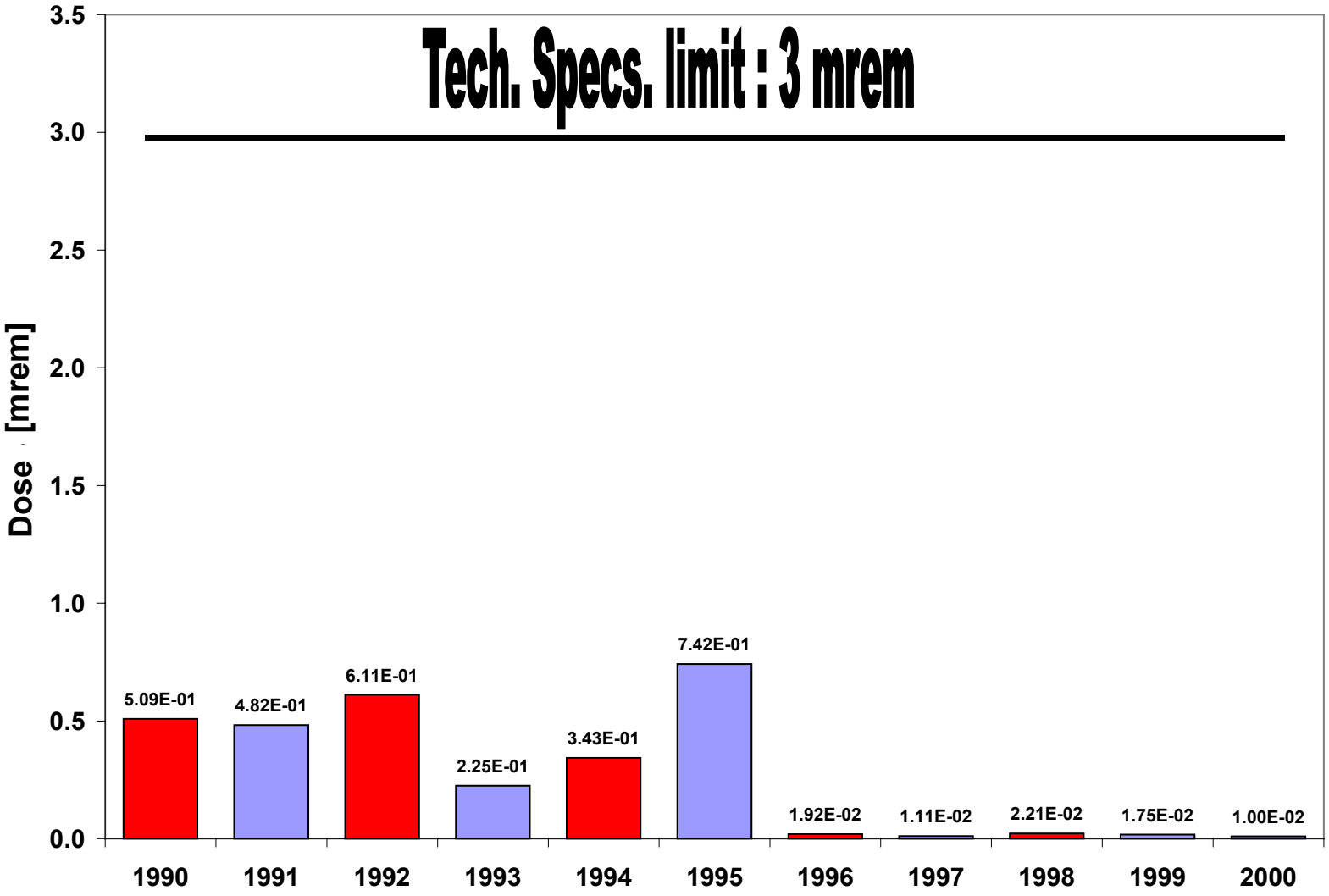


FIGURE 15-7
~~FIGURE 15/6~~
ANNUAL GASEOUS RELEASES HISTORICAL DATA (UNIT 1)
NOBLE GASES

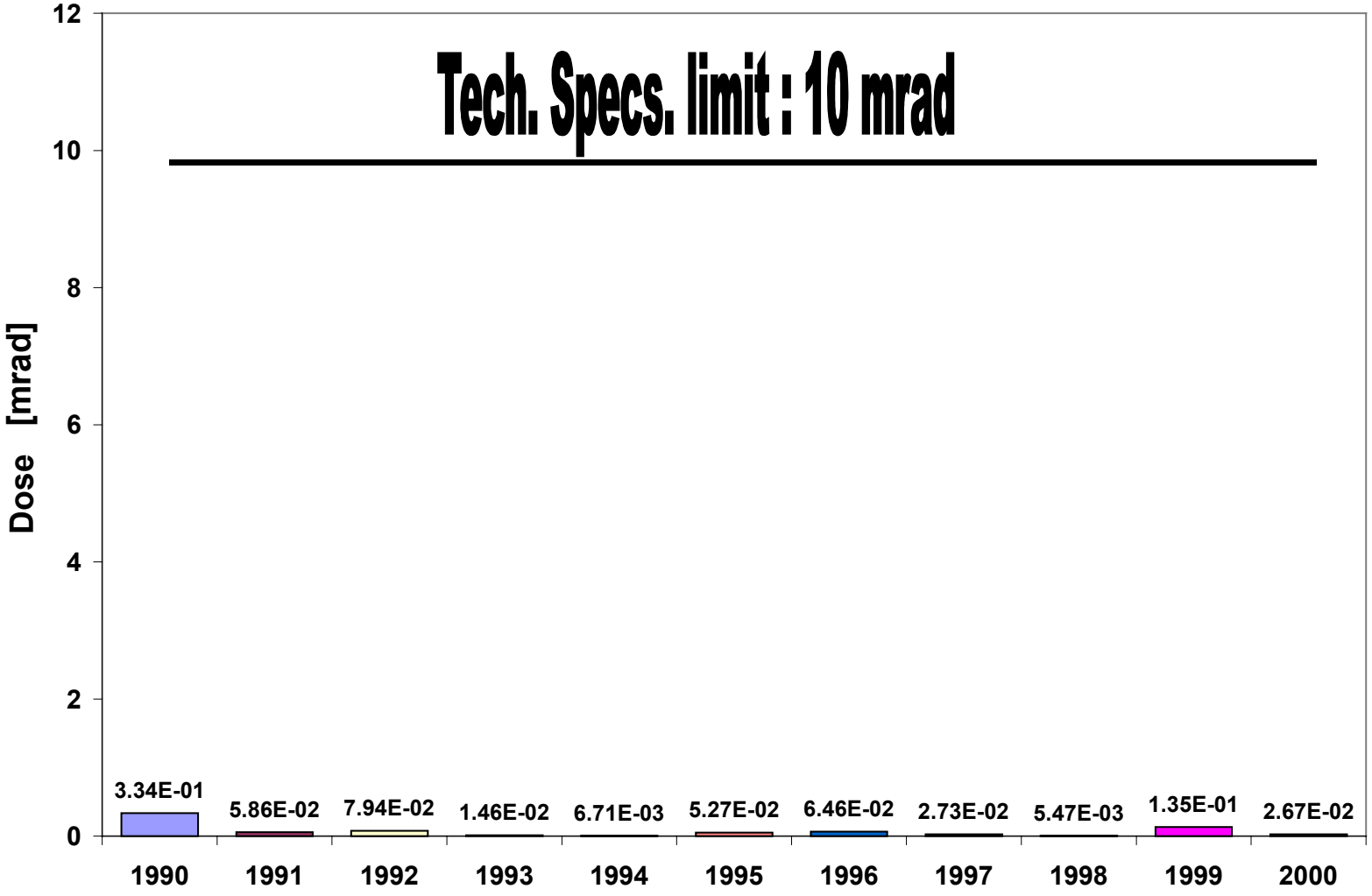


FIGURE 15-8
~~FIGURE 15.7~~
ANNUAL GASEOUS RELEASES HISTORICAL DATA (UNIT 2)
NOBLE GASES

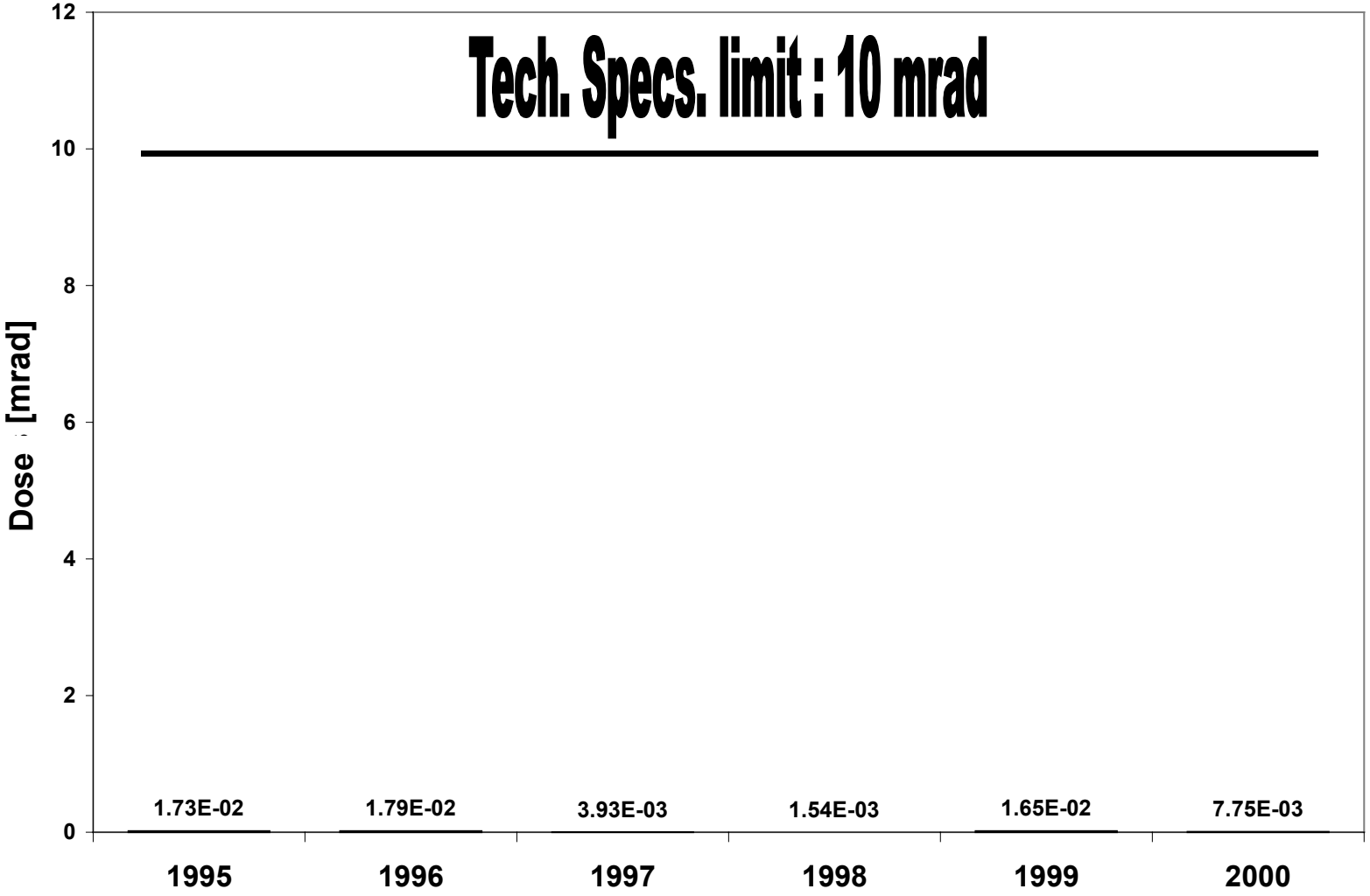


FIGURE 15.9
~~FIGURE 15.8~~
ANNUAL GASEOUS RELEASES HISTORICAL DATA (UNIT 1)
IODINE , PARTICULATE, TRITIUM

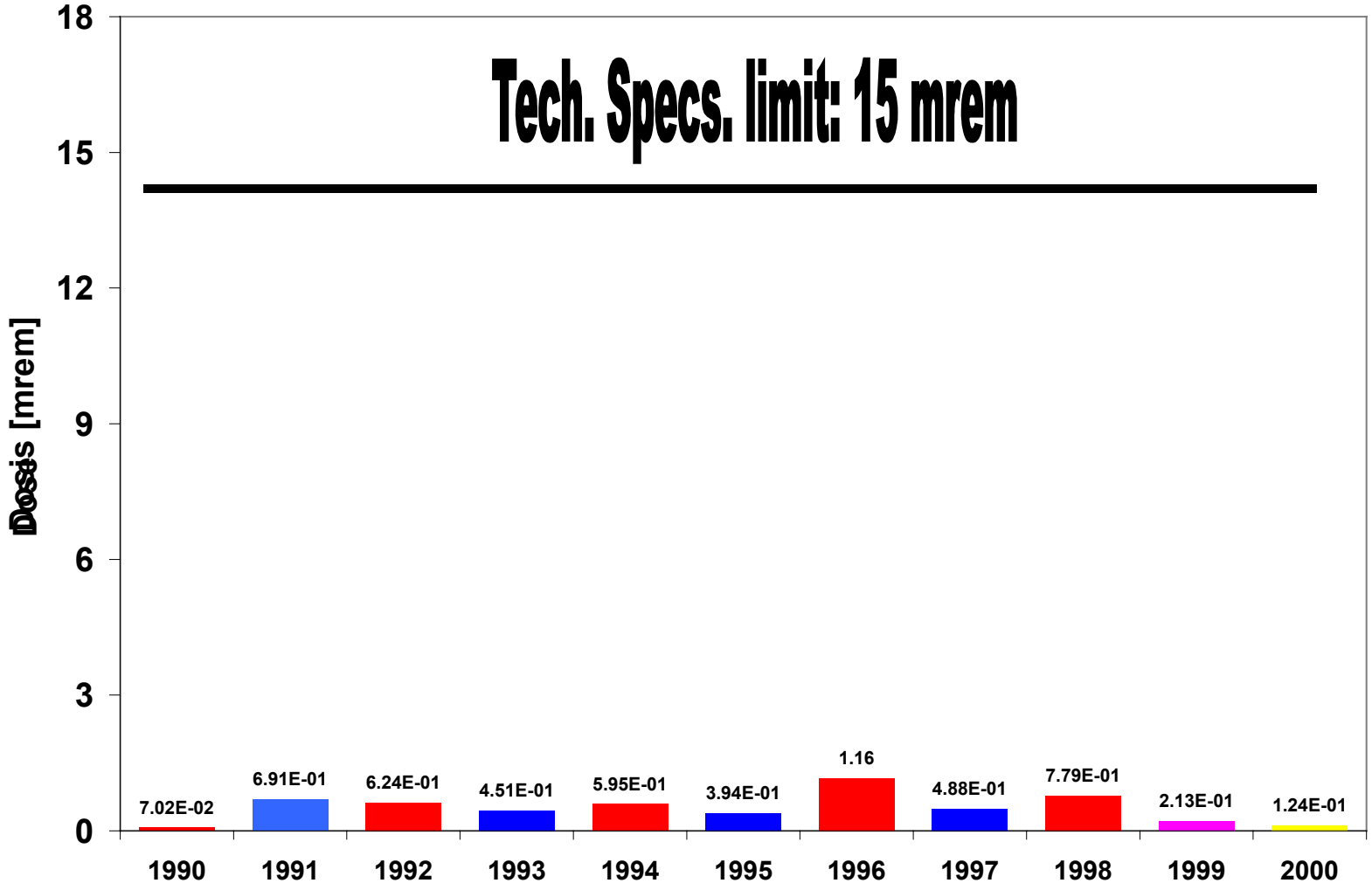
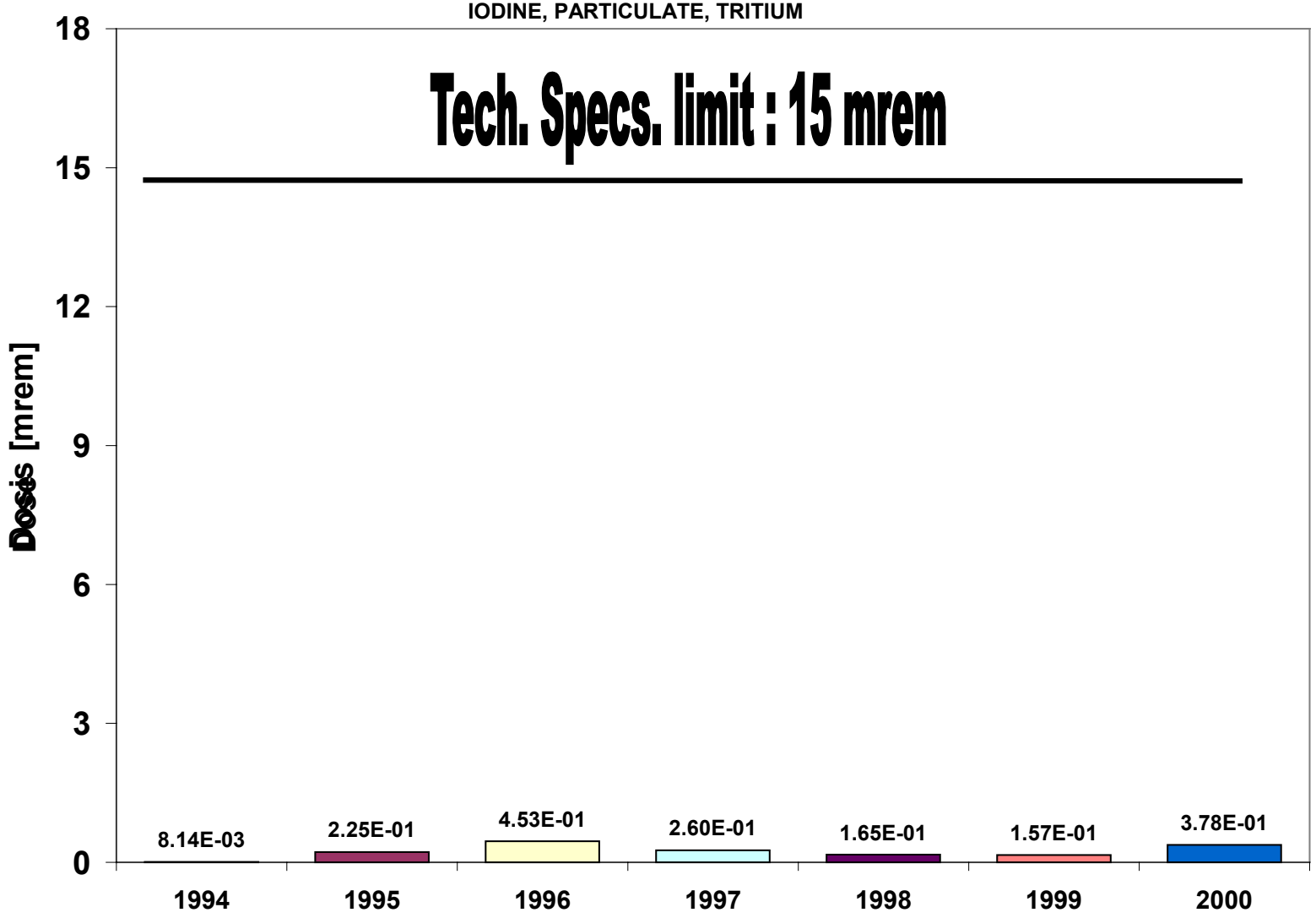


FIGURE 15.10
~~FIGURE 15.9~~
ANNUAL GASEOUS RELEASES HISTORICAL DATA (UNIT 2)
IODINE, PARTICULATE, TRITIUM



ARTICLE 16. EMERGENCY PREPAREDNESS

16.1 LVNPS EMERGENCY PLANS

16.1.1 Regulatory Aspects

The regulatory aspects related with this Article has not changed so remains valid the information that was established in the First National Report (See Annex I in its section 16.1.1). However the condition No. 13 of the License, granted as part of the 5 % power increase, stresses the need to maintain up to date the radiological emergency plans.

16.1.2 Emergency Response Organisation

Note: The information presented in this section was available at the time of the First Report of the Contracting Parties, but it was not included in (Annex I), however is it included now because it is considered that gives more details and clarifies some doubts presented by some Member States after the review of the report.

The Emergency Preparedness for the LVNPS is form by two different and complementary plans known as The Internal Emergency Plan and External Radiological Emergency Plan.

Internal Emergency Plan

The Internal Emergency Plan forms part of the LVNPS Integrated Emergency Preparedness, developed by the Federal Commission for Electricity (CFE).

The Internal Emergency Plan describes the Organization, Resources and Directives that will be applied under emergency situations at Laguna Verde NPP. This Organization fulfills the requirement of the NUREG- 0654.

There is a central group named Group of Technical Support composed by the Coordinator of Emergencies at the Site and four directors (Radiological Control, Evaluation of Accidents, Repairs of Emergency and Operations) supported by two Notifiyers of Emergency and an Advisory Group, with task groups for each of the response areas such as: Fire Protection Brigade, Operational Support, Evaluation of Accidents, Radiochemistry, Dose Projection, Monitoring and Descontamination, Environmental Monitoring, Control of Damages, Logistic Support and Physical Security.

A Center of Technical Support is available and located in at adjacent zone to the main Control Room, where there are works stations with signals from the Integral

Information Process System, which provides the key variables of the operative plant status, and the radiological and environmental status.

The following is the complete set of installations that forms part of the Internal Emergency Plan is:

- Center for Technical Support,
- Main Control Room,
- Center of Operational Support,
- Center of Dose Projection,
- Center of Accident Evaluation,
- Center of Safety Alarms
- Decontamination and First Aids, and
- Post Accident Sampling Station.

The Plan also provides the following materials and equipment:

- Clothes for Personal Protection,
- Equipment for Respiratory Protection,
- Radiation Monitors,
- Contamination Monitors,
- High Volume, Air Monitors
- Dosimetry Digital/Sounder,
- Primary and Alternate, Communications Systems
- Plant Alarm Systems.
- Unit of Intensive Care,
- Fire fighting Truck,
- Unit of Environmental Monitoring and
- Autocars for Personnel Transportation.

External Radiological Emergency Plan

The Radiological Emergency Plan Response Organisation is composed of Federal and State entities listed below. These entities form the External Radiological Emergency Plan Committee (COPERE):

- Secretaría de Gobernación (SEGOB, Secretariat of the Interior)
- Comisión Federal de Electricidad (CFE, Federal Commission of Electricity)

- Secretaría de Comunicaciones y Transportes (SCT, Secretariat of Communications and Transportation)
- Policía Federal Preventiva (PFP, Preventive Federal Police)
- Secretaría de la Defensa Nacional (SEDENA, Secretariat of Defence)
- Secretaría de Marina y Armada de México (SM-AM, Secretariat of Navy)
- Gobierno del Estado de Veracruz (GEV, Government of Veracruz State)
- Secretaría de Salud del Estado de Veracruz (SESEVER, Secretariat of Health for the State of Veracruz)
- Instituto Nacional de Investigaciones Nucleares (ININ, Nuclear Research National Institute)
- Comisión Nacional del Agua (CNA, National Commission of Water)
- Procuraduría Federal de Protección al Ambiente (PROFEPA, Environmental Protection Agency)
- Distribuidora e Impulsora Comercial CONASUPO (DICONSA, CONASUPO Distributor and Commercial Promoter)

Representatives of these Dependencies, with responsibilities in the Plan, participate in the Plan and Procedures updating regarding the personnel training, the public information, the verification of human and material resources as well as the planning and performing drills and exercises. Additionally, these Dependencies propose the activities for maintaining the ability in the performance of the Plan and each two years review the procedures. The Table 16.1 shows the matrix of responsibilities of the External Radiological Emergency Plan.

16.1.3 Emergency Assessment Actions

Note: The information, presented in this section is additional and complementary to the First National Report (Annex I).

Two zones surrounding LVNPS require the population protective measures: Plume Zone (a 16 km radius from LVNPS) and Ingestion Zone (a 60 km radius from LVNPS).

To support emergency preparedness activities the following is available:

- Integral Process Information System, that includes the Safety Parameter Display System (SPDS).
- RASCAL Code, Radiological Assessment System for Consequences Analysis developed by Oak Ridge National Laboratory.

- Core Damage Estimation Methods based on the MELCOR Code, “Melting Core” developed by Sandia National Laboratory.

In addition to these computational tools, the following analytical tools are available, for confirmatory purposes:

- Isotopic Analysis using Gamma Spectrometers,
- Ionic Chromatography
- Atomic Adsorption.

All those systems and equipment is available at Laguna Verde NPP and there are capable and trained personnel to operate them.

16.1.4 Installations and Emergency Equipment

The information related with the installations and emergency equipment has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 16.1.4).

16.1.5 Emergency Plan Activation Exercises/Drills

During 1998 – 2000 several emergency Plan drills, either internal or external, have been carried out in order to verify the suitability and validity of the preparation for a radiological emergency in LVNPS.

16.1.5.1 Internal Emergency Plan Exercises and Drills

The following Table shows the Exercises and Drills that have been hat were carried out since 1988 up to date.

CONCEPT	YEAR		
	1998	1999	2000
Notification of an emergency	4	3	8
Fire Protection	30	62	68
First Medical Aids	2	2	2
Monitoring and decontamination	1	1	2
Environmental monitoring	2	1	1
Dose Projection	8	6	16
Post Accident Sampling	1	1	1
Accident Evaluation (Plant status and conditions)	1	1	1

CONCEPT	YEAR		
	1998	1999	2000
Site Emergency	1	2	1

16.1.5.2 External Emergency Plan Exercises and Drills

The following Table shows the Exercises and Drills that have been carried out since 1988 up to date:

CONCEPT	YEAR		
	1998	1999	2000
Radiological Monitoring, classification and decontamination of evacuated people	2	2	5
Notification to the Main Control	2	2	0
Equipment and vehicles decontamination	1	1	2
Shelters Activation	1	1	2
Environmental laboratory Activation and operation	1	0	0
Accident assessment, Technical analysis and Protection actions	0	1	2
Notification to the Main Control and Task Force 82 (CFE activities)	0	0	3
Administrative Building Evacuation (Annex III)	0	0	1
Logistic Support	0	0	2
Cabinet Exercise PEI/PERE	0	0	1
CNSNS Witness of the Integrated Exercise PEI / PERE CFE response	0	0	1

16.2 MEASURES FOR INFORMING THE PUBLIC IN RELATION TO EMERGENCY PREPAREDNESS

In connection with the activities of this topic, and since the first National Report up to date and in particular during 1998–2000, the following activities have been developed:

- Community workshops on information to the inhabitants that are in the radius covered from the exterior of the fence property of the LVNPS to 16 kilometres. Particularly, this included a description of the Laguna Verde NPP and the activities of the External Radiological Emergency Plan (PERE). These events were carried out during the second semester of the year 2000, with the important participation of the children in school age and the leaders of the area. These community workshops were held in each of the municipal heads that are covered in the PERE. This effort was developed with the participation of the CFE and the National Centre of Prevention of Disasters (CENAPRED).

- Taking advantage of the First National Week of Civil Protection, carried out in September 18-22 of the 2000, a great diffusion in the local and national press was given to one of the three partial exercises carried out during that year, which covered the displacement of the forces known as "Immediate Reaction", conformed by the National Defence, Army and the Preventive Federal Police. This was the first exercise in which the journalists were invited as observers of the activities of protection. This was considered by the communication media as a good opening symptom.

16.3 INTERACTION WITH NEIGHBOURING STATES

The information related with the interaction with neighbouring states has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 16.3).

16.4 REGULATORY BODY ACTIVITIES

CNSNS reviews and approves the LVNPS Emergency Plans (internal and external to the site plant), as well as the procedures to control and implement all the activities related with those plans. On the other hand, all the activities and procedures for the external response of the emergency are reviewed and approved by the organisms (federal and state dependencies) that have responsibilities within the external emergency plan.

During the occurrence of an accident, the main responsibility of the Regulatory Body is to advise the Federal Government in the decision-making process. To fulfil this responsibility, an Emergency Committee is activated immediately after the notification of the activation of the LVNPS Emergency Plan. See Article 8 in this National Report. Under this situation the main task of the National Commission of Nuclear Safety and Safeguards (CNSNS) is the surveillance of the actions taken by the task forces and to serve as advisor of the Federal Government in the decisions making. The CNSNS

has a direct communication system via phone with all the centers in which the activities are taken place during the emergency, as well as all the facilities required to perform its responsibilities during an emergency at LVNPS.

As regards to LVNPS' Emergency Plan, an important duty of CNSNS is to carry out inspections and audits to verify the extend of fulfilment of the preparations of each of the dependencies forming part of the Plan. CNSNS designs integral drills both for the Internal and External Plans and assess the performance of each of the dependencies participating. In a similar manner, CNSNS reviews and evaluates the Emergency Plan document and related procedures.

16.5 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

The information presented in the preceding sections of this Article, establishes that the Mexican United States have the proper institutional framework to minimise consequences to the population in the event of a condition at LVNPS, which could result in a radiological emergency. The integral and individual periodic exercises of each of the radiological emergency response activities along with the assessment and surveillance activities performed by CNSNS allow to conclude that the obligations in Article 16 of the Convention on Nuclear Safety are fully satisfied.

TABLE16.1 MATRIX OF RESPONSIBILITIES OF THE EXTERNAL RADIOLOGICAL EMERGENCY PLAN

	R E S P O N S E						
ACTIVITY	**SEGOB**	**CFE**	**SCT**	**SDN**	**SM-AM**	**GEV**	**SS**
1.Command and Control	X	X	X	X	X	X	X
2. Notification to the Main of Control		X					
3. Accident Assessment		X					
4. Dose Calculation		X					
5. Environmental Monitoring		X					
6. Protection Action Assessment		X					
7. Notification to Population		O		O	X		
8. Communications		X	O				
9. Network Operation	X	X	X	X	X	X	X
10. Control of Road, Air and Maritime Traffic			X	O	X		
12. Transportation		X		O	O	X	
13. Evacuation		O	O	X	X	O	
14. Radiological Prophylaxis		X					X
15. Rescue				X	X		X
16. Monitoring, Classification and Decontamination of People Evacuated		X X		O	 O		X X
17. General Medical Attention				X			X
18. Specialized Medical Attention					X		X
19. Transportation of Injured People		O					X
20. Control of Exposure		X	O	O	O	O	X
21. Activation of Lodgings		X					
22. Decontamination of Equipment and		X				X	
23. Safety and Surveillance				X	X	O	
24. Attention to Victims				O		X	O
25. Control of Food and Water		O					X

X - PRIMARY O – SUPPORT

ARTICLE 17. SITING

17.1 REGULATORY ASPECTS

The regulatory aspects for LVNPS site have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 17.1).However it has been incorporated in the LVNPS the OBE Exceedance Criteria, following the USNRC Regulatory Guide 1.166 named "Pre-earthquake Planning and Immediate Nuclear Power Plants Operator Postearthquake Actions", This guide considers the effects of high frequencies accelerations. Also, it has been incorporated the "Damage Scale for Nuclear Power Plant Facilities" contained in the document EPRI NP-6695, which is similar to the Scale of Mercalli.

17.2 LAGUNA VERDE NUCLEAR POWER STATION SITE

17.2.1 Design Basis as Regards to LVNPS-1 & 2 Siting

There is no additional information generated since the issuance of the First National Report to fulfil the commitments of the Convention on Nuclear Safety. The information presented in this section provides additional information to clarify the concerns from the Member States of the Convention of Nuclear Safety regarding the Mexican National Report. Therefore, this information is complementary to that contained in the First National Report (Annex I).

- **Geology, Seismology and Geotectonic Engineering**

  LVNPS's siting is located at the intersection of parallel 20 and the Trans-Mexican Volcanic Belt (**TMVB**). This belt is an east -west – trending belt of volcanic vents and volcanic units that extends from the Pacific coast north of Puerto Vallarta to the area of the Laguna Verde NPP site on the Gulf of Mexico. The **TMVB** is the indirect result of the subduction of the oceanic Cocos Plate sliding beneath continental Mexico from the Middle America trench along the Pacific Coast of southern Mexico. The subducted slab of the Cocos Plate melts and depths of about 100 km, producing magma that rises to form the volcanoes and related magma bodies of the **TMVB**.

  Heat flow measurements suggest that the **TMVB** typically have a thin brittle crust with the remaining crust below being typically plastic rather than brittle. This thin brittle crust can not store great strain energy, which explains why the **TMVB** is an area of relatively low seismicity, and that the damaging earthquakes that have occurred within the **TMVB** have not approached in magnitude to the great earthquakes typical of the Benioff Zone.

The Laguna Verde NPP site is located within the **TMVB**, near the eastern margin of the province. The facility is founded on a mass of Pliocene-Pleistocene basaltic rocks running along the Gulf of Mexico over an approximate 1.4 km extension of a variable 30 to 50 metre thickness. Stratigraphic studies show the existence of a subjacent layer of alluvium consolidated deposits of a 40 to 65-metre thickness deposited over andesitic material, extending itself 150 metres in depth. The basaltic layer presents a columnar fracture of thermal nature of lengths going from 6 to 8 metres.

In order to satisfy the regulatory requirements, CFE performed the following studies: Phisiography, Geological History, Differential Settlements and Upheavals, Stratigraphy, Faulting, Chemical Weathering, Cavernous and Carstic Terrain, Subsoil Faults Under Dynamic Load, Pre-consolidation Evidence through Volcanic Erosional Processes, Liquefaction, Slope Stability, Permeability and Phreatic Levels, Seismic Stability of Alluvium Materials subjacent to Superficial Basalt and Flow of Ashes and Lava from a Potential Volcano Eruption.

Because of the proximity of the site to different volcanoes of the eastern **TMVB**, the near field effects (ashfall and lava) at El Abra and the far field effects eruption at Pico de Orizaba, were analyzed. Due to the geologic characteristics, morphology of the cone and crater, there were not considered other kind of possible effects. There is no any evidence to associate the cinder cones at El Abra with historic macroseismicity.

In this specialty, the atmospheric shock waves induced by explosions were also considered.

The following regional environmental studies were performed covering a radius of 320 km: Volcanic activity, Superficial faulting, Tsunami and Tectonic of sea bed, Attenuation of vibratory movements of trans-mexican volcanic belt terrain, Tectonic provinces and their maximum historically-related earthquakes, Acellerograms, Determination of Design Basis and Operation Basis Earthquakes, Geological-Seismic conditions on continental platform and Sea bed boundary, Correlation of regional seismicity with that of the site, Structural relations between "Graben", "Palma Sola", "Cofre de Perote" and "El Farallon", Related tectonics, Analysis of two faults parallel to volcanic cones of "El Abra", Related tectonics, Distribution of mine fracture systems and the zone of "La Viga-Tuxtla" as well as distinction fracture system of "El Abra, Tectonics related.

The seismic design basis for Laguna Verde was defined using the Peak Ground Accelerations that were computed for the maximum earthquakes identified for each seismotectonic province and similarly for each of the potential seismogenic structures that were identified within the Trans Mexican Volcanic Belt (**TMVB**).

Peak ground accelerations were computed using six different formulas that appear in common literature (Campbell, Joyner and Boore, Idriss, Bufaliza, Esteva and Villaverde and Esteva conservative).

The response spectrum for the design safe shutdown earthquake (design SSE) was obtained using the criteria of the US Regulatory Guide 1.60 and, the value of 0.26 g for the safe shutdown peak acceleration was determined. The return period for the design SSE is 2000 years. From this value it was obtained a 0.14 g for the Operating Basis that corresponds to nearly a half of the SSE.

These seismic design parameters for Laguna Verde NPP were originally developed from a conservative assessment of the potential for earthquakes in eastern continental Mexico and the adjacent area of the Gulf of Mexico and are based on pre 1979 site specific studies regarding site ground motion characteristics. Subsequently the CFE has undertaken a series of geological, geophysical, seismological, and engineering investigations to better evaluate the potential for earthquake induced ground motion at the site. The results of these studies confirm the conservatism of the original design parameters and do not suggest the necessity for changes in the original design criteria.

These lasts studies were issued in 1987, and were performed taking into account a large amount of data coming from different sources: The National Oil Company (PEMEX), The US Geological Survey, The Texas University, The Texas A & M University. These studies not only confirmed the original design ground acceleration and potential for an earthquake, but they strongly indicate that a lower ground acceleration motion could be proposed to Regulatory Body. The original and current ground motion is 0.26 g and the last studies suggest an acceleration of 0.18 g.

As part of the Periodic Safety Review process, performed back in 1999, the above was confirmed and currently CFE is carrying out a Probabilistic Risk Assessment of External Events which consider seismic events.

Particularly, in relation to the volcanic risk and as an example of the detail and deepness of the studies performed, both active and non-active volcanoes within a radius of 150 kms from the site, including those corresponding to the sea bed, were analysed. In order to provide conservative results of the effect of a volcano eruption, the following was considered as an analysis basis event: (1) The birth of a new volcano 13.5 km away from the site in direction of the ash volcanoes "El Abra", producing quantities of ash and lava equivalent to that of the Paricutin Volcano, and (2) The eruption of the "Peak of Orizaba", considering the amount of ash expulsed equivalent to that of Mount St. Helen in U.S.A. on May 18, 1980. Results determined that the effect of a nearby ("El Abra") or so far ("Peak of Orizaba") volcano eruption would not affect the safe condition of LVNPS-1 & 2.

17.2.2 Effect of the Seismic Events on LVNPS

A series of seismic events have been perceived in the LVNPS site for which the operation personnel have declared "Unusual Event". However, when their effect have been evaluated it has been determined that none have had some adverse effect or any damage to the systems, structures and components of LVNPS 1&2.

Two seismic events have been of particular interest. One perceived in June of 1997 and the other one in August of the year 2000, where the OBE spectra was surpassed in the zone of high frequencies. However, it has been determined that neither they have had an adverse effect in the LVNPS. For such a reason, it has been incorporated in the LVNPS the OBE Exceedance Criteria, following the USNRC Regulatory Guide 1.166 named "Pre-earthquake Planning and Immediate Nuclear Power Plants Operator Postearthquake Actions", which considers the effects of the accelerations of high frequencies. Also, it has been incorporated the "Damage Scale for Nuclear Power Plant Facilities" contained in the document EPRI NP-6695, which is similar to the Scale of Mercalli.

Associated to the above-mentioned, the CFE has carried out an updating of the System of Seismic Monitoring of the LVNPS.

In this respect, the CNSNS has evaluated the mentioned events and it has determined that the results and analysis obtained by the CFE have been satisfactory.

17.3 CONSEQUENCES TO THE LVNPS SURROUND DUE TO OPERATION

The consequences to the LVNPS surround due to operation have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 17.3).

17.4 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

Based on the information contained in the First national Report (Annex I) and the additional information presented in this National Report, it is concluded that the obligations provided in Article 17 of the Convention on Nuclear Safety are met.

ARTICLE 18. DESIGN AND CONSTRUCTION

18.1 REGULATORY ASPECTS

The regulations regarding the LVNPS design and construction have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.1).

18.2 DESIGN ASPECTS

In general terms, the information concerning the LVNPS design aspects has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.2).However the most significant change was given in the LVNPS thermal power. Originally this thermal power was 1931 MWt, at the end of 1999 the LVNPS was licensed to uprate5% nominal power to 2027 MWt. Currently each LVNPS unit generates a gross electric power of 708 MWe and a net power of 687 MWe.

The design changes and modifications in LVNPS are performed according to the 10 CFR 50.59. These are summarised in the sections 14.3.1 and 14.3.2 of this National Report.

18.3 IMPLEMENTATION OF THE PHILOSOPHY OF DEFENCE IN DEPTH

The implementation of the philosophy of defence in depth at LVNPS has not changed so the information that was established in the First National Report is stll valid (See Annex I in its section 18.3).

18.4 LVNPS DESIGN CRITERIA AND STRUCTURE, SYSTEM AND COMPONENT CLASSIFICATION

18.4.1 General Design Criteria

The general design criteria applied in the LVNPS have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.4.1).

18.4.2 Safety Design Criteria

The safety design criteria applied in the LVNPS have not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.4.2).

18.4.3 LVNPS Structure, System and Component Classification

The classification of structures, systems and components in LVNPS has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.4.3).

18.5 PROVED VALIDITY OF LVNPS 1 & 2 DESIGN AND CONSTRUCTION

The information about the proved validity of LVNPS 1 & 2 design and construction has not changed so the information that was established in the First National Report is still valid (See Annex I in its section 18.5).

18.6 CNSNS ACTIVITIES

During 1998-2000, the CNSNS has participated in various projects and activities aimed to develop tools and human capacity in the fields of the nuclear and radiological safety. Among these projects, it highlights the participation of the CNSNS in the International Program for the Development and Training in SCDAP (See section 8.4.1 of this National Report), which has allowed the CNSNS to have a Best Estimate tool called SCDAPSIM, for an independent analysis of the progression of a severe accident in a nuclear power station. The Code SCDAPSIM is based on the mechanistic models used in the SCDAP /RELAP5 code developed by the Nuclear Regulatory Commission of the USA and it compiles the whole international investigation in the severe accidents field. The results of this investigation has allowed the CNSNS to be actualized in the way that a severe accident can progress, so it can establish mechanisms that allow to minimize and to mitigate the consequences of this accidents through recommendations to maintain and to improve the safety of the LVNPS. Also, it has been developed the capacity and necessary tools to evaluate and to Severe Accident Management Guidelines for the LVNPS.

18.7 RELIABLE OPERATION

In connection with the existence of reliable levels and methods of protection, refer to Article 10 in this National Report.

As regards to the consideration of human factors and a reliable operation, see Articles 12 and 19 respectively, in this National Report.

18.9 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE CONVENTION OBLIGATIONS

The information presented in this Article, establishes that in the Mexican United States the Law, Regulations, Implementation and Surveillance of the fulfilment by CNSNS as well as the principle of Defence In Depth have been fundamental for the design and construction of LVNPS-1 & 2. These have provided several levels of protection against the release of radioactive material in order to prevent accidents and minimise radiological consequences in the remote event of occurrence.

Furthermore, the technologies adopted in the design and construction are of proven validity in similar reactors operating in countries with greater nuclear experience. In general, there are no unique characteristics and in special cases the acceptance of CNSNS has been based on specific tests and analyses.

The above mentioned and the consideration in the design of the limitation of human performance under normal and abnormal conditions and postulated accidents, ensure the reliable, stable and easily controlled operation of LVNPS.

Therefore, compliance with obligations in this Article 18 of the CSN is satisfied.

ARTICLE 19. OPERATION

19.1 INTRODUCTION

In general, the legal framework related to operation has not change from the one presented in the First National Report (See Annex I), except for the issue of the following Mexican Official Standards: NOM – 031 – NUCL - 1999 “Requirements for the qualification and training of occupational exposure personnel to radiation” and NOM - 034 - NUCL - 2000 “Requirements for the qualification and training of Nuclear Power Station Personnel”.

19.2 ADMINISTRATION AND MANAGEMENT CRITERIA

The administration and management criteria used in LVNPS have not changed so the information described in the First National Report is still valid (See Annex I in its section 19.2).

19.2.1 Construction Stage

The administration and management criteria used in the construction stage of LVNPS have not changed so the information described in the First National Report is still valid (See Annex I in its section 19.2.1).

19.2.2 Operation Stage

For the operation stage, since the beginning of commercial operation of the Unit 1 in the year 1999, the following mechanism were implemented to assure that the operation is maintained within the imposed limits by the Regulatory Body and in accordance with the Operation License Basis: Technical Specifications for Operation and a Periodic Safety Review that reflect the status of the installation after its design modification authorized by the Regulatory Body.

In relation to the Technical Specifications, CNSNS has authorized 163 changes for Unit 1 (up to its 8^{th} refueling outage, 2001) and 61 for Unit 2 (up to its 5^{th} refueling outage, 2001). These changes have been evaluated in a similar process than the original. The Periodic Safety Review was submitted to the CNSNS and it is actually under evaluation and so far no issue that reflects deviation from the established regulatory requirements has been found.

19.3 LVNPS SAFETY ANALYSIS AND START UP PROGRAM

19.3.1 Safety Analysis

The information related to the safety analysis is still the same as the one presented in the First National Report (See Annex I). However, as it was mentioned in section 14.3.2.1 B) of this National Report, CNSNS evaluated the 5% Power Uprate Safety Analysis which covers almost all the topics included in the Final Safety Analysis Report.

CNSNS witnessed every step of the five power increase of 1% up to reach 105% power, in order to assure the stable behavior of the plant. The safety analyses with the new power and steam flow were performed as part of the primary containment system analysis considering a loss of coolant accidents inside and outside the primary containment.

19.3.2 Start Up Program

- **Test for the 5% Power Uprate**

Due to the fact that under the power uprate condition neither the pressure at the RPV nor the reactor recirculation flow were affected, many of the start up test were validated by analysis of the test results during the initial start up testing for both units. However the change in the main steam flow required the following tests to prove the stable operation under this new condition:

- Stable behaviour for normal operation
- Stable operation of the Reactor Core Isolation Cooling System (RCIC)
- Thermal limits evaluation and calibration of feedwater flow transmitters for each power step from 100% up to 105%.
- Pressure Regulator EHC (including regulator failure to verify the transference to the backup regulator)
- Feedwater Control and feedwater system, stable RPV level control and operation
- Chemistry
- Isotopic Analysis
- Environmental radiological monitoring at the release and discharge points, inside the restricted area

19.3.3 Regulatory Body Activities

For the 5% Power Uprate condition, the Regulatory Body evaluated and authorized

the testing program for both units of LVNPS. The safety related tests were witnessed by CNSNS in order to verify that the expected safety and operational parameter figures were obtained as it is described at the Safety Analysis. As a result of the CNSNS evaluation and analysis the testing results, it was determined that both units of LVNPS have had a stable behaviour so they can operate to a 5% Power Uprate Condition. Finally the Secretariat of Energy granted the new Operation Licenses in December 8, 1999 for both units of LVNPS with the same expiration date as the original ones, that is July 24, 2020 (Unit 1) and April 10, 2025 (Unit 2).

19.4 SAFETY ANALYSIS DURING OPERATIVE STAGE AT LVNPS

This topic from the internal (CFE) and external (CNSNS and others) point of view is addressed in detail in section 14.3.1 and 14.3.2 of this National Report.

19.5 USE OF APPROVED PROCEDURES

The information related to the use of approved procedures in LVNPS has not change so the information described in the First National Report is still valid (See Annex I in its section 19.4).

19.6 PROCEDURES FOR OPERATIONAL INCIDENTS PREDICTED AND ACCIDENTS

The information related to procedures for operational incidents predicted and accidents in LVNPS has not change so the information described in the First National Report is still valid (See Annex I in its section 19.5).

19.7 TECHNICAL SUPPORT SERVICES DURING THE INSTALLATION'S LIFETIME

The information related to the technical support services for LVNPS has not change so the information described in the First National Report is still valid (See Annex I in its section 19.6).

19.8 NOTIFICATION OF INCIDENTS

The information related to the notification of incidents at LVNPS has not changed so the information described in the First National Report is still valid (See Annex I in its section 19.7), nevertheless the following additional information is presented.

With the purpose to improve the root cause analysis of the events, since 2000 a

group with enough experience and specialized in root cause analyses methods was created.

.

Figure 19.1 shows notifications and reportable events since initial commercial operation at LVNPS through December 2000.

19.9 OPERATIONAL EXPERIENCE

19.9.1 Internal Operational Experience

In general, the information related to the internal operational experience has not changed so the information described in the First National Report is still valid (See Annex I in its section 19.9), with the exception that the term “Reportes de Eventos a Analizar” (REA) was changed for the term “Reportes de Eventos Internos”(REI).

Figure 19.2 shows the Internal Event Reports occurred from 1999 up to December of the 2000 at the LVNPS.

19.9.1.1 Containment Performance

A testing program to measure the primary containment leakage prior to initial operation of the LVNPS Units 1 and 2 and periodically throughout its operating life has been applied. The testing program has included the performance of Type A test to measure the overall integrated leakage rates, Type B test to detect and measure local leakage from certain components, and Type C test to measure containment isolation valve leakage rates.

These leakage tests are performed in accordance with the requirements of Appendix J of 10 CFR 50, “Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors” from USNRC.

Type A tests are performed using the absolute method. A makeup verification test is performed as a supplemental test. The pressure detectors, temperature sensors and dew point sensors are in accordance with the characteristics established in the ANSI ANS-56.8/1987.

Acceptance criteria for the preoperational and periodic leak rate tests are based on the 10 CFR 50, Appendix J. The peak pressure test performed at the calculated peak containment accident pressure (37.0 psig) is acceptable if the total measured containment leakage rate does not exceed 75% of the maximum allowable leakage rate. During the periodic tests, the local leakage tests are performed so that repairs can be accomplished to reduce the total leakage within the acceptance criteria.

The Figure 19.3 shows the performance of the primary containment of the Units 1 and 2 of the LVNPS:

19.9.2 External Operational Experience

As it was established in the First National Report (Annex I), the scope of the external operational experience includes the experience from the following sources: the Institute of Nuclear Power Operations – INPO, the World Association of Nuclear Power Operators – WANO, General Electric, Vendors, Architects / Engineers and the United States Nuclear Regulatory Commission (USNRC).

For a better scattering of recent external events in the nuclear industry, a selected number of them are being translated into Spanish and included in a bulletin of operational experience that is transmitted regularly and is available through the Nuclear Division electronic system (INTRANET) to the plant personnel. Additionally, the Just In Time (JIT) bulletins from WANO / INPO that are applicable to BWR are translated into Spanish and in accordance with the Management policy they are discussed in work meetings and used to continuously expand the electronic internal net (INTRANET) with documents in Spanish.

19.9.3 Regulatory Body Activities

Additionally to the evaluation of the licensing event reports submitted by LVNPS in accordance with the regulations, when an important to safety incident occurs at the station, the CNSNS setup an special task group for its evaluation and inspection at the plant in order to verify if the root cause was adequate identified, and to assure the correct implementation of the corrective actions defined to avoid the recurrence of the event.

During 1998 to 2000, the Regulatory Body has continued participating in the NEA Incident Reporting System – (IRS) and in the IAEA system for immediate notification of nuclear events. Additionally CNSNS during this period has participated in the Iberoamerican Nuclear Regulators Forum exchanging experiences with the member countries.

19.10 RADIOACTIVE WASTE TREATMENT SYSTEMS

The information provided in the following sections is complementary to the one originally presented in the First National Report (Annex I).

19.10.1 Liquid Radwaste System

The liquid Radwaste System (LRS) provides for collection, storing, processing and controlled release of radioactive and potentially radioactive liquids associated with the operation of the nuclear power plant. The discharge of treated waste is controlled and monitored to ensure that any discharge is As Low As Reasonably Achievable (ALARA) and in conformance with the requirements specified in 10 CFR 20 and 10 CFR 50 including the dose design objective specified in 10 CFR 50 Appendix I. The

LRS is design to collect essentially all potential radioactive waste produced by the plant operation and by processing the radionuclide concentration is reduced upgrading its quality to permit its reuse or discharge to the environment. The LRS for each unit is divided into six subsystems designed to segregate the various type of liquids and semi liquids radwaste base on their composition and process requirements. These subsystems are: Equipment and floor drains, chemical and regenerating wastes, detergent wastes and solidification preparatory. The processing of liquid radwaste is performed in the Radwaste and Purification Building on a batch basis.

19.10.2 Gaseous Waste Treatment

The information related to the Gaseous Waste Treatment at LVNPS has not changed so the information described in the First National Report is still valid (See Annex I in its section 19.9.2).

19.10.3 Solid Waste Treatment

This subsystem is designed to collect and process humid and dry wastes generated at LVNPS in order to confine such waste within a solid homogeneous monolith with asphalt or concrete matrix free of water. Those drums are then stored in the decay area located inside the Radwaste Building. Also, the LVNPS adopted the methodology of storage resins and filter sludge (wet solid waste) into a High Integrity Containers (HIC) and dewatered to less than 1 % free standing water and later dispose of them at a definite or provisional storage site. Such wastes are handled by remote control, in a manner that LVNPS personnel is maintained within the allowable dose limits established in the Radiological Safety General Regulations issued by CNSNS. The HIC are designed according to Seismic Design and Quality Assurance requirements. Humid solid wastes come from spent resins of ionic exchange, sludge from phase separators, chemical concentrations from laboratory wastes, regenerating and decontaminating solutions.

Dry solid wastes come from contaminated cartridge filters, clothing and articles.

Humid wastes are stored in 200 liters capacity high integrity containers. These containers satisfy the quality standard to guarantee resistance against corrosion and structural stability. Then, the containers are transported to a provisional warehouse within the same radioactive waste building and later to another provisional warehouse at the same place built on modules, each one with a capacity of 5 years of operation for both LVNPS units. It is important to mention that these wastes are of low and medium material activity category.

LVNPS has a solid waste storage area in the Radwaste Building approximately equivalent to one-year operation that normally functions as a staging and decay area for accumulating drums and HIC for shipment.

During the start-up of the Unit 1, it was decided to provide a temporary Onsite Radioactive Waste Storage Facility (OSRWSF) for low and medium level wastes. It was licensed as extension of the area for storage of the radioactive waste treatment building. This facility was built in 1991, with capacity of storage for 5 years of operation for both units at the original design rate of waste production. Based on the Politics for Reduction of Waste at LVNPS, improvements were carried out to the waste production process that have resulted in a decreased rate of waste generation, this will allow a storage capacity up to 2005.

The reactor waste, such as spent control rod blades, failed fuel rods, etc. are stored in the fuel pool (See section 19.9.4 of this National Report).

19.10.4 Spent Fuel Storage

The spent fuel storage pool (one per LVNPS unit) was originally designed (in 1972) for a capacity of just 580 fuel assemblies, for an 18-month of operation. Towards the end of 1989, analyses were performed for the definite arrangement of fuel racks in the storage pool, based on the use of steel racks having special receptacles to retain Boron. LVNPS presented an analysis to the Regulatory Body, and after the evaluation of the heat removal capacity from the pool cooling systems as well as the sub-criticality factor, the authorization was granted to increase the capacity of each storage pool to up to 7.16 cores (3177 fuel assemblies), from which 6.16 cores (2733 assemblies) are designated for routine storage and a complete core for emergency situations. This represents a storage capacity for the total estimated operational lifetime of LVNPS.

19.10.5 Radioactive Waste Production-Reduction Program

The information related to the Radioactive Waste Production-Reduction Program at LVNPS has not changed so the information described in the First National Report is still valid (See Annex I in its section 19.9.5).

19.11 AGING MANAGEMENT AND PLANT LIFE EXTENSION

In conformance with the Laguna Verde NPP Operating License, there is in an environmental qualification program, which its main objective is to assure and maintain during the design life of the LVNPS 1 & 2 the qualification of the equipment important to safety. This program is oriented mainly to control the aging and accident environmental effects for the electrical, mechanical and instrumentation and control components. This control is important to assure the performance of the above mentioned components during after normal conditions and accidents, as well to avoid the occurrences of common cause failures.

Different programs control the aging of mechanical components: In Service Inspection, Operability of Pumps and Valves, Augmented In Service inspection to

specific mechanical components (pipes, snubbers, etc.). Specifically as a preventive measure for the reactor internals and coolant pressure boundary care, there is an augmented inspection program for reactor internals and a hydrogen and noble metal injection systems have been scheduled to be implemented during the 9th refueling outage for Unit 1 and for the 6th refueling outage for Unit 2. These provisions among others, as well as the replacement of obsolete technologies, will able CFE to applied for a life extension license

19.12 LVNPS-1 & 2 PERFORMANCE INDICATORS (PI´s)

Among these performance indicators, in particular those related to safety and reliability that are the same as the ones defined and used by the world's nuclear community (WANO) are considered as a mean for collecting and exchanging operational experience. LVNPS-1 & 2 applies such operational experience as a mean of performance comparison with other similar plants and to emulate the best international practices.

PERFORMANCE INDICATORS OF LVNPS-1 & 2 (2000)

INDICATOR (PI)	UNIT OF MEASUREMENT	LVNPS-1	LVNPS-2	WANO GOAL FOR THE YEAR 2000
NUCLEAR SAFETY				
RHR System Unavailability	%	0.0033	0.0117	0.020
Diesel Generator Unavailability	%	0.00119	0.0000158	0.025
High-pressure Injection System Unavailability	%	0.00143	0.00093	0.025
Automatic SCRAM's X 7,000 Critical Hours	Number	1.86	2.27	1
Chemical Factor	Number	1.23	1.36	1
Collective Exposure to Radiation	Rem-Man	133.76	431.73	215

INDICATOR (PI)	UNIT OF MEASUREMENT	LVNPS-1	LVNPS-2	WANO GOAL FOR THE YEAR 2000
RELIABILITY				
Unplanned Lost Capacity	%	4.07	23.21	3.00

19.13 EVALUATION OF THE LEVEL OF COMPLIANCE WITH THE OBLIGATIONS IMPOSED BY THE CONVENTION

The information contained in this Article and in preceding Articles of this National Report demonstrates that within the Mexican United States, the implementation and surveillance of the National Law and Nuclear Regulations adopted entirely satisfy the obligations postulated in Article 19 of the Convention on Nuclear Safety.

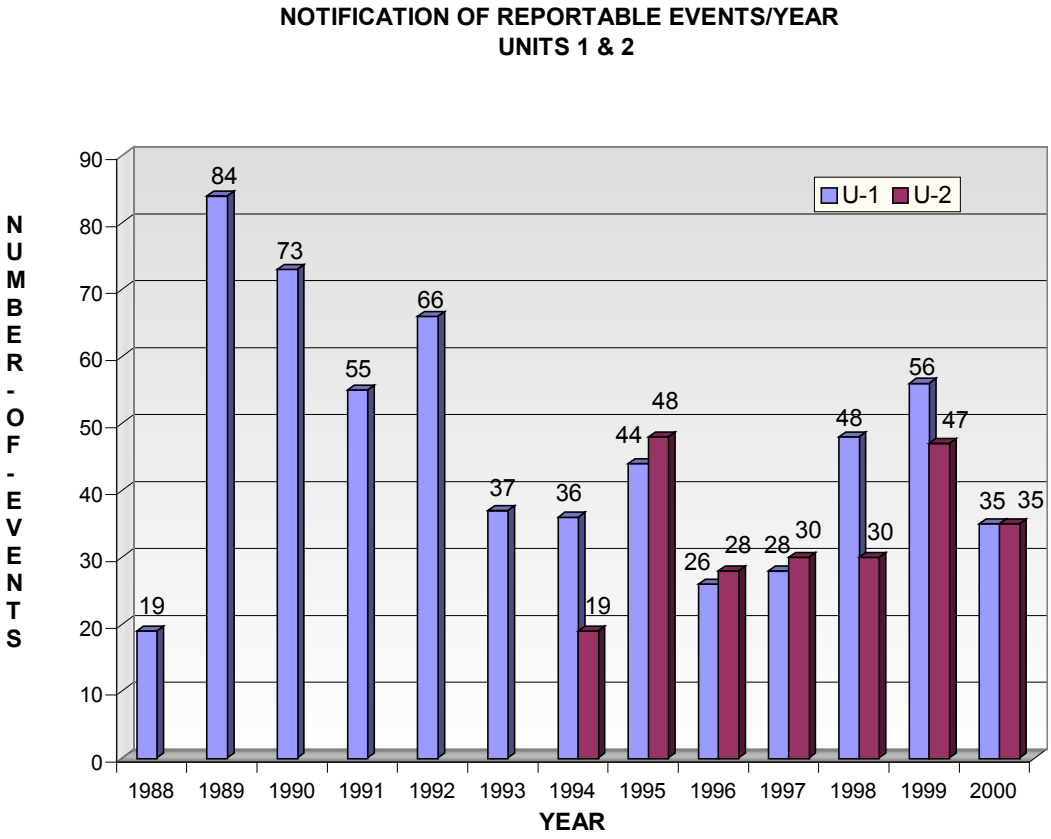


FIGURE 19.1

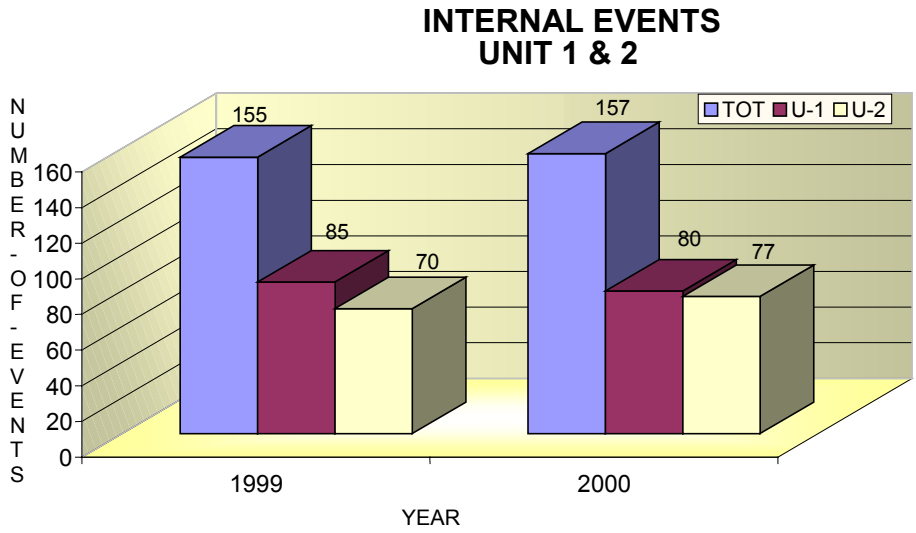


FIGURE 19.2

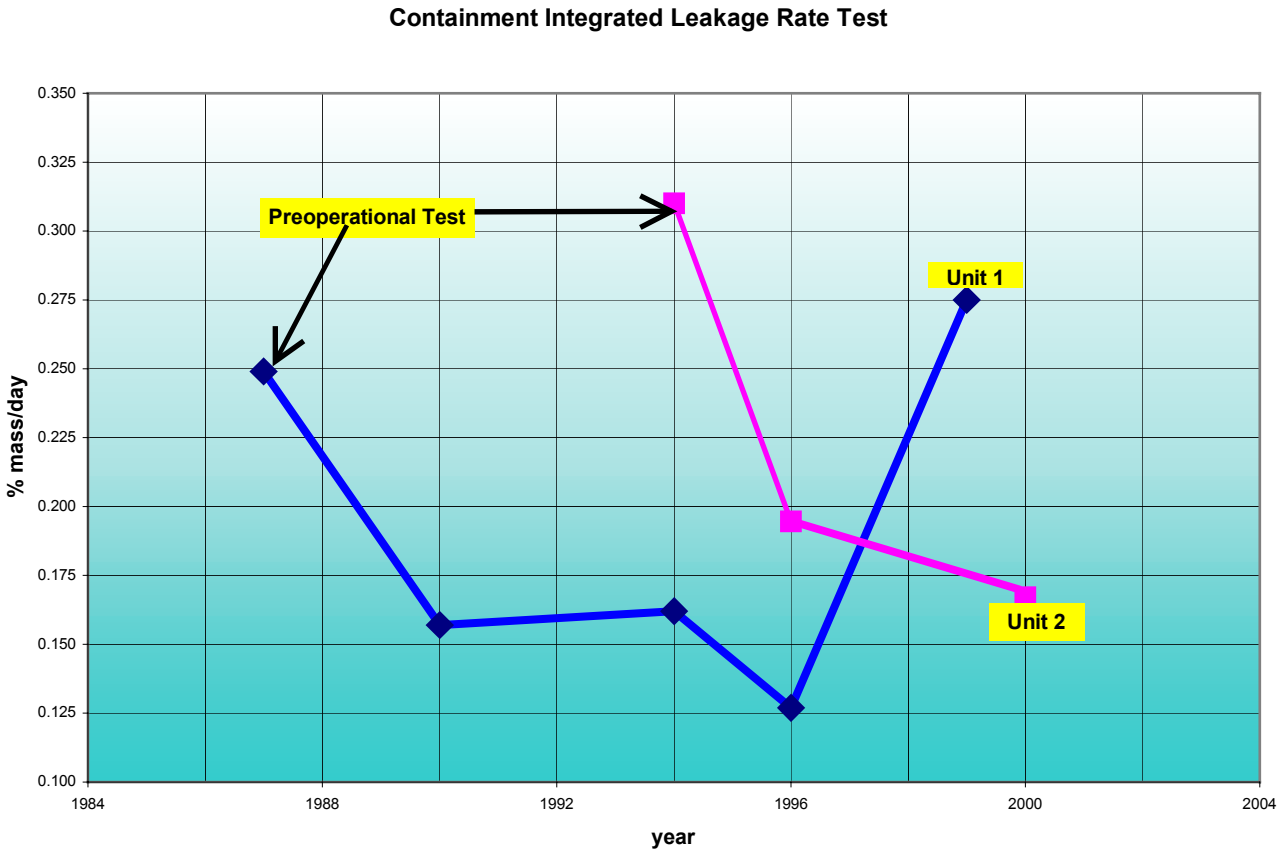

Containment Integrated Leakage Rate Test
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
% mass/day
Preoperational Test
Unit 1
Unit 2
1984
1988
1992
1996
2000
2004
year

FIGURE 19.3

ANNEX I

"MEXICAN UNITED STATES NATIONAL REPORT PRESENTED TO FULFIL THE REQUIREMENTS OF THE CONVENTION ON NUCLEAR SAFETY"

Presented during the IAEA First Meeting for Reviewing the National Reports in April 1999

CONTENTS

ARTICLE 9. RESPONSIBILITY OF THE LICENSEE

ARTICLE 10. PRIORITY TO SAFETY

ARTICLE 11. FINANCIAL AND HUMAN RESOURCES

ARTICLE 12. HUMAN FACTORS

ARTICLE 13. QUALITY ASSURANCE

ANNEX II

"CNSNS MANUAL OF QUALITY ASSURANCE"

(Spanish Version)

CONTENIDO

MANUAL DE GARANTÍA DE CALIDAD
Comisión Nacional de Seguridad Nuclear y Salvaguardias

Introducción

La Comisión Nacional De Seguridad Nuclear y Salvaguardias como Autoridad Reguladora Nacional en materia de seguridad nuclear, radiológica y física, así como de salvaguardias, es responsable de vigilar que la utilización de la energía nuclear se lleve a cabo sólo con fines pacíficos y sea realizada de forma tal que se reduzcan los riesgos radiológicos a los trabajadores, a la población en general y al medio ambiente a niveles socialmente aceptables; de igual manera vigila que se reduzcan los riesgos los riesgos del personal ocupacionalmente expuesto a niveles tan bajos como razonablemente puedan lograrse.

Como parte del mejoramiento de la calidad en las actividades que por ley aplican, implanta y desarrolla este organismo regulador, y con el fin de estar en congruencia con los actuales requerimientos en todos los ámbitos de la aplicación de la garantía de calidad, esta comisión establece acciones que garanticen la mejora en las actividades y servicios prestados.

Para cumplir con su responsabilidad, la comisión implanta un Sistema de Garantía de Calidad (SGC) que se aplica a sus actividades de acuerdo con los lineamientos y políticas que se describen a continuación.

El SGC de la Comisión es implantado y ejecutado para proporcionar la seguridad de que toda actividad, sustantiva o de apoyo, sujeta al mismo, satisface los requisitos y objetivos establecidos, dentro de los márgenes e intervalos de aceptación y cumple con los propósitos para los cuales fue creada la Comisión.

En este documento se definen los objetivos y alcances de las acciones del SGC de la Comisión y se dan las bases para la ejecución de los servicios sujetos al mismo. Además, se describen los criterios usados para la aplicación y evaluación del SGC.

POLITICA DE CALIDAD

La Comisión Nacional de Seguridad Nuclear y Salvaguardias regula tareas que pueden tener impacto en la salud y los bienes de los habitantes de nuestro país, así como en el medio ambiente, por lo que se considera necesaria la existencia de mecanismos que aseguren que las actividades que realice el personal de la Comisión en materia de seguridad radiológica, nuclear, física y de salvaguardias, se ejecuten con calidad.

En apoyo a este hecho, el presente Manual de Calidad se ha concebido como una herramienta que brinda los medios para asegurar que las actividades que realiza la Comisión sean correctamente planeadas, ejecutadas y evaluadas, de acuerdo con su MISIÓN, que consiste en:

“Asegurar que las actividades en donde se involucren materiales nucleares, radiactivos y fuentes de radiación ionizante, se lleven a cabo exclusivamente con fines pacíficos y con la máxima seguridad para el público y el medio ambiente considerando los desarrollos tecnológicos actuales.”

El Sistema consta de un conjunto de documentos como el Manual de Garantía de Calidad, el Manual de Organización, los procedimientos de trabajo, los registros de calidad, los programas de capacitación y, adicionalmente de manera preponderante, de las habilidades y calificaciones del personal.

A fin de lograr que las metas de calidad se cumplan, resulta indispensable y, por tanto, obligatorio para el personal de la Comisión, desde la Dirección General hasta los consultores técnicos, el apego a los principios del Sistema de Calidad Total y consecuentemente a las acciones que de sus principios emanen. El Sistema de Calidad es un programa interdisciplinario que a todos nos pertenece, por lo que la responsabilidad de su implantación y seguimiento es compartida.

Reconociendo que la calidad se genera esencialmente por las personas que realizan las actividades, éstas tienen el derecho de sugerir mejoras, por lo que se propone la integración de círculos de calidad específicos, de acuerdo a las actividades realizadas por cada uno de los grupos de trabajo definidos.

La Dirección General impulsa los principios que integran al trabajo diario los requerimientos de calidad y proporciona a los trabajadores de la Comisión, a través de los funcionarios respectivos, la información y el apoyo necesarios para que puedan llevar a cabo sus actividades de acuerdo con los lineamientos del Sistema de Garantía de Calidad.

Finalmente, la Comisión asume el compromiso de superar permanentemente la calidad en todos y cada uno de los servicios que proporciona a fin de cumplir con excelencia las funciones que tiene asignadas.

DEFINICIONES

AUDITORIA

Análisis sistemático e independiente para determinar si las actividades de calidad y sus resultados cumplen las disposiciones establecidas.

CALIDAD

Conjunto de características de una actividad que le confieren la aptitud para satisfacer necesidades explícitas e implícitas.

CAPACITACIÓN BÁSICA

Conjunto de conocimientos fundamentales que requiere el personal, para la comprensión del alcance de la Misión de la CNSNS.

CAPACITACIÓN ESPECÍFICA

Conjunto de conocimientos requeridos para que el personal realice las funciones definidas de un puesto determinado.

CLIENTE

El receptor de un Producto o Servicio. Puede ser interno de, o externo a, la Comisión, y como ejemplo tenemos a cualquier persona física o moral, institución pública o privada, gerencias, departamento o área de la CNSNS.

COMISIÓN

Comisión Nacional de Seguridad Nuclear y Salvaguardias.

DESVIACIÓN

Incumplimiento de un requisito especificado

GARANTIA DE CALIDAD

Conjunto de actividades planeadas y sistemáticas implantadas dentro del sistema de calidad y demostradas según se requiera para proporcionar confianza adecuada de que un servicio cumplirá los requisitos para la calidad.

LA LEY

Ley Reglamentaria del Articulo 27 Constitucional en Materia Nuclear.

MANUAL DE GARANTÍA DE CALIDAD

Documento que establece la política de calidad y describe el sistema de calidad de una organización.

PLAN DE GARANTÍA DE CALIDAD

Documento que establece las prácticas relevantes específicas de calidad, los recursos y secuencia de actividades pertenecientes a un servicio, proyecto o actividad particular.

POLÍTICA DE CALIDAD

Directrices y objetivos generales de una organización, concernientes a la calidad, los cuales son formalmente expresados por la alta dirección.

PROCEDIMIENTO

Documento que especifica la manera de desarrollar una actividad.

PROVEEDOR

Individuo u organización que suministra un producto o servicio. Puede ser interno de, o externo a, la CNSNS.

REGISTRO

Documento que provee evidencia objetiva de la extensión del cumplimiento a los requisitos para la calidad.

SERVICIO

El resultado generado por actividades internas del proveedor para satisfacer las necesidades del cliente.

SISTEMA DE GARANTÍA DE CALIDAD

Es la estructura organizacional, los procedimientos, los procesos y los recursos necesarios para implantar la administración de la calidad.

UNIDAD SUSTANTIVA

La Dirección General, las Gerencias y la Unidad de Finanzas y Administración.

SIGLAS

CC Comité de Calidad

CNSNS Comisión Nacional de Seguridad Nuclear y Salvaguardias

DG Dirección General

GSN Gerencia de Seguridad Nuclear

GSR Gerencia de Seguridad Radiológica

GTRyS Gerencia de Tecnología, Reglamentación y Servicios

MGC Manual de Garantía de Calidad

PGC Plan de Garantía de Calidad

SGC Sistema de Garantía de Calidad

UFA Unidad de Finanzas y Administración

US Unidad Sustantiva

SISTEMA DE GARANTÍA DE CALIDAD

1. ORGANIZACIÓN

1.1 Objetivo

Asegurar que las responsabilidades y las líneas de autoridad dentro de la Comisión estén claramente definidas y asignadas.

1.2 Estructura Organizacional

La Comisión cuenta con un manual de Organización que describe la estructura organizacional establecida, incluyendo las responsabilidades funcionales, los niveles de autoridad y las líneas de comunicación e interfaces para el personal.

Las US, de acuerdo con el Manual de Organización, han definido explícitamente cuáles son las actividades a las que se aplica el MGC y que en este documento son denominadas servicios. Esta definición es aprobada en forma colegiada por el Director General, el Gerente de Tecnología, Reglamentación y Servicios, al Gerente de Seguridad Nuclear, al Gerente de Seguridad Radiológica, el Jefe de la Unidad de finanzas y Administración, y el Comité de Calidad.

El anexo no. 1 muestra la estructura de la organización funcional básica de la Comisión.

1.3 Responsabilidad de la Dirección

La DG da a conocer la Política de Calidad para que sea entendida, implantada y mantenida por el personal de la Comisión.

La DG planifica, dirige y proporciona los recursos y el apoyo necesarios para que se cumplan los objetivos de calidad descritos en este MGC.

La DG supervisa y coordina las actividades de los Gerentes de Seguridad Nuclear, de Seguridad Radiológica y de Tecnología, reglamentación y Servicios, y del Jefe de la Unidad de Finanzas y Administración, a fin de que sus servicios cumplan con lo establecido en el presente MGC.

1.4 Responsabilidad del Personal de la CNSNS

La calidad de los servicios es responsabilidad de todas y cada una de las personas que intervienen en la ejecución de los mismos.

La verificación del cumplimiento con los requisitos establecidos en este MGC, se realiza a través de auditorias ejecutadas por personas que no tengan responsabilidad o participación directa en la ejecución de los servicios verificados.

1.5 Comité de Calidad

1.5.1 Independencia

El CC dispone de la autoridad jerárquica y libertad organizacional conferida por la DG para identificar y recomendar soluciones a problemas que afectan la calidad.

1.5.2 Responsabilidad

El CC coordina y coadyuva al desarrollo e implantación del SGC.

EL CC verifica que se pongan en práctica los requisitos establecidos en el MGC.

El CC notifica a la DG y a la US especifica, los resultados de las auditorias. Además, evalúa las acciones correctivas propuestas por la US:

1.5.3 Estructura

El CC está formado por un coordinador y un representante de cada US. El Coordinador preside al CC y es designado por la DG.

Los puestos del CC son honoríficos y las designaciones de sus integrantes se deciden por los responsables de las US, teniendo una vigencia de dos años.

1.6 Revisión del Manual de Calidad

El MGC se debe revisar, al menos bianualmente para su actualización y mejoramiento. La revisión se realiza por los miembros del CC considerando fuentes de información, tales como, los resultados de las auditorías, comentarios del personal, nuevas normativas, etc. El CC notifica a las US los cambios efectuados al MGC.

2. PERSONAL Y RECURSOS MATERIALES

2.1 Objetivo

Establecer los lineamientos necesarios para asegurar la disponibilidad de los recursos materiales y promover el desarrollo de los recursos humanos para que los servicios proporcionados satisfagan los objetivos de este MGC.

2.2 Personal

El personal que proporciona servicios debe poseer los conocimientos y la experiencia profesional exigida por los mismos.

2.3 Motivación

Para el desarrollo de la motivación, la comunicación y el desempeño de las personas que realizan los servicios, la DG promueve:

(1) un ambiente laboral tal que favorece la excelencia y óptimas relaciones de trabajo,
(2) que se impulse el potencial de cada miembro de la organización mediante métodos de trabajo consistentes y creativos,
(3) que los objetivos y tareas a realizar sean entendidos,
(4) que el personal participe y contribuya en la calidad, y
(5) estímulos para el personal de la Comisión que proponga y realice mejoras sustantivas a la calidad.

2.4 Capacitación

El personal es capacitado de manera continua, y/o calificado, para realizar el servicio asignado con calidad.

El personal que interacciona con el cliente, debe tener el conocimiento y las habilidades tal que permitan ofrecerle un servicio oportuno y con calidad.

La DG proporciona los recursos para mantener un alto nivel técnico y organizativo, para el desarrollo de los planes de capacitación del personal.

Los responsables de cada una de las US, identifican las necesidades relativas a la capacitación y/o calificación de su personal y establecen un programa para satisfacer estas necesidades.

2.4.1 Programa de Capacitación

El programa contempla dos etapas: La capacitación Básica y la Capacitación Específica.

La GTRyS elabora, organiza y coordina el Programa de Capacitación Básica, conjuntamente con las US.

Los responsables de las US elaboran el Programa de Capacitación Específica para su personal y le dan seguimiento para su cumplimiento.

Las US organizan seminarios o cursos para informar y dar a conocer al personal los avances e innovaciones tecnológicas de interés.

2.5 Comunicación

Los responsables de cada una de las US promueven y fortalecen la comunicación en todos los niveles de la Comisión.

Por otro lado, la UFA difunde los derechos y obligaciones institucionales del personal de la Comisión.

2.6 Recursos Materiales

Los responsables de las US solicitan a la UFA, y ésta proporciona, los recursos materiales que permitan desarrollar con la efectividad requerida todos los servicios que su US proporciona, considerando sus necesidades operativas.

Los recursos materiales requeridos para ejecutar los servicios pueden incluir:

(1) equipo e instalaciones para proveer el servicio;
(2) mantenimiento de equipo e instalaciones;
(3) calibración de equipo;
(4) necesidades operativas diversas, como son, compras, almacén y transporte;
(5) instrumentación y software de cómputo.

3. PLAN DE GARANTIA DE CALIDAD

3.1 Objetivo

Establecer un Plan de Garantía de Calidad efectivo, sobre la base de las normas de la serie NMX-CC, que permita cumplir con la política y los objetivos de calidad de la Comisión.

3.2 Ciclo de la Calidad del Servicio

Con el fin de que los procesos se manejen de una manera sistemática, se establece el modelo de referencia conocido como ciclo de calidad. El modelo es una adaptación de la norma NMX-CC-006/2: 1995 IMNC "Administración de la Calidad y Elementos del Sistema de Calidad. Parte 2: Directrices para Servicios".

El modelo de ciclo de la calidad considera las etapas que se presentan en la secuencia siguiente:

1. Análisis de los Servicios

La necesidad de un servicio se conoce a través de las relaciones entre cliente y proveedor, tanto a nivel nacional como internacional, estableciendo la intercomunicación sobre mejoras tecnológicas, desarrollo e investigación de avanzada y modificaciones en las regulaciones para analizar las necesidades cambiantes del cliente.

2. Definición, Planeación y Control del Servicio

La definición e inicio de servicios es aprobado por los responsables de las US, se establecen indicadores de desempeño y se controla su cumplimiento. Se cuenta con un sistema de control, integrado en el trabajo regular, cuyo objetivo es asegurar que los trabajos de la Comisión son consistentes con las leyes y reglamentos, procedimientos, prácticas seguras y planeación basada en la verificación. En el Anexo II se describen los aspectos que deben considerarse en la definición y ejecución del servicio.

3. Prestación del Servicio

En la prestación del servicio se considera: la organización y conformación del mismo de acuerdo con la regulación, procedimientos y planeación; así como la verificación de la documentación del cliente y la utilización de tecnología adecuada para garantizar la calidad en el servicio.

4. Evaluación y mejora continua

La evaluación y mejora continua se realizan a través de evaluaciones internas y externas, en las que se revisa que el trabajo diario es consistente con la Política de Calidad, se vigila la implantación de la misma y del sistema de garantía de calidad, identificándose problemas importantes, se verifican los resultados de los sistemas de control, se realizan auditorías, se considera la evaluación de los clientes y se promueve la mejora de los procesos.

3.3 Ejecución de Actividades y Servicios

3.3.1 General

Los servicios se realizan en condiciones controladas de acuerdo con procedimientos aprobados.

Los elementos necesarios en la prestación del servicio se identifican y controlan para asegurar su uso correcto y se expiden, manipulan, almacenan y operan de acuerdo con el procedimiento aplicable.

3.3.2 Administración

La UFA elabora un informe a sus clientes de la situación presupuestal, de recursos humanos, financiera y de recursos materiales de la CNSNS.

3.3.3 Adquisición

Los elementos requeridos para proporcionar un servicio, así como los solicitados por las US, cumplen con lo establecido en los procedimientos correspondientes. Los proveedores se evalúan y seleccionan atendiendo a criterios definidos de acuerdo con los procedimientos.

En los documentos de adquisición se estipulan y especifican los requisitos necesarios para garantizar la calidad de los elementos y servicios; antes de utilizarlos, debe disponerse de pruebas que evidencien que éstos cumplen los requisitos establecidos para su adquisición.

En los documentos referentes a la adquisición se consignan los requisitos para notificar las desviaciones respecto de las especificaciones estipuladas.

3.3.4 Reglamentación y Normalización

La GTRyS coordina tanto el proceso de elaboración de reglamentos, normas y documentos relacionados con la seguridad nuclear, radiológica, física y de salvaguardias como las opiniones técnicas que soliciten los organismos internacionales sobre códigos, normas y guías relacionados con el uso pacífico de la energía nuclear.

3.3.5 Desarrollo e Investigación

El cliente define en procedimientos, el método para proponer, aprobar y designar al proveedor que administra y realiza el proyecto. Asimismo, especifica las responsabilidades de aquellos que solicitan, planean, administran, revisan y aprueban los proyectos.

3.3.6 Licenciamiento

La GSR, previa la evaluación del nivel de seguridad de las instalaciones del cliente, expide las licencias para la posesión, uso, transferencia, distribución, almacenamiento, transporte y disposición temporal o final de material radiactivo; y dictamina sobre el otorgamiento de autorizaciones de importación y exportación de fuentes de radiación ionizante, y de permisos de construcción de instalaciones radiactivas. Además, dictamina sobre la seguridad radiológica relativa a instalaciones nucleares en coordinación con la GSN. LA expedición de licencias, autorizaciones y permisos se lleva a cabo de conformidad con los procedimientos aprobados.

La Comisión cuenta con los recursos humanos, técnicos y financieros para proporcionar las bases o dictámenes técnicos para que la Secretaría de Energía otorgue, en su caso, las licencias, autorizaciones o permisos que las instalaciones nucleares demanden.

3.3.7 Salvaguardias y Seguridad Física

La GSN establece y mantiene actualizado el Sistema Nacional de Contabilidad y Control de Material Nuclear Especial dentro del territorio nacional y vigila la observancia de los acuerdos sobre salvaguardias y seguridad física de los que nuestro país es signatario. Además, evalúa los planes de seguridad física de las instalaciones nucleares del país y verifica los recursos materiales y humanos necesarios para el adecuado y puntual cumplimiento de los Planes de Seguridad Física, así como de los procedimientos correspondientes.

3.3.8 Inspección

Se preparan y ejecutan programas de inspección para las diferentes instalaciones y actividades reguladas. Las inspecciones se desarrollan y coordinan de acuerdo con procedimientos aprobados.

LA GSR ejecuta inspecciones, auditoría, verificaciones y reconocimientos para vigilar y evaluar las condiciones radiológicas de las instalaciones nucleares y radiactivas. LA GSN ejecuta inspecciones para verificar las condiciones de seguridad nuclear, física y salvaguardias de las instalaciones nucleares.

3.3.9 Coacción

La política y el proceso de coacción, así como los requisitos correspondientes se establecen conforme a la normativa, aplicándose a las medidas preventivas y/o de seguridad, y se implantan por medio de procedimientos de coacción que incluyen el método para imponer sanciones administrativas.

3.3.10 Emergencia

Las respuestas a las emergencias radiológicas y a las contingencias en instalaciones nucleares, en las que se requiera la participación de la Comisión, se coordinan por medio de procedimientos conforme a lo indicado en los Planes de Contingencias Radiológicas y Nucleares de esta Comisión.

En los procedimientos y planes se identifica al personal que constituye la organización de respuesta a la emergencia, se describen las responsabilidades del mismo en el sitio, en el centro de control de emergencias y en otros sitios de respuesta. En los procedimientos se especifica también, el alcance de la responsabilidad reguladora durante la emergencia y cómo estas actividades se coordinan. Las responsabilidades y acciones se definen y describen para los diferentes modos de respuesta.

3.3.11 Análisis Cuantitativos

La Comisión establece y mantiene una capacidad permanente y actualizada:

(1) de análisis y modelación en materia de impacto ambiental por el vertimiento rutinario de material radiactivo de instalaciones nucleares y radiactivas; de evaluación de dosis por incorporación de material radiactivo en seres humanos y evaluación determinista y probabilista de consecuencias de accidentes en instalaciones nucleares y radiactivas;

(2) para diseñar y llevar a cabo los análisis radioquímicos e instrumentales para realizar estudios radiológicos de muestras ambientales, de alimentos y de materiales de interés para la CNSNS;

(3) de análisis y registro en materia de dosimetría personal y ambiental acorde con la normativa aplicable y atribuciones de la Comisión.

3.3.12 Servicios de Apoyo

La CNSNS cuenta, entre otros, con servicios documentales, computacionales y de asuntos internacionales.

Asimismo, se cuenta con diversos comités internos que apoyan los servicios que presta la Comisión.

Además, la CNSNS planea y ejecuta los servicios relativos para la difusión de los conceptos de seguridad nuclear y radiológica entre los clientes.

3.4 Procedimientos, Registros y Control de Documentos

Cada US describe en documentos cómo se controlan, realizan y evalúan los servicios sujetos al MGC y los requisitos que deben cumplir. Asimismo se establecen los recursos materiales para su realización y las calificaciones necesarias para el personal involucrado.

3.4.11 Procedimientos

Los servicios involucrados en el MGC se llevan a cabo de conformidad con los procedimientos aprobados y vigentes.

La preparación, revisión, modificación, cancelación y aprobación de los procedimientos se someten a medidas de control. Las personas encargadas de la revisión y aprobación tienen acceso a la información pertinente en la cual se basa dicha revisión y aprobación.

La distribución de procedimientos se realiza utilizando listas de distribución consignadas en los mismos.

La frecuencia de revisión de los procedimientos la determina cada US y no debe exceder de cinco años.

3.4.12 Registros de Calidad

Cada US define en procedimientos, el sistema de archivo de sus registros de calidad. Los registros asociados a un servicio dado son legibles, completos e identificables. Se asegura que estos documentos se archiven, actualicen, identifiquen y estén disponibles para su consulta y verificación.

3.4.13 Control de Documentos

Los documentos que se emplean en la ejecución y desarrollo de los servicios, tales como, los procedimientos, guías, manuales, memorias de cálculo, etc., se controlan desde que se emiten hasta el momento que se retiran oficialmente.

Cada US elabora, aprueba, mantiene actualizados y recuperables los documentos requeridos para el desarrollo de los servicios bajo su responsabilidad. Asimismo, debe especificar en procedimientos, el control de los documentos que emplea su personal.

3.5 Auditorías Internas de calidad

Se garantiza, a través de las auditorias internas, la verificación del cumplimiento de los requisitos del MGC.

La efectividad del MGC se verifica de manera sistemática a través del Programa de Auditorías Internas. Dicho Programa se elabora bianualmente por el Comité de Calidad.

Los servicios que influyen en la calidad se auditan al menos una vez cada dos años.

Las personan que llevan a cabo las auditorias no deben tener responsabilidad en los servicios que auditan.

Las auditorías se realizan de acuerdo con el procedimiento aprobado y vigente.

Los resultados de la realización de la auditoría se remiten en forma escrita, para su consideración, al responsable de la US correspondiente y a la DG.

Las desviaciones notificada se responden, en un plazo no mayor de un mes, para ser evaluadas por el CC.

Al cerrar la auditoría se archivan y conservan los documentos relacionados con la misma.

4 INTERRELACIONES CON LOS CLIENTES

4.1 Objetivo

Establecer los mecanismos necesarios para una interrelación efectiva entre el proveedor y el cliente.

4.2 Interacción con los clientes

La comunicación con los clientes implica el escucharlos y mantenerlos informados. La Comisión mantiene una comunicación efectiva con sus clientes para ofrecer un servicio de calidad. Lo anterior implica que:

(1) los clientes conocen la descripción del servicio, alcance, disponibilidad y la estimación del tiempo en el que su solicitud de servicio será atendida;
(2) a los clientes se les explica el efecto de cualquier problema y su solución, si alguno surge;
(3) los clientes están conscientes de la contribución que puedan hacer a la calidad del servicio;
(4) se proporcionan los medios adecuados y accesibles para establecer con los clientes una comunicación efectiva;
(5) se determina la relación entre el servicio ofrecido y las necesidades reales del cliente.

Cada US, en coordinación con la DG, proporciona información, de los temas de su incumbencia cuando un cliente lo solicite.

4.3 Responsabilidad

Cada US implanta y mantiene actualizadas las bases de datos de sus clientes que coadyuvan para lograr una comunicación efectiva con los mismos.

5 ANÁLISIS DE LOS SERVICIOS

5.1 Objetivo

Establecer el mecanismo para analizar y administrar el servicio.

5.2 Calidad en el Análisis de los Servicios

Los responsables de las US establecen el procedimiento para analizar un servicio, considerando:

(1) las responsabilidades de la Comisión establecidas en la Ley;
(2) la normativa y códigos nacionales e internacionales;
(3) el establecimiento de las necesidades y expectativas del cliente;
(4) la investigación de avanzada y nuevas tecnologías para examinar las necesidades cambiantes del cliente.

5.3 Resumen del Servicio

Cuando las US prestan un servicio documentan los análisis realizados en un resumen del servicio. Este resumen debe incluir lo establecido en el punto 5.2

5.4 Administración del Servicio

Las US, previo a la prestación de un servicio, establecen procedimientos para planear, organizar e implantar el servicio y, si aplica, su eventual retiro.

El responsable de la US se asegura que todos los recursos necesarios estén disponibles de acuerdo con la programación de cada uno de los procesos que conforman el servicio.

6 DEFINICIÓN DEL SERVICIO

6.1 Objetivo

Establecer los lineamientos para la definición, planeación y control de los procesos que se llevan a cabo para cumplir con los servicios.

6.2 Definición de un Servicio

Definir un servicio involucra describirlo en especificaciones para su planeación, prestación y control.

6.2.1 Responsabilidad de la Definición del Servicio

El responsable de la US que ejecuta un servicio coordina la aplicación del proceso descrito en este capitulo para desarrollar el servicio. El proceso de ejecución del servicio se encuentra documentado en procedimientos.

6.3 Especificación del Servicio

Documento en el que se describe la definición del servicio y se establecen los medios y métodos que se utilizan en la prestación del mismo, incluyendo:

(1) la descripción de las características del servicio y los criterios de aceptación para éstas;
(2) los recursos materiales requeridos, incluyendo el tipo y cantidad de equipo e instalaciones necesarios para cumplir con la especificación del servicio;
(3) los recursos humanos.

6.3.1 Calidad en Adquisiciones

Para la adquisición de bienes o servicios importantes para la calidad del servicio que presta la Comisión, se especifican inicialmente los requisitos que deben cumplir, tanto el proveedor como los bienes o servicios, y se verifica su cumplimiento.

6.3.2 Revisión de la Definición del Servicio

Al final de la definición de un servicio, el responsable de la US debe llevar a cabo una revisión formal documentada de los resultados de la definición contra el resumen del servicio. En esta revisión participa todo el personal involucrado en la prestación del servicio.

6.3.3 Validación de la Especificación del Servicio

El responsable de la US realiza una validación de los servicios y de sus procesos, con el fin de asegurar que están plenamente desarrollados y que cumplen las necesidades de los clientes bajo condiciones anticipadas, e incluso adversas. Esta validación se define y planea antes de la implantación del servicio.

6.3.4 Control de Cambios

La especificación del servicio es el documento básico de referencia para el mismo y no debe modificarse sin la debida causa y consideración.

Cada US, de acuerdo con el procedimiento aprobado y en el ámbito de su competencia, establece un control de cambios a la especificación del servicio tal que se asegure que:

(1) la necesidad del cambio se identifica, verifica y analiza;
(2) los cambios se documentan y aprueban, implantan y registran;
(3) el personal involucrado en los procesos afectados por el cambio participan en su determinación y aprobación.

7 PROCESO DE LA PRESTACIÓN DEL SERVICIO

7.1 Objetivo

El suministro de un servicio se hace con apego a la especificación del servicio, la cual se revisa periódicamente para asegurar su efectividad y eficacia. Las especificaciones y procedimientos relativos a un servicio, cuentan con los controles administrativos que aseguran la custodia de los originales y el uso de la revisión más reciente.

7.2 Autoevaluación

Las jefaturas de todos los niveles de la organización evalúan el funcionamiento del SGC, analizando la efectividad al establecer, promover y lograr los objetivos de calidad de los servicios por ellos proporcionados e identifican las debilidades del SGC y de su propia actuación.

7.3 Acciones Correctivas

7.3.1 Generalidades

El CC detecta incumplimientos de los requisitos del MGC y los documenta como desviaciones. Asimismo evalúa el impacto de la desviación e informa al nivel apropiado de la línea de mando para el análisis de la causa, la corrección de la desviación y la implantación de medidas que prevengan su recurrencia.

7.3.2 Control y Registro de las Desviaciones y Acciones Correctivas

El CC establece un registro y notifica las desviaciones a los responsables de las US y a la DG, con el fin de que tomen las medidas necesarias para el control de las desviaciones detectadas garantizando la implantación de las acciones correctivas que permitan la solución de las mismas.

El responsable de la US involucrado lleva el control de la desviación desde que recibe la notificación hasta que se da solución a la misma.

El CC elabora periódicamente un informe del control estadístico de las desviaciones, el cual se toma en cuenta para el mejoramiento de las tareas y el sistema de estímulos por la calidad.

7.3.3 Establecimiento de las Acciones Correctivas

Las fuentes más importantes para asistir a la toma de decisiones que conciernen a las acciones correctivas para eliminar las causas de las desviaciones son:

(1) control del desarrollo de los servicios;
(2) revisiones del MGC;
(3) auditorías de calidad;
(4) notificación de desviaciones;
(5) quejas y reclamaciones del cliente;
(6) iniciativas propias del personal.

La implantación de acciones correctivas para la solución de las desviaciones corresponde al responsable de la US donde se presente la desviación, con base en un análisis que abarque desde la identificación precisa de la desviación hasta la evaluación de su trascendencia y determinación de su causa, con el objeto de reunir los elementos necesarios para la toma de acciones preventivas que impidan la recurrencia de las desviaciones. La investigación de la causa de la desviación toma en cuenta, al menos, los siguientes factores:

(1) especificaciones y procedimientos;
(2) registros de calidad;
(3) proceso con el que se desarrolla el servicio.

El CC debe verificar la correcta implantación de las acciones correctivas e informar su resultado a la DG y a la US correspondiente.

8 ANÁLISIS Y MEJORAMIENTO EN EL DESEMPEÑO DEL SERVICIO

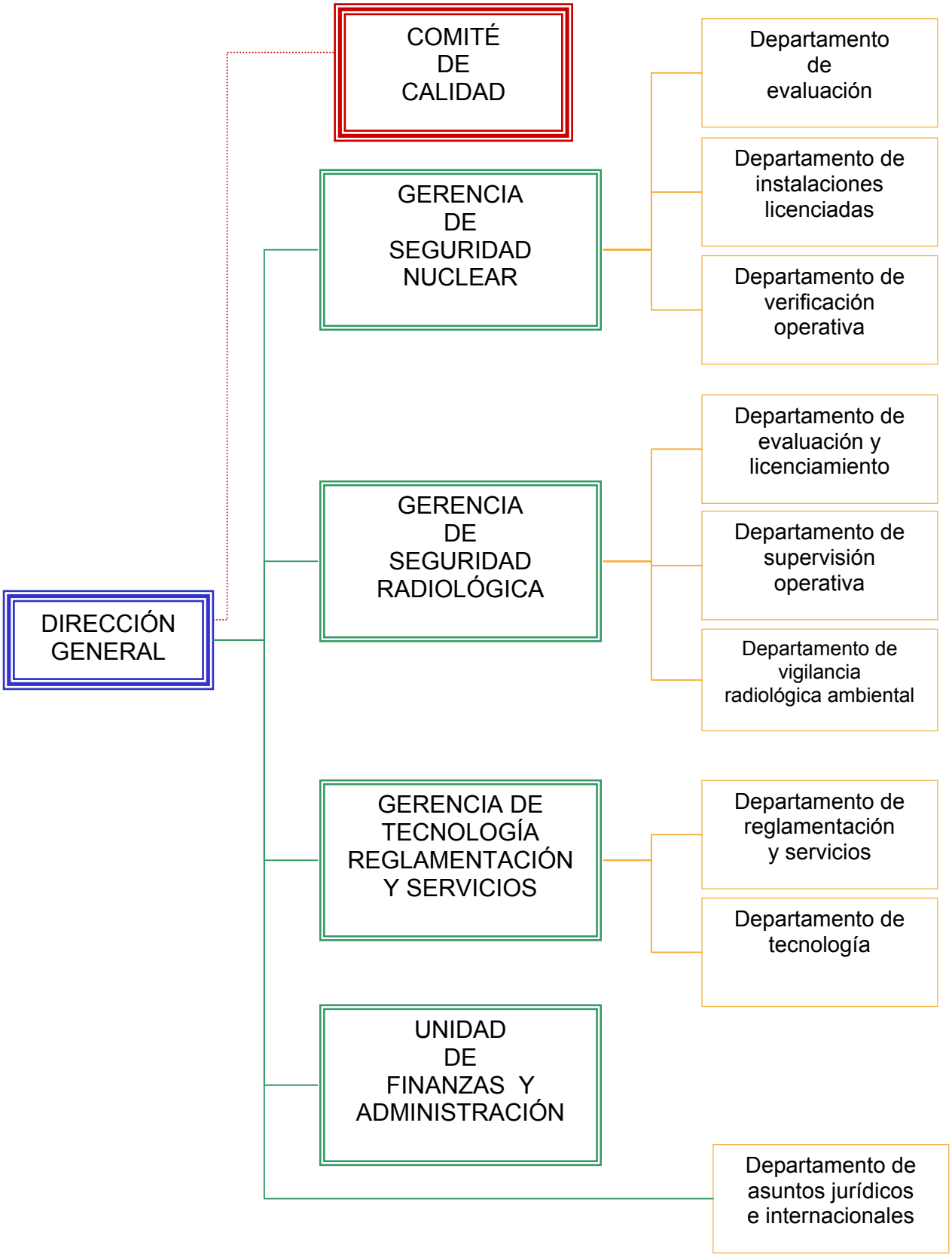
8.1 Objetivo

Promover la evaluación sistemática de los servicios para identificar y buscar las oportunidades para la mejora de la calidad del servicio.

8.2 Mejoramiento de la Calidad del Servicio

A petición de la DG, el CC realiza evaluaciones internas o coordina evaluaciones externas, para medir la efectividad de la implantación del SGC. Las evaluaciones se apoyan en los resultados de auditorias, revisiones y verificaciones, entre otros.

ANEXO I. ORGANIGRAMA DE LA CNSNS



ANEXO II. CONSIDERACIONES GENERALES PARA LA DEFINICIÓN Y EJECUCIÓN DE UN SERVICIO

Los servicios se definen, planean y controlan para asegurar que los objetivos de la Comisión se cumplen de manera sistemática y oportuna. Esto requiere establecer prioridades y líneas de comunicación apropiadas.

El servicio a realizarse se define en descripciones preliminares de actividades en las que se establecen su objetivo y alcance.

Se definen, planean y controlan las actividades que impactan la calidad del servicio y se identifica la US responsable de las mismas.

Los planes del proyecto detallados y los compromisos de presupuesto se revisan y aprueban por el responsable de la US.

Los responsables de las US aseguran que el personal designado para proporcionar el servicio ha recibido el entrenamiento necesario, los recursos y las directrices.

El servicio se realiza de acuerdo con procedimientos aprobados.

El progreso del servicio se supervisa y compara con el plan original. El responsable de la actividad notifica y utiliza los resultados para mejorar la ejecución del servicio.