RBMK-SC-051
LIMITED DISTRIBUTION

WORKING MATERIAL

IAEA/USDOE SENIOR MANAGEMENT WORKSHOP ON PROMOTION OF SAFETY CULTURE FOR THE NPPS WITH RBMK REACTORS

Ignalina NPP, Lithuania, 6 to 9 May, 1997

Reproduced by the IAEA
Vienna, Austria, 1997

FOREWORD

The IAEA initiated in 1990 a programme to assist the countries of central and eastern Europe and the former Soviet Union in evaluating the safety of their first generation WWER-440/230 nuclear power plants. The main objectives of the Programme were: to identify major design and operational safety issues; to establish international consensus on priorities for safety improvements; and to provide assistance in the review of the completeness and adequacy of safety improvement programmes.

The scope of the Programme was extended in 1992 to include RBMK, WWER-440/213 and WWER-1000 plants in operation and under construction. The Programme is complemented by national and regional technical co-operation projects.

The Programme is pursued by means of plant specific safety review missions to assess the adequacy of design and operational practices; Assessment of Safety Significant Events Team (ASSET) reviews of operational performance; reviews of plant design, including seismic safety studies; and topical meetings on generic safety issues. Other components are: follow-up safety missions to nuclear plants to check the status of implementation of IAEA recommendations; assessments of safety improvements implemented or proposed; peer reviews of safety studies, and training workshops. The IAEA is also maintaining a database on the technical safety issues identified for each plant and the status of implementation of safety improvements. An additional important element is the provision of assistance by the IAEA to strengthen regulatory authorities.

The Programme implementation depends on voluntary extrabudgetary contributions from IAEA Member States and on financial support from the IAEA Regular Budget and the Technical Co-operation Fund.

For the extrabudgetary part, a Steering Committee provides co-ordination and guidance to the IAEA on technical matters and serves as forum for exchange of information with the European Commission and with other international and financial organizations. The general scope and results of the Programme are reviewed at relevant Technical Co-operation and Advisory Group meetings.

The Programme, which takes into account the results of other relevant national, bilateral and multilateral activities, provides a forum to establish international consensus on the technical basis for upgrading the safety of WWER and RBMK nuclear power plants.

The IAEA further provides technical advice in the co-ordination structure established by the Group of 24 OECD countries through the European Commission to provide technical assistance on nuclear safety matters to the countries of central and eastern Europe and the former Soviet Union.

Results, recommendations and conclusions resulting from the IAEA Programme are intended only to assist national decision makers who have the sole responsibilities for the regulation and safe operation of their nuclear power plants. Moreover, they do not replace a comprehensive safety assessment which needs to be performed in the frame of the national licensing process.

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SUMMARY

The term of Safety Culture was first utilized by the IAEA's International Nuclear Safety Advisory Group (INSAG) in its 1986 report INSAG-1, "Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident", which declared that "There is a need for a 'Nuclear Safety Culture' in all operating nuclear power plants".

The concept was further expended in the 1988 INSAG-3 report, "Basic Safety Principles for Nuclear Power Plants" and was identified as one of the three fundamental management principles. The report stated further that "an established safety culture governs the actions and interactions of all individuals and organizations engaged in activities related to nuclear power".

Since then the term Safety Culture has been used increasingly in the literature in connection with NPP safety. However, the meaning of the term was left open to interpretation and guidance was lacking on how safety culture could be assessed. Moreover, this led also to some negative findings, as "lack of safety culture", which often gave pessimistic influence on international nuclear community.

In response to the international needs, the INSAG-4 report, "SAFETY CULTURE", came into being in 1991, which so defines the concept of safety culture as it relates to organizations and individuals engaged in nuclear power activities that a basis for assessing the effectiveness of safety culture in specific instances is provided.

In order to provide further assistance to the Member States, the ongoing important activities on safety culture at the IAEA are to prepare documents on assisting in developing safety culture and to organize workshops on promoting the enhancement of safety culture.

Under the Agency's special extra-budgetary programme to assist the countries of central and eastern Europe and the former Soviet Union in evaluating the safety of WWER and RBMK plants in operation and under construction, safety culture was one of the operational safety issues amongst 58 generic safety issues identified for RBMK NPPs in 1995. To assist these Member States in improving safety culture there have been significant effort from international community in the past few years. One of the important activities devoted to the RBMK was the IAEA/SiP Senior Manager Workshop on International Promotion of Safety Culture for the NPPs with RBMK reactors at the Forsmark NPP, Sweden from 1 to 4 October 1996.

The current workshop, co-sponsored by the IAEA and USDOE, was a continuation of the previous effort for further promotion of safety culture at RBMK NPPs.

The objective of the workshop was to provide a forum for senior managers from governmental organizations and operating organizations to further exchange experience in understanding the factors influencing safety culture, in assessing safety culture at their own organizations and developing safety culture at RBMK NPPs. The workshop consisted of a broad scope of presentations to review the basic concepts and major elements of safety culture

(ownership, accountability, pride, job satisfaction, trust, openness, etc.), to identify and discuss the various approaches used in different countries in attaining a strong safety culture, and to explain, through the use of practical examples, what the benefits of a strong safety culture are; how to improve the behaviour of people, how to gain trust and openness, how to overcome difficulties in changing staff's attitudes, and how to manager safety culture.

The participation of high ranking officials including Messrs. R. Kazlauskas, member of the Committee of Economic of Lithuanian Parliament, S. Kutas, the Director General of the Lithuanian Nuclear Power Safety Inspectorate (VATESI), and H. Bieliauskas, Division Director of the Ministry of Economy as well as the General Manager of the INPP, Mr. V. Schevaldin indicated the willingness of the Lithuanian government, regulatory authority and operating organization to enhance safety culture and their understanding of its importance to the safe operation of INPP. Participants of other RBMK owner's countries were from operating organizations and one regulator.

Practical experience in human performance enhancement, operational safety, experience feedback and in maintaining safety culture was presented by the invited experts and acknowledged to be very informative. Measures taken by the RBMK owners for improving safety culture were shared among the participants. Good practices, which were identified in the INPP Safety Analysis Report (SAR) indicating a good safety culture, were highlighted at the workshop.

During the discussions and work sessions, it was acknowledged that developing and maintaining safety culture need strong national commitment. The involvement of high ranking government officials and senior management of all related organizations is a good start point. However, this should not stay at the level of policy statement. The realization of the policy statement and the permeation of the plant Vision into the day-to-day life of all staff members to shape their attitudes and guide their behaviour remain a lot to be done.

Workshop for Senior Managers
"ENHANCEMENT OF SAFETY CULTURE IN THE OPERATION OF NPPs"
6 - 9 May 1997; Visaginas, Lithuania

Jointly Sponsored by:
International Atomic Energy Agency (IAEA) and US Department of Energy (US-DOE)
In Cooperation with:
Swedish International Project on Nuclear Safety (SIP) and
Lithuanian Ministry of Economy (LME), Lithuanian Nuclear Safety Authority (VATESI), Ignalina NPP (INPP)
Lithuanian Energy Institute (LEI), Kaunas Technological University (KTU)

Date Time	Tuesday 6 May '97	Wednesday 7 May '97	Thursday 8 May '97	Friday 9 May '97
9:00- 9:30	**Opening Ceremony:** *Viktor Shevaldin* (INPP) *Rimantas Kazlauskas* (LME) *Saulius Kutas* (VATESI) *Wanli Zhong* (IAEA) *Erik Jende* (SIP) *Jan B. van Erp* (ANL)	P.9 Review Techniques and Criteria of the Operator's Internal Safety Review Team; Feedback to the Operating Staff *Douglas L. Davis* (TU)	V.1 Demonstration Safety Inspection Walkthrough of INPP	P.20 Human Performance Enhancement Programs in NPP Operation *Douglas L. Davis* (TU)
9:30- 10:00	Objectives & Overview of the Workshop *Jan B. van Erp* (ANL) *Wanli Zhong* (IAEA)	P.10 Review of the Conclusions of the '96 IAEA Workshop on Safety Culture, Sweden *Thomas Eckered* (SIP)	V.2 Demonstration Safety Inspection Walkthrough of INPP	P.21 Feedback of Safety-Related Operational Experience; Lessons Learned *David Elias* (ComEd)
Break				
10:15- 10:45	P.1 Nuclear Power Management in Lithuania and Implications for Safety Culture *Vytautas Bieliauskas* (LME)	P.11 Recent Developments in Safety Culture in Russia *Alexandre Panov* (REA)	V.3 Demonstration Safety Inspection Walkthrough of INPP	P.22 Experience Gained in Enhancing Operational Safety at D.C. Cook NPP *Joel S. Wiebe* (AEP)
10:45 - 11:15	P.2 Basic Safety Principles in the Operation of NPPs: Lessons Learned *Jan B. van Erp* (ANL)	P.12 Recent Developments in Safety Culture at LNPP *Alexey Dolganov* (LNPP)	V.4 Demonstration Safety Inspection Walkthrough of INPP	P.23 Experience Gained in Enhancing Operational Safety at ComEd NPPs *David Elias* (ComEd)
Break				
11:30- 12:00	P.3 Principal Characteristics of a Good Safety Culture *Wanli Zhong* (IAEA)	P.13 Safety Culture Issues Raised in the SAR of the INPP *Alexandre Dvoretsky* (INPP)	V.5 Demonstration Safety Inspection Walkthrough of INPP	P.24 Recent Developments in Safety Culture in Ukraine *TBD*
12:00 - 12:30	P.4 Operator / Regulator Interface: Organizat'l Structure and Responsibilities *Joel S. Wiebe* (AEP)	P.14 Approaches to Safety Culture Evaluation: ASCOT Methodology *Wanli Zhong* (IAEA)	Return to LOK Conference Center	W.5 Discussion of Means to Enhance Safety Culture at Operating NPPs
Lunch				
1:30- 2:00	P.5 The Role of Self-Assess-ment Programs in NPP Operational Safety *David Elias* (ComEd)	P.15 Safety Culture Enhancement through Self Assessment *Joel S. Wiebe* (AEP)	P.17 The SAR: Importance as the Main Licensing Document *David Elias* (ComEd)	W.6 Discussion of Means to Enhance Safety Culture at Operating NPPs
2:00 - 2:30	P.6 Swedish Perspectives on Safety Culture *Erik Jende* (SIP)	L.16 Experience Gained in the Development of Safety Culture at Leibstadt NPP *David Burns* (LsNPP)	P.18 QA/QC in Operation: Organizational Structure and Experience Gained *Douglas L. Davis* (TU)	D.6 Panel Discussion
Break				
2:45 - 3:15	P.7 Recent Initiatives to Enhance Safety Culture at INPP *Gytis Maksimovas* (VATESI)	D.3 Question and Answer Session	L.19 Development of Safety Culture in NPP Operation *Wanli Zhong* (IAEA)	**Closing Ceremony** *Viktor Shevaldin* (INPP) *Gytis Maksimovas (VATESI)* *Wanli Zhong* (IAEA) *Jan B. van Erp* (ANL)
3:15 3:45	P.8 Recent Initiatives to Enhance Safety Culture at INPP *TBD* (INPP)	D.4 Question and Answer Session	W.2 Discussion of Means to Enhance Safety Culture at Operating NPPs *Thomas Eckered* (SIP)	Departure for Vilnius
Break				
4:00 - 4:15	D.1 Panel Discussion	D.5 Question and Answer Session	W.3 Discussion of Means to Enhance Safety Culture at Operating NPPs *Thomas Eckered* (SIP)	
4:15 - 4:45	D.2 Panel Discussion	W.1 Discussion of Means to Address Safety Culture Issues Raised at INPP Chair: *Thomas Eckered* (SIP)	W.4 Discussion of Means to Enhance Safety Culture at Operating NPPs *Thomas Eckered* (SIP)	

Legend: P = Presentation; D = Panel Discussion; W = Work Session; V = Technical Visit
AEP = American Electric Power Co.; ComEd = Commonwealth Edison Co.; TU = Texas Utilities Electric Co
REA = Rosenergoatom; LNPP = Leningrad NPP; LsNPP = Leibstadt NPP. (File: LI70401T; Rev. 97/5/7)

Note: The program on 6 May 1997 is aimed at providing a general overview of the topic of safety culture. Participation by interested parties representing the various branches of the Lithuanian Government is encouraged.

Senior Managers Workshop on Promotion of Safety Culture for the NPPS with RBMK Reactors
6 - 9 May 1997, Ignalina NPP, Lithuania

Paticipants from the Republic of Lithuania:

Committe of Economic of Lithuanian Parliament
Mr. R. Kazlauskas, Member
Mr. S. Malkevicius, Member
Mr. R. Didziokas, Member

Government of Lithuania
Mr. G. Vajciunas, Adviser for Energy
Mr. R. Ziemelis, State Consultant for Energy

Ministry of Economy, Nuclear Energy Division
Mr. V. Bieliauskas, Head
Mr. D. Jasulaitis, Chief Specialist
Ms. V. Kazlauskaite, Senior Specialist

Ministry of National Defence, Dept. of Civil Protection
Mr. A. Paulikas, Deputy Director for Strategical Planning
Mr. V. Valaskas, Head Subdivision of Planning of Radiation & Chemical Protection Measures

Ministry of Health
Mr. A. Mastauskas, Director of Radiation Protection Center
Mr. V. Andriuska, Director of Utena Public Health Center
Ms. R. Stasiunaitiene, Div. Head, Radiation Protection Center

Kauna University of Technology
Mr. J. Gylys, Head, Nuclear Education Program
Mr. A. Ziliukas, Reasearcher
Mr. R. Barauskas, Researcher
Mr. M. Daunys, Researcher
Mr. K. Petkevicius, Researcher
Mr. H. Medeksas, Researcher

VATESI
Mr. S. Kutas, Director General
Mr. G. Maksimovas, Inspector
Mr. A. Alejev, Technical Expert

Lithuanian Energy Institute
Mr. J. Vilemas, Director
Mr. E. Uspuras, Head, Ignalina Safety Analysis Group

Institute of Physics
Mr. V. Remeikis, Deputy Director
Mr. R.L. Kalinauskas, Researcher
Mr. D. Baltrunas, Researcher
Mr. A. Plukis, Researcher

Ignalina Nuclear Power Plant
Mr. V. Shevaldin, Director
Mr. A. Dvoretsky, Head, QA service
Others (See attached list)

Lietuvos Respublikos
Ūkio ministerija
VALSTYBĖS ĮMONĖ
IGNALINOS ATOMINĖ ELEKTRINĖ

ĮSAKYMAS 97 04 29 Nr. 185
Visaginas

Other participants from INPP

С 6 по 9мая 1997г. на ИАЭС будет проводиться семинар для руководителей высшего звена «Повышение культуры безопасности на АЭС с реакторами РБМК».

Семинар будет проходить в ЛОК, начало семинара 06.05.97г. в 9:00. В связи с проведением семинара

ПРИКАЗЫВАЮ:

1. Начальнику ЛОК Р. Агекян обеспечить подготовку зала для проведения семинара а также обед участников семинара.
2. Начальнику АХО Д. Урбонавичене обеспечить семинар организационной техникой (проектор, экран, ксерокс, бумага, фламастеры, доски, папки)
3. Начальнику АТЦ П. Кислому обеспечить автотранспорт для целей семинара (доставка в ЛОК и обратно в гостиницу).
4. Пригласить для участия в Семинаре в количестве наблюдателей следующих руководителей:

1. Г. Негривода
2. С. Кайрис
3. Э. Круминис
4. Ф. Маркявичюс
5. В. Зимин
6. О. Миронов
7. Н. Продан
8. Л. Козлов
9. Э. Величковский
10. А. Ротченков
11. В. Гусев
12. Б. Воронцов
13. В. Антипьев
14. А. Роботько
15. Трефилов
16. С. Кульков
17. В. Федоров
18. Н. Крестинин

С. Урбонавичене
А Орлова
А. Клочек

5. А. Дворецкому обеспечить семинар необходимым для успешной работы документами. (программа, слайды, документы по культуре безопасности)

Приложение:

1. Программа семинара (рус., англ.).
2. Список участников семинара (гостей).

Генеральный директор В. Шевалдин

Senior Managers Workshop on Promotion of Safety Culture for the NPPS with RBMK Reactors
6 - 9 May 1997, Ignalina NPP, Lithuania

Participants from countries other than Lithuania

International Atomic Energy Agency

Mr. W. Zhong *	Safety co-ordination Section, IAEA

Russian Federation

Mr. A. Panov,	Resenergoatom
Mr. A. Parshin	Smolensk NPP,
Mr. E. Dolganov	Leningrad NPP,

Sweden

Mr. E. Jende	Swedish National Project-Nuclear Safety (SiP)
Mr. T. Eckered	Proment Ltd.

Switzerland

Mr. D. Burns	Vice Director, NPP Leibstadt

Ukraine

Mr. S. Benison	Ministry for Environmental Protection and Nuclear Safety of Ukraine
Mr. B. Gontcharov	Chief Engineer, Chernobyl NPP
Mr. A. Polivoda	Goscomatom of Ukraine

U S A

Mr. D. L. Davis	Manager, Nuclear Overview Dept. Comanche Peak NPP,
Mr. David Elias	Group Level Executive, Commonwealth Edison Company.
Mr. J.S. Wiebe	Manager, Performance Engineering and Analysis Department American Electric Power Service Corporation
Mr. J.B. van Erp	Nuclear Safety Research Engineer Argone National Laboratory

* *Note:* Mr. V. Koutchinov of the IAEA was the Scientific Secretary for organizing the workshop, who was not able to attend the workshop due to other engagement.

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SiP SWEDISH INTERNATIONAL PROJECT
Nuclear Safety

6 May 1997

IAEA SECOND SENIOR MANAGERS WORKSHOP ON PROMOTION OF SAFETY CULTURE FOR RBMK NPPs

6 - 9 May 1997 in Visaginas, Lithuania

Introductory Remarks by Mr Jan H Nistad, SiP, presented by Mr Erik Jende, SiP

Ladies and Gentlemen,

I am very sorry that it has not been possible for me to participate in the Workshop. You know, anyhow, what importance SiP places on the Safety Culture enhancement work. I want to express my appreciation to those who have organised and made this second workshop possible: IAEA, Ignalina NPP and other Lithuanian organisations, and US Department of Energy.

It is always a great pleasure for SiP employees to participate in meetings and seminars in Visaginas and at INPP. This time it is even more so because this Safety Culture Workshop is the second in a series that started at Forsmark in Sweden in October last year.

The Forsmark Workshop was successful but it would have been to no use if it had been a single event with no continuation. One part of the continuation you can see here today: We have all gathered for a second Workshop

When I opened the Forsmark seminar I said that Safety Culture is nothing that you can buy from a consultant or a specialist supplier. You must develop it within yourselves. If you think that you can buy it, you have already failed; you have demonstrated how wrong your safety culture is. To develop and improve your safety culture you must first realise and accept that your present one is not good enough. By participating in this second Workshop you show that you have this understanding of the nature of Safety Culture and of how to enhance it.

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SiP

This Workshop, as the first one, concentrates on the Safety Culture of RBMK reactors. But continued enhancement of Safety Culture is needed at every kind of nuclear power plants, in the West as well as in the East and therefore it is so important that we are going to exchange experiences from many places in the world.

When we ended the last Workshop there was a common, good understanding of

- what constitutes a good Safety Culture?
- what is good and bad in our own countries and plants from a Safety Culture point of view?
- where can we find advice and help from our colleagues to improve our own Safety Culture?

Since then we have all had some time for both hard work and reflection and I think that this second workshop can only make things even better.

We all know from experience how important the human, non-technical aspects of nuclear power plant operation are for safety. A plant that has its shortcomings in technical safety can to some extent compensate for that by having an extra high level of quality assurance, procedures, staff morale, dedication of the staff, in short having a good Safety Culture. On the other hand, a "perfect" plant from technical safety point of view, can be made dangerous because of bad management, bad staff training, low morale, in short: bad safety culture. Do not believe, however, that good management, good training and high morale are only needed for plant operation. That is needed for every activity at a nuclear power plant.

I think that Ignalina NPP shall be given special credit for what you have achieved in the Safety Culture area since the first Workshop. You have come a long way in developing your Quality Assurance programme, your Safety Committee is operational and you have in a short time developed the crucially important SIP-2 safety improvement programme. Now please remember that the SIP-2 programme will also stand or fall with the good management, good training and high morale of the staff of the plant.

I want to end my statement with a message that I gave already last October in Forsmark: **Safety Culture is a living matter. You - you personally - have to work continuously on improving it. If you don't - it will deteriorate.** Therefore, your task is not finished on Friday when this workshop ends. You will have to continue your struggle for Safety Culture, every day in the work at your plant.

WORKSHOP FOR SENIOR MANAGERS

ENHANCEMENT OF SAFETY CULTURE

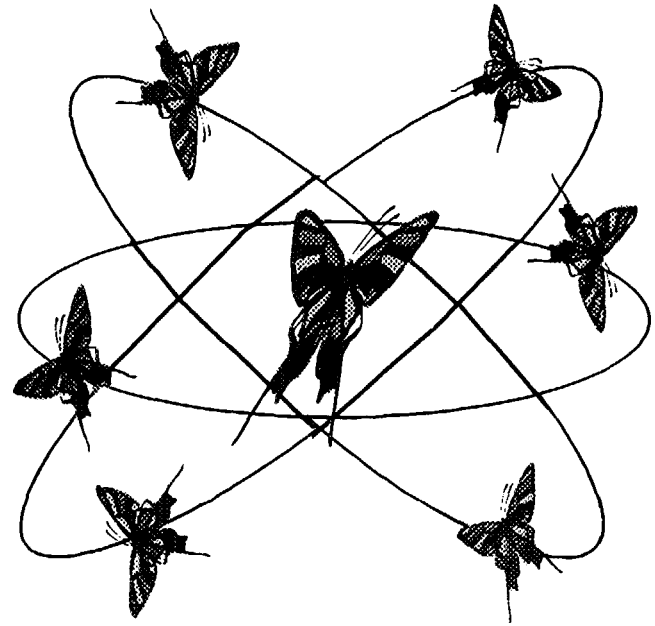
IN THE OPERATION OF NPPS

6 - 9 May 1997, Visaginas, Lithuania

OBJECTIVES AND OVERVIEW

- REVIEW THE PRINCIPAL CHARACTERISTICS OF SAFETY CULTURE
- REVIEW THE CONCLUSIONS OF THE 1996 IAEA WORKSHOP IN SWEDEN
- PRESENT AND REVIEW EXAMPLES OF GOOD PRACTICES IN VARIOUS COUNTRIES
- EXAMEN WAYS AND MEANS FOR ENHANCEMENT OF SAFETY CULTURE
- ADDRESS SPECIFIC PROBLEM AREAS THAT MAY IDENTIFIED IN WORK / DISCUSSION SESSIONS

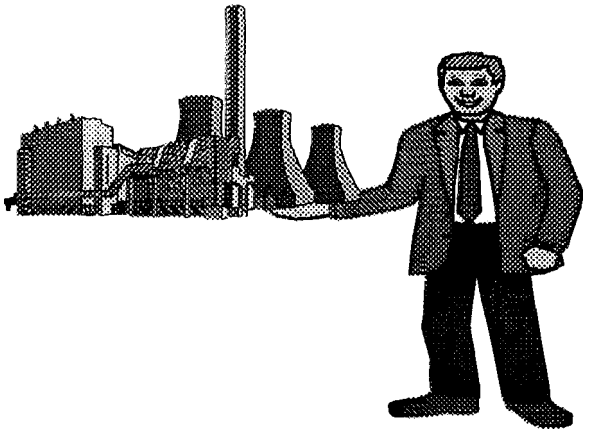
SAFETY CULTURE AT INPP



ROLE OF THE GOVERNMENT AND THE OWNER

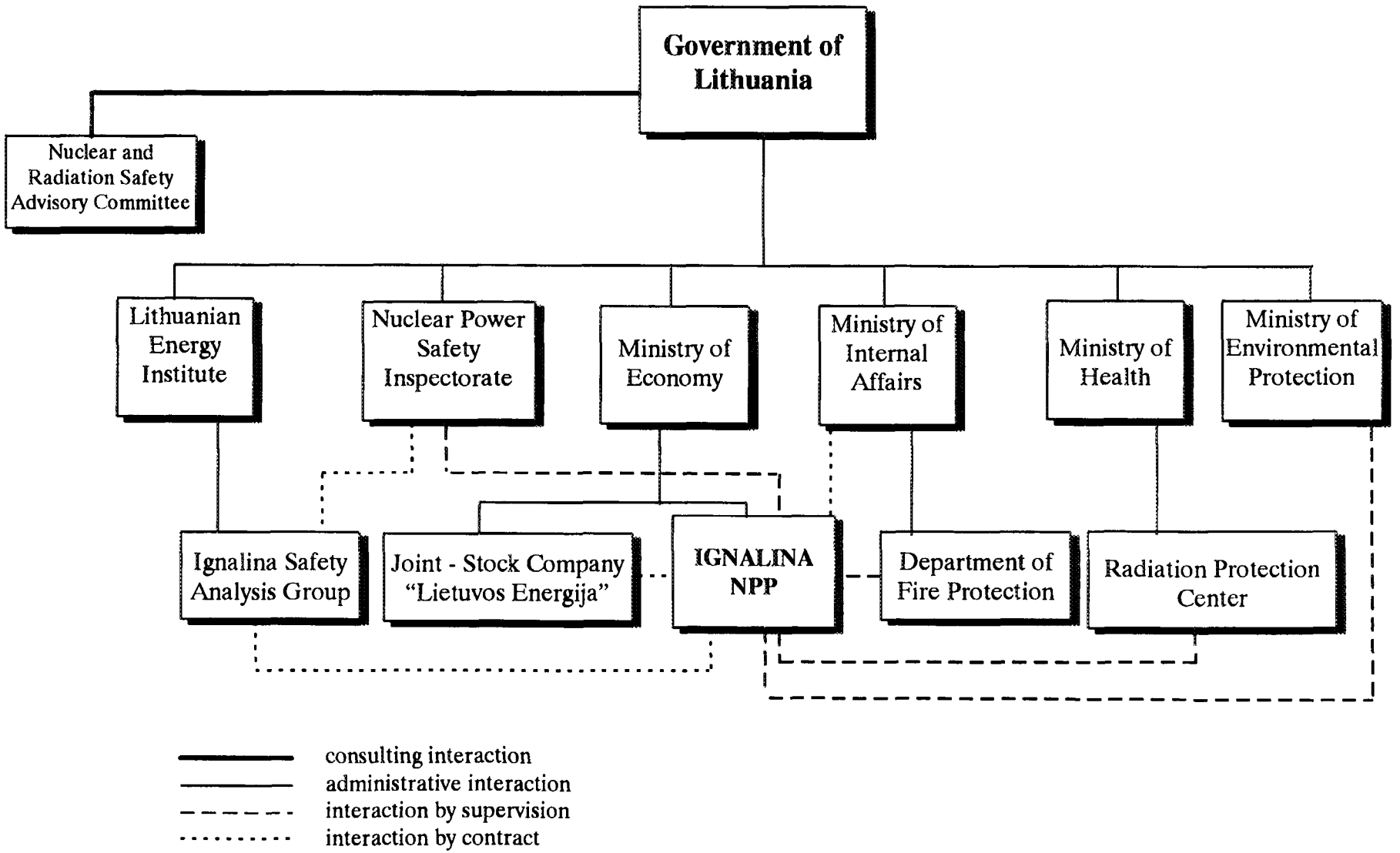
WORKSHOP ON INTERNATIONAL PROMOTION OF SAFETY CULTURE

Presentation of the Nuclear Energy Division, Ministry of Economy



- If "The operator of the nuclear facility is fully responsible for adequate and safe operation of the facility..." what the rest of today's company is doing here?

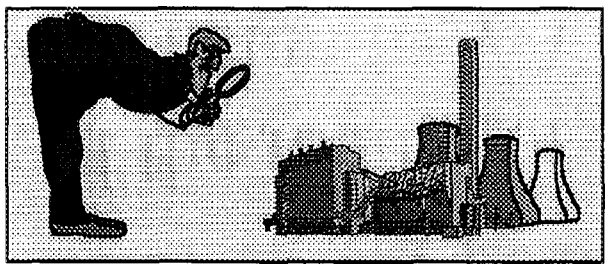
CHART OF INTERACTION BETWEEN GOVERNMENTAL AND REGULATORY BODIES AND IGNALINA NPP



ROLE OF THE GOVERNMENT

- Signatory to Nuclear Safety Convention - YES
- Establishment of Probabilistic Safety Criteria - YES
- Policy statement emphasizing safety as a prerequisite for use of nuclear power - YES
- Adequate funding of the regulatory body and safety research - let's listen to VATESI
- Established exchange of safety information with other countries - YES

POLICY OF TRANSPARENCE



ASSET mission — 1989

ASSET Follow Up Mission — 1993

Ontario-Hydro Peer Review — 1993

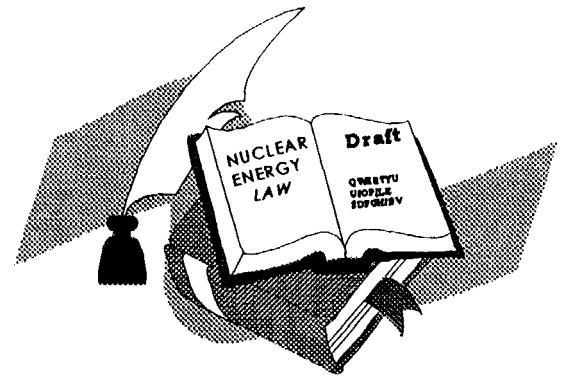
OSSART Mission — 1995

Safety Analysis Report — 1996

OSSART Follow Up Mission — 1997

Licence for unit 1 by VATESI — 1999

LEGAL ISSUES



- CIVIL LIABILITY LAW - ADOPTED IN 1993
- ENERGY LAW - ADOPTED IN MARCH 1995
- NUCLEAR ENERGY LAW - ADOPTED IN NOVEMBER 1996
- RADIATION PROTECTION LAW - DRAFT IN DEVELOPMENT
- WASTE MANAGEMENT LAW - DRAFT IN DEVELOPMENT

ROLE OF THE GOVERNMENT
(ctd.)

- "...the Lithuanian Government should define and establish appropriate division of responsibilities between the Lithuanian State, Ignalina NPP, VATESI and TSO's with regard to Nuclear Safety."
- "Lithuania must provide direction and resources to ensure a qualified and adequate regulatory staff and technical and scientific expertise..."

ROLE OF THE OWNER

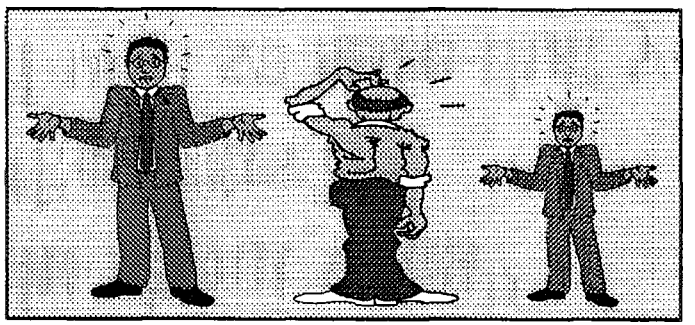
- IN GENERAL:

  "Plant must have a confidence in the competence and expertise at corporate level on nuclear safety matters. An effective and credible nuclear safety review group should be established at corporate level"- but the role of the Western type utility is impossible - staff of the Nuclear Energy Division consists of 4 persons;

ROLE OF THE OWNER (ctd.)

- drafts of legal acts, concerning management, supervision of nuclear power, regulatory regime, research, TSOs etc.;
- solving issues of SIP - 2 financing;
- supervision of implementation of safety measures;
- policy of openness

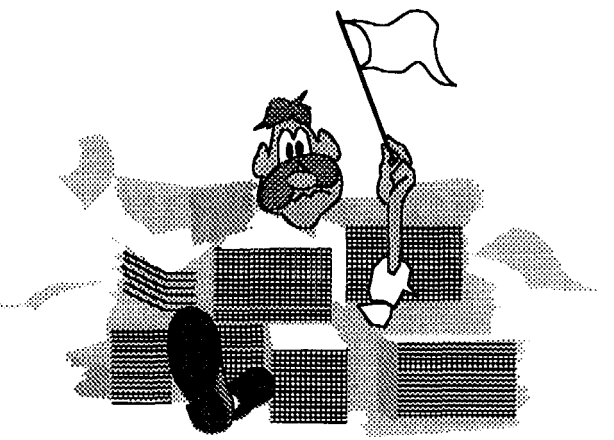
PROBLEMS



- Separation of responsibilities - more or less clear concerning NPP and VATESI but what to do with TSO's?
- Nuclear Energy Law - is it really good?
- What future is awaiting for Ignalina NPP? Strong need for updated Energy Strategy.

SC As Part Of Overall Culture
or short tale about unwritten letter, member of Academy and big tub

-Did you receive my letter?
-No, I didn't.
-Oh, so I was right!
-You were right about what?
What was in the letter?



-Oh, you see, I was so sure that you won't receive it, that I didn't bother to write it.

21

WORKSHOP FOR SENIOR MANAGERS

ENHANCEMENT OF SAFETY CULTURE IN THE OPERATION OF NPPS

6 - 9 May 1997, Visaginas, Lithuania

BASIC SAFETY PRINCIPLES; LESSONS LEARNED

By:

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WORKSHOP FOR SENIOR MANAGERS

ENHANCEMENT OF SAFETY CULTURE

IN THE OPERATION OF NPPS

6 - 9 May 1997, Visaginas, Lithuania

BASIC SAFETY PRINCIPLES; LESSONS LEARNED

- THE CONCEPT OF SAFETY CULTURE DID NOT START WITH INSAG AFTER THE ACCIDENT AT CHERNOBYL

- SAFETY CULTURE BY DIFFERENT NAMES HAS BEEN RECOGNIZED EARLIER THAN CHERNOBYL: A PRIME EXAMPLE IS THE KEMENY REPORT ON THE ACCIDENT AT THREE MILE ISLAND (TMI)

- THE KEMENY REPORT ON TMI IDENTIFIED HUMANS AS THE PRIME SOURCE / DEFENSE FOR / AGAINST ACCIDENTS

- SAFETY CULTURE AND THE ROLE OF HUMANS IN SAFETY HAVE BEEN RECOGNIZED SINCE A LONG TIME IN MANY INDUSTRIES; EXAMPLE: AIRLINE INDUSTRY, ETC.

SOME CONCLUSIONS FROM THE KEMENY REPORT ON THE ACCIDENT AT TMI

AS THE EVIDENCE ACCUMULATED, IT BECAME CLEAR THAT THE FUNDAMENTAL PROBLEMS ARE PEOPLE-RELATED PROBLEMS AND NOT EQUIPMENT PROBLEMS.

WHEREVER WE LOOKED, WE FOUND PROBLEMS WITH THE HUMAN BEINGS WHO OPERATE THE PLANT, WITH THE MANAGEMENT THAT RUNS THE KEY ORGANIZATION, AND WITH THE AGENCY THAT IS CHARGED WITH ASSURING THE SAFETY OF NUCLEAR POWER PLANTS.

WE NOTE A PREOCCUPATION WITH REGULATIONS. HOWEVER, WE ARE CONVINCED THAT REGULATIONS ALONE CANNOT ASSURE SAFETY. INDEED, ONCE REGULATIONS BECOME VOLUMINOUS AND COMPLEX AS THOSE REGULATIONS NOW IN PLACE, THEY CAN SERVE AS A NEGATIVE FACTOR IN NUCLEAR SAFETY.

THE SATISFACTION OF REGULATORY REQUIREMENTS IS (ERRONEOUSLY) EQUATED WITH SAFETY. THIS COMMISSION BELIEVES THAT IT IS (ONLY) AN ABSORBING CONCERN WITH SAFETY THAT WILL BRING ABOUT SAFETY -- NOT JUST THE MEETING OF NARROWLY PRESCRIBED AND COMPLEX REGULATIONS.

REQUIRE OPERATORS AND SUPERVISORS WHO HAVE A THOROUGH UNDERSTANDING OF THE FUNCTIONING OF THE PLANT AND WHO CAN RESPOND TO COMBINATIONS OF SMALL EQUIPMENT FAILURES.

WHAT THE NRC AND THE INDUSTRY HAVE FAILED TO RECOGNIZE SUFFICIENTLY IS THAT THE HUMAN BEINGS WHO MANAGE AND OPERATE THE PLANTS CONSTITUTE AN IMPORTANT SAFETY SYSTEM.

WE FIND THAT THERE IS A LACK OF "CLOSURE" IN THE SYSTEM – THAT IS, IMPORTANT SAFETY ISSUES ARE FREQUENTLY RAISED AND MAY BE STUDIED TO SOME DEGREE OF DEPTH, BUT ARE NOT CARRIED THROUGH TO RESOLUTION.

CONTRIBUTING CAUSES:

1. IT IS OUR CONCLUSION THAT THE TRAINING OF TMI OPERATORS WAS GREATLY DEFICIENT.

2. WE FOUND THAT THE SPECIFIC OPERATING PROCEDURES, WHICH WERE APPLICABLE TO THIS ACCIDENT, ARE AT LEAST VERY CONFUSING AND COULD BE READ IN SUCH A WAY AS TO LEAD THE OPERATORS TO TAKE THE INCORRECT ACTIONS THEY DID.

3. THE LESSONS FROM PREVIOUS ACCIDENTS DID NOT RESULT IN NEW, CLEAR INSTRUCTIONS BEING PASSED ON TO THE OPERATORS.

SOME RECOMMENDATIONS FROM THE KEMENY REPORT ON THE ACCIDENT AT TMI

1. THE NUCLEAR INDUSTRY MUST DRAMATICALLY CHANGE ITS ATTITUDE TOWARD SAFETY AND REGULATIONS:

   A. THE INDUSTRY SHOULD ESTABLISH A PROGRAM THAT SPECIFIES APPROPRIATE SAFETY STANDARDS INCLUDING THOSE FOR MANAGEMENT, QUALITY ASSURANCE, AND OPERATING PROCEDURES AND PRACTICES, AND THAT CONDUCTS INDEPENDENT EVALUATIONS.

   B. THERE MUST BE A SYSTEMATIC GATHERING, REVIEW, AND ANALYSIS OF OPERATING EXPERIENCE AT ALL NUCLEAR POWER PLANTS COUPLED WITH AN INDUSTRY-WIDE INTERNATIONAL COMMUNICATIONS NETWORK TO FACILITATE THE SPEEDY FLOW OF THIS INFORMATION TO AFFECTED PARTIES.

2. ALTHOUGH THE COMMISSION CONSIDERS THE RESPONSIBILITY FOR SAFETY TO BE WITH THE TOTAL ORGANIZATION OF THE PLANT, WE RECOMMEND THAT EACH NUCLEAR POWER PLANT COMPANY HAVE A SEPARATE SAFETY GROUP THAT REPORTS TO HIGH-LEVEL MANAGEMENT.

3. INTEGRATION OF MANAGEMENT RESPONSIBILITY AT ALL LEVELS MUST BE ACHIEVED CONSISTENTLY THROUGHOUT THIS INDUSTRY. THERE MUST BE A SINGLE ACCOUNTABLE ORGANIZATION WITH THE REQUISITE EXPERTISE TO TAKE RESPONSIBILITY FOR THE INTEGRATED MANAGEMENT OF THE DESIGN, CONSTRUCTION, OPERATION, AND EMERGENCY RESPONSE FUNCTIONS.

4. IT IS IMPORTANT TO ATTRACT HIGH QUALIFIED CANDIDATES FOR THE POSITIONS OF SENIOR OPERATOR AND OPERATOR SUPERVISOR.

5. SUBSTANTIALLY MORE ATTENTION AND CARE MUST BE DEVOTED TO THE WRITING, REVIEWING, AND MONITORING OF PLANT PROCEDURES.

   A. THE WORDING OF PROCEDURES MUST BE CLEAR AND CONCISE.

   B. THE CONTENT OF PROCEDURES MUST REFLECT BOTH ENGINEERING THINKING AND OPERATING PRACTICALITIES.

   C. THE FORMAT PROCEDURES, PARTICULARLY THOSE THAT DEAL WITH ABNORMAL CONDITIONS AND EMERGENCIES, MUST BE ESPECIALLY CLEAR, INCLUDING CLEAR DIAGNOSTIC INSTRUCTIONS FOR IDENTIFYING THE PARTICULAR ABNORMAL CONDITIONS CONFRONTING THE OPERATORS.

   D. MANAGEMENT OF BOTH UTILITIES AND SUPPLIERS MUST INSIST ON THE EARLY DIAGNOSIS AND RESOLUTION OF SAFETY QUESTIONS THAT ARISE IN PLANT OPERATIONS.

CONCLUSIONS AND RECOMMENDATIONS FROM THE ROGOVIN REPORT ON THE ACCIDENT AT TMI

THE PRINCIPAL DEFICIENCIES IN COMMERCIAL REACTOR SAFETY TODAY ARE NOT HARDWARE PROBLEMS, THEY ARE MANAGEMENT PROBLEMS. THESE PROBLEMS CANNOT BE SOLVED BY THE ADDITION OF A FEW PIPES AND VALVES--OR, FOR THAT MATTER, BY A RESIDENT FEDERAL INSPECTOR AT EVERY REACTOR.

MANY NUCLEAR PLANTS ARE PROBABLY OPERATED BY MANAGEMENT THAT HAS FAILED TO MAKE CERTAIN THAT ENOUGH PROPERLY TRAINED OPERATORS AND QUALIFIED ENGINEERS ARE AVAILABLE ON SITE IN RESPONSIBLE POSITIONS TO DIAGNOSE AND COPE WITH A POTENTIALLY SERIOUS ACCIDENT. THE NRC, FOR ITS PART, HAS VIRTUALLY IGNORED THE CRITICAL AREAS OF OPERATOR TRAINING, HUMAN FACTORS ENGINEERING, UTILITY MANAGEMENT, AND TECHNICAL QUALIFICATIONS.

WE HAVE FOUND AN INDUSTRY IN WHICH THE EXPERTISE AND RESPONSIBILITY FOR SAFETY IS FRAGMENTED AMONG MANY PARTIES--THE UTILITY COMPANY THAT OPERATES THE PLANT, THE PLANT DESIGNER, THE MANUFACTURER OF THE REACTOR SYSTEM, THE CONTRACTOR, AND THE SUPPLIERS OF CRITICAL COMPONENTS, IN ADDITION TO THE NRC. COORDINATION AMONG THESE PARTIES AND BETWEEN THEM AND THE NRC, AS WELL AS WITHIN THE NRC, IS INADEQUATE.

WE FOUND THAT BEFORE MARCH 28, 1979, AN ATTITUDE OF COMPLACENCY PERVADED BOTH THE INDUSTRY AND THE NRC, AN ATTITUDE THAT THE ENGINEERED DESIGN SAFEGUARDS BUILT INTO TODAY'S PLANTS WERE MORE THAN ADEQUATE, THAT AN ACCIDENT LIKE THAT AT THREE MILE ISLAND WOULD NOT OCCUR.

DURING THE PERIOD IN WHICH MOST LARGE NUCLEAR PLANTS HAVE BEEN DESIGNED, THE NUCLEAR INDUSTRY HAS PAID REMARKABLY LITTLE ATTENTION TO ONE OF THE BEST TOOLS AVAILABLE FOR INTEGRATING THE REACTOR OPERATOR INTO THE SYSTEM: THE RELATIVELY NEW DISCIPLINE OF "HUMAN FACTORS".

A NUMBER OF EXCELLENT STUDIES HAVE FOUND SIGNIFICANT FLAWS IN CONTROL ROOM DESIGN OF OPERATING NUCLEAR PLANTS: INSTRUMENTS THAT ARE DIFFICULT TO MAKE OUT AND DO NOT DISTINGUISH BETWEEN NORMAL AND DANGEROUS READINGS; CONTROLS LOCATED FAR FROM THE INSTRUMENT DISPLAYS; FAILURE TO DISPLAY IMPORTANT PLANT PARAMETERS IN A PROMINENT POSITION; LACK OF FUNCTIONAL INSTRUMENT GROUPING, LACK OF CONSISTENT COLOR CODING AND LABELING.

THE STUDIES ALSO FOUND PHYSICAL HINDRANCES HAD TO BE ENDURED BY OPERATORS. GLARE AND REFLECTION ON INSTRUMENTS, COMPOUNDED BY POOR LIGHTING, MADE METERS DIFFICULT TO READ. INSTRUMENTS WERE PLACED TOO HIGH OR TOO LOW. FAR TOO MANY ALARMS, BOTH AUDIBLE AND VISUAL, INUNDATED THE OPERATORS WITH A NUMBING AMOUNT OF INFORMATION.

CONTROL ROOM DESIGN PLAYED MORE THAN A MINOR ROLE IN CONTRIBUTING TO THE ACCIDENT AT THREE MILE ISLAND.

INSTRUMENTATION DEFICIENCIES (FROM ROGOVIN REPORT)

1. NO VISUAL ALARM SIGNALED THAT THE EMERGENCY FEEDWATER SYSTEM WAS COMPLETELY BLOCKED OFF.

2. THE INDICATOR LIGHT FOR THE STUCK-OPEN PRESSURIZER RELIEF VALVE WAS WIRED TO SHOW WHAT THE VALVE HAD BEEN "INSTRUCTED" BY THE ELECTRICAL SYSTEM TO DO, NOT THE VALVE'S ACTUAL POSITION.

3. THE PLANT DID NOT HAVE INSTRUMENTATION SHOWING THE LEVEL OF REACTOR COOLANT IN THE MAIN REACTOR VESSEL.

4. INCORE THERMOCOUPLES SHOWING TEMPERATURES ABOVE THE REACTOR CORE HAD TO BE READ WITH A HAND-HELD ELECTRICAL METER BECAUSE THE THERMOCOUPLES WERE READING OFF THE COMPUTER'S DISPLAY SCALE.

5. OPERATORS SHOULD HAVE DETECTED THE STUCK-OPEN PORV FROM HIGH TEMPERATURE READINGS IN THE PIPING THROUGH WHICH THE COOLANT WAS LEAKING. THESE READINGS WERE MISINTERPRETED, BECAUSE, WITHOUT A STRIP CHART SHOWING THE READINGS OVER TIME, THEY WERE THOUGHT TO BE "TRENDING DOWN".

6. THE READ-OUT DISPLAY COMPUTER GOT SO FAR BEHIND IN PRINTING OUT ALARMS THAT OPERATORS HAD TO "DUMP" ITS MEMORY IN ORDER TO GET UP TO DATE. INFORMATION THAT MIGHT HAVE HELPED THEM DIAGNOSE THE ACCIDENT WAS CONSEQUENTLY LOST.

XA9744764

PRINCIPAL CHARACTERISTICS OF GOOD SAFETY CULTURE

W. ZHONG
IAEA

Visaginas, 6 - 9 May 1997

DEFINITION OF SAFETY CULTURE

Based on INSAG-4

Safety Culture is that assembly of

Characteristics and Attitudes

in Organizations and Individuals

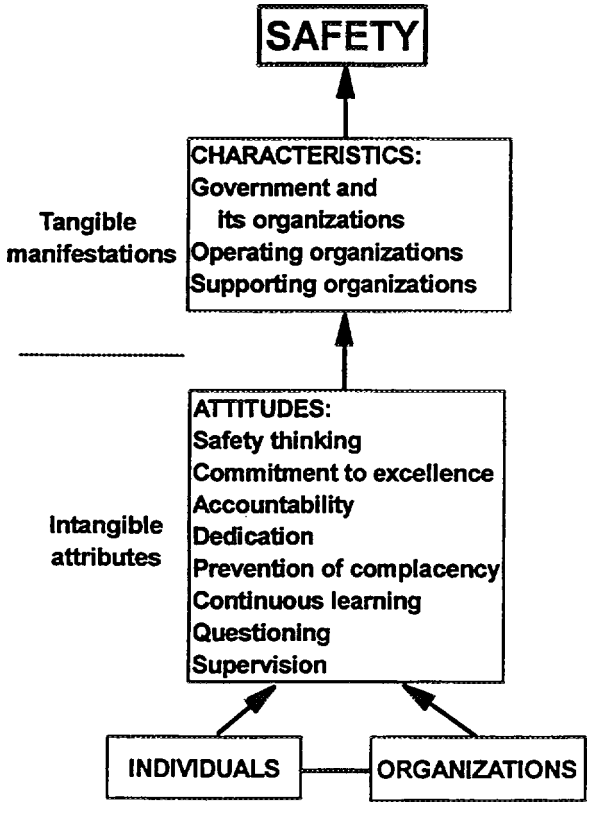
which establishes that

,as an overriding priority,

nuclear plant safety issues receive the

attention warranted by their significance.

WHAT IS SAFETY CULTURE

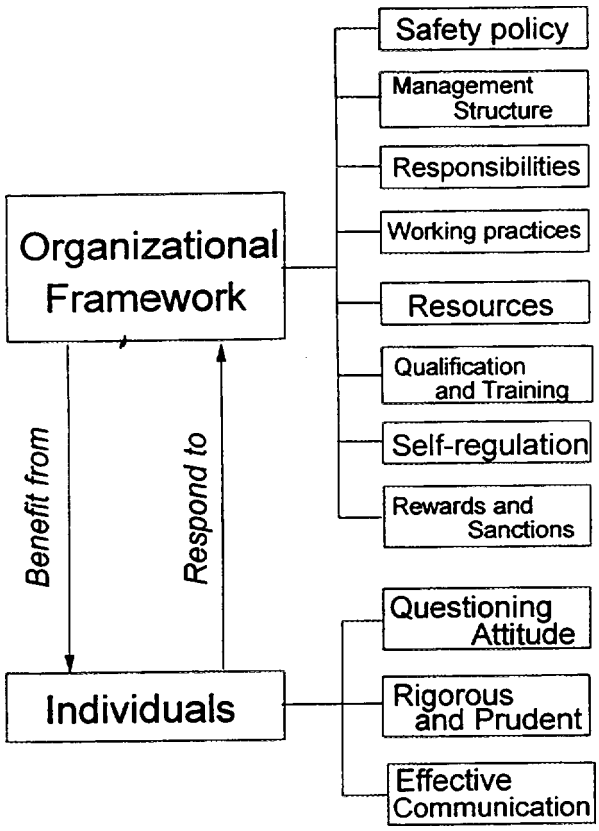


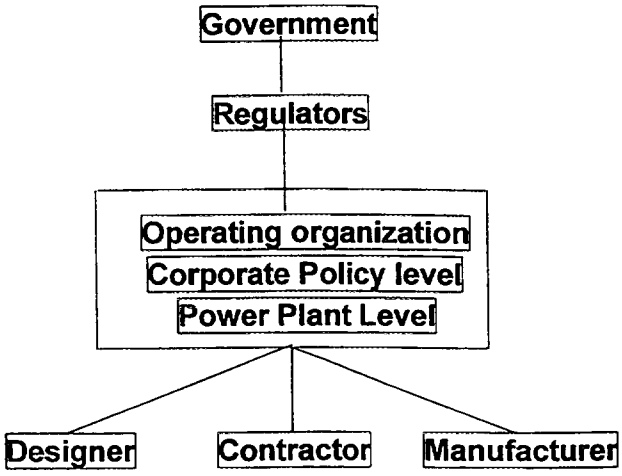
UNIVERSAL FEATURES OF SAFETY CULTURE

Safety Culture has two general components:

- The first is the necessary framework within an organization and is the responsibility of the management hierarchy.
- The second is the attitude of staff at all levels in responding to and benefiting from the framework.

The Main Elements of Safety Culture





REQUIREMENTS AT POLICY LEVEL

- **In any important activity, the manner in which people act is conditioned by requirements set at a high level.**
- **The highest level affecting nuclear plant safety is the legislative level, at which the national basis for Safety Culture is set.**
- **Governments discharge their responsibilities to regulate the safety of nuclear plants.**
  - **advisory and regulatory bodies**
  - **International exchanges**
- **Within an organization, similar considerations apply. Policies promoted at a high level**
  - **create the working environment and**
  - **condition individual behaviour.**

SAFETY CULTURE AT THE GOVERNMENT LEVEL

National nuclear law and subsidiary legislation

- **Establish a legislative and statutory framework**
- **Establish a regulatory body to oversee nuclear safety**

Safety policy statement

- **to declare the organizations' objectives and the public commitment**
  - **+ to promote safety and to protect the public**
  - **+ committed to implementing legislation**

SAFETY CULTURE AT THE GOVERNMENT LEVEL

To strengthen worldwide nuclear safety co-operation

- signatory of the International Nuclear Safety Convention
- inviting international peer reviews
  - considering making the findings public
  - encouraging implementation of the recommendations

SAFETY CULTURE AT REGULATORY BODY

Commitment to safety

- Safety policy with objectives
- Staff recruitment and training

Definition of responsibilities

- Reporting to Government
- Relationship with other regulatory bodies/ministries

SAFETY CULTURE AT REGULATORY BODY

To deal with nuclear safety matters in an open fashion

- Open and co-operative relations with operating organizations
- Open approach to setting safety objectives
- Controversial issues are dealt with in an open way
- To provide information to the public on itself

Working method for safety assessment

- Number of pending safety issues
- Safety performance appraisal in installations

Individual staff safety commitment

- Questioning attitude
- Ways of enforcing

SAFETY CULTURE AT OPERATORS

Safety policy statement

- Safety is the utmost priority, which may override production objectives
- Demonstrates by both the senior and middle management
- Structure, responsibilities and resources reflect the safety objectives
- Strong message communicated through vision, mission, core values
- Are understood and made use of by staff at all levels
- Top down commitment
- To achieve a high level of safety performance beyond that simply required by law

SAFETY CULTURE AT OPERATORS

Strong line management responsibility in safety matters

- Clear assignment of authority
- Clear documented definition of duties
- Clear reporting lines
- Few and simple interfaces
- Empowerment of staff at all levels within their responsibilities
- Strong systematic independent assessment

+ a full competent group of people outside of the normal chain of command to regularly review and annually evaluation on safety related activities

SAFETY CULTURE AT OPERATORS

Management creates a framework to introduce Openness, transparency and mutual confidence in the day to day work

- Safety performance is kept under constant scrutiny by regular inspections
- Internal discussions and seminars on safety matters are held regularly
- Findings and recommendations are evaluated and acted upon timely
- Operating experience feedback
- Reporting incidents according to the regulatory reporting criteria
- Policy of transparency towards the local population and the local authorities on events

SAFETY CULTURE AT OPERATORS

Management attitude

- A self critical manner that refuses to accept second best
- Willingness to listen to it's own problems
- Willing to analysis precursory events and take action to resolve the issues
- Correcting the problems (thoroughly and promptly)
- Attention to detail
- Not satisfied with minimum compliance with safety requirements
- Involvement of employees
- Focus on people, not on job
- Respect for individuals - fairness and equality
- Respect for nuclear technology

SAFETY CULTURE AT OPERATORS

Effective communication and consultation

- Very good relationship between management and staff
- Utilizing good teamwork and communications
- Staff selection and promotion arrangements
- Staff training and education
- Employee safety concern programs
- An open relationship with the regulatory body
- Proactive, ongoing dialogue with the public and the media

SAFETY CULTURE AT OPERATORS

A disciplined approach and a sound technical basis to operations

- Highly trained staff
- The design basis is up-to-date
- Technical documentation is developed for plant changes
- Procedures are up-to-date
- Strict following procedures
- Prudent and conservative operations
- Limits of the design bases are observed
- Maintaining the plant for the long-term

REQUIREMENTS ON MANAGERS

REQUIREMENTS ON MANAGERS

- **The attitudes of individuals are greatly influenced by their working environment.**
- **The key to an effective Safety Culture in individuals is found in the practices moulding the environment and fostering attitudes conducive to safety.**
- **It is the responsibility of managers to institute such practices in accordance with their organization's safety policy and objectives.**

REQUIREMENTS ON MANAGERS

- It is the task of managers to ensure that their staff respond to and benefit from this established framework of practices and, by attitude and example, to ensure that their staff are continuously motivated towards high levels of personal performance in their duties.

SAFETY CULTURE AT DESIGNERS

- Commitment to Safety
  - Establishment of QA programme highlighting safety aspects
  - Staff allocation for safety control over design
- Definition of Responsibilities
  - Assignment of safety duty for operating experience feedback analysis/mitigation
- Working Method for Safety Assessment
  - Internal QA and safety review
  - Integration into design of operator safety requirements
- Individual Staff Commitment
  - Attitude to analysis
  - Rigorousness

RESPONSE OF INDIVIDUALS

It is the task of staff at all levels to respond to and benefit from the framework set.

The response of all those who strive for excellence in matters affecting nuclear safety is characterized by:

A QUESTIONING ATTITUDE

plus

A RIGOROUS AND PRUDENT APPROACH

plus

COMMUNICATION

⇓

SAFETY

RESPONSE OF INDIVIDUALS

- Questioning attitude
  - Do I understand the task?
  - What are my responsibilities?
  - Do I have the necessary knowledge to proceed?
  - What could be the consequences of failure or error?
- Rigorous and prudent approach
  - Understanding the work procedures
  - Complying with the procedures
  - Stopping and thinking if a problem arise
  - Forgoing shortcuts
- Communication approach
  - Obtaining useful information from others
  - Transmitting information to others
  - Reporting on results of work, both routine and unusual

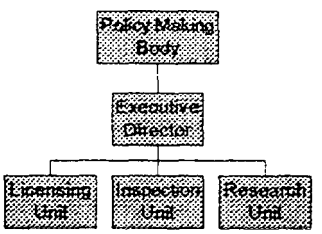
Operator Regulator Interface:

Organizational Structure and Responsibilities

Regulatory Organization

- Policy Making Body
- Research Unit
- Licensing Unit
- Inspection Unit

Regulatory Organization



Policy Making Body

- Five Members
- Establish Policy by Vote
- Appointed by President/Confirmed by Senate
- Meetings are Open to Public

Policy Making Body

- Advantages
  - Diverse Views are Considered
  - Policy is More Balanced
  - Policy is More Stable

Policy Making Body

- Disadvantages
  - Policy Making is Very Slow
  - It is Hard to Determine Who is in Charge
  - Policy Makers Give Different Signals
  - It is Hard to Predict Policy Decisions

Executive Director

- Provides Management Focus
- Implements the Policies

Research Unit

- Technical Research
- Regulations
- Industry Standards
- Generic Safety Issues

Licensing Unit

- Implements Regulations
- Licenses Facilities
- Provides Guidance to Inspection Unit

Inspection Unit

- Verifies Implementation of Regulations
- Verifies Implementation of License Requirements
- Takes Enforcement Action

Operating Organization

- NPP Management
- NPP Operations
- NPP Engineering
- NPP Licensing
- NPP Quality Assurance

Regulatory Interfaces

- Research Unit
  - Routine Information
    - NPP Licensing
  - Special or Unique Information
    - NPP Licensing
    - NPP Management
    - NPP Operations, Engineering, etc.

Regulatory Interfaces

- Licensing Unit
  - Coordination - NPP Licensing
  - Technical - NPP Engineering
  - Formal Communications - NPP Management

Regulatory Interfaces

- Inspection Unit
  - Gathering Information
    - All NPP Organizations
    - Coordinated by NPP Licensing
  - Verbal Discussion of Performance
    - NPP Management
  - Formal Communications or Enforcement
    - NPP Management

THE ROLE OF SELF-ASSESSMENT PROGRAMS IN NUCLEAR POWER PLANT OPERATIONAL SAFETY

ComEd

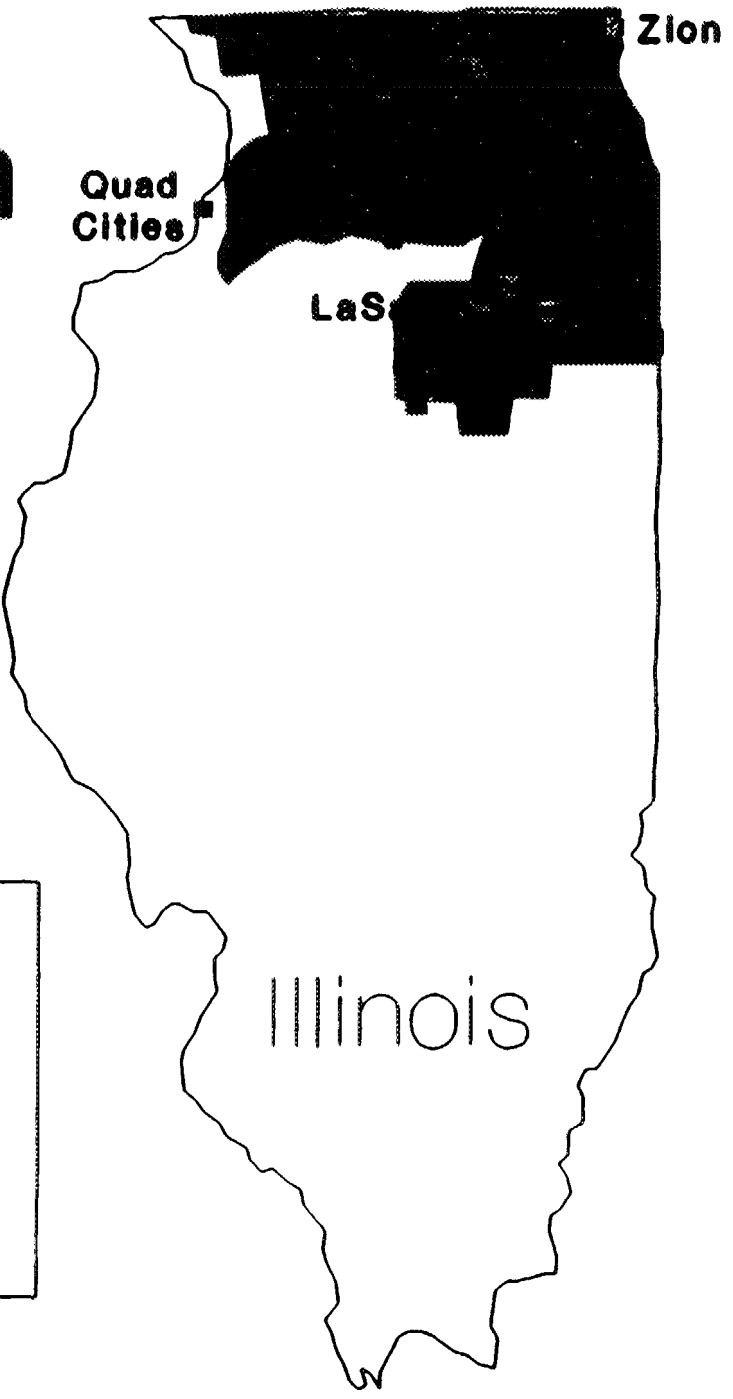
A Unicom Company

Dr. D. Elias

May 6 - 9, 1997

Ignalina Nuclear Power Plant, Lithuania

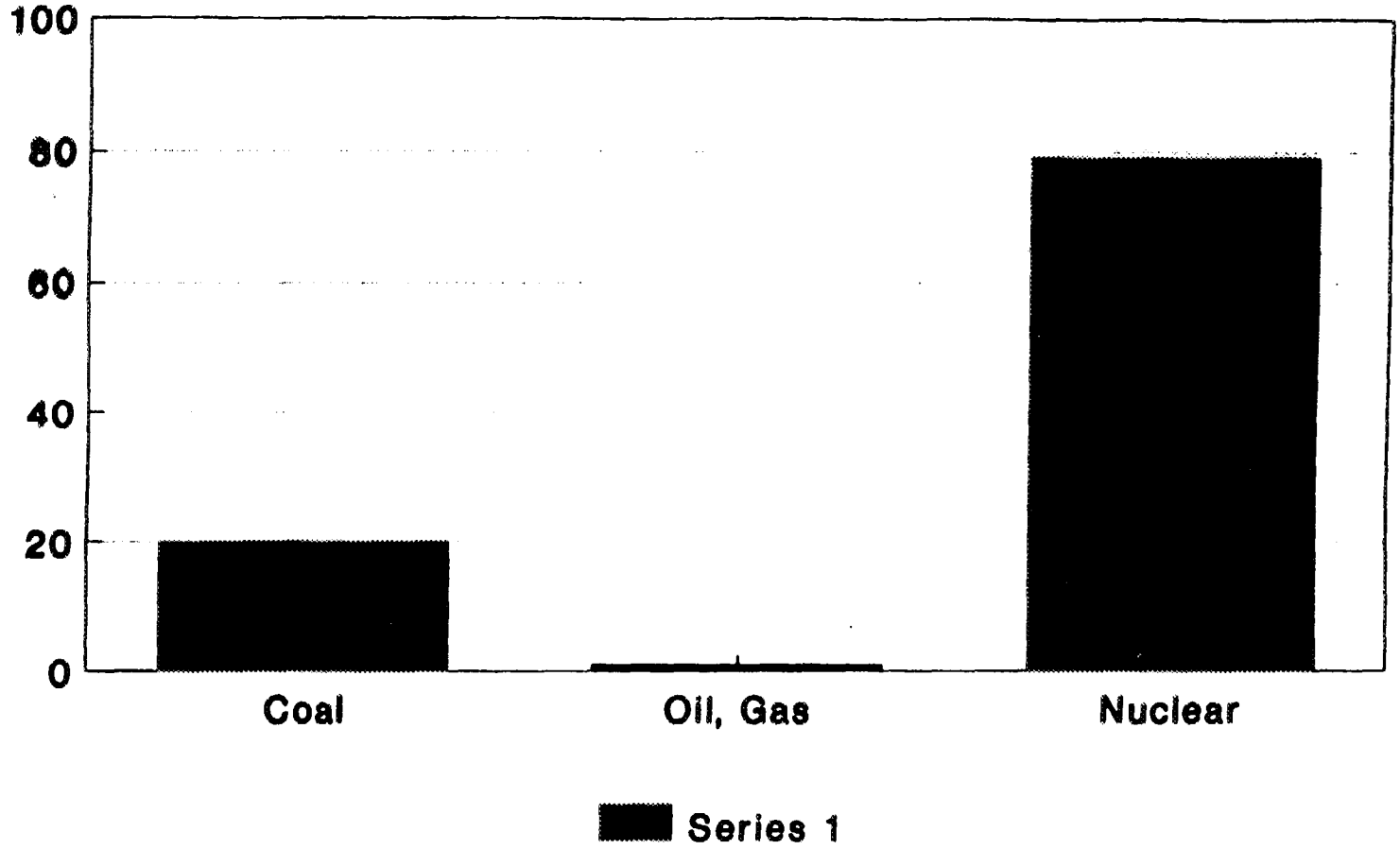
Commonwealth Edison



Service Territory

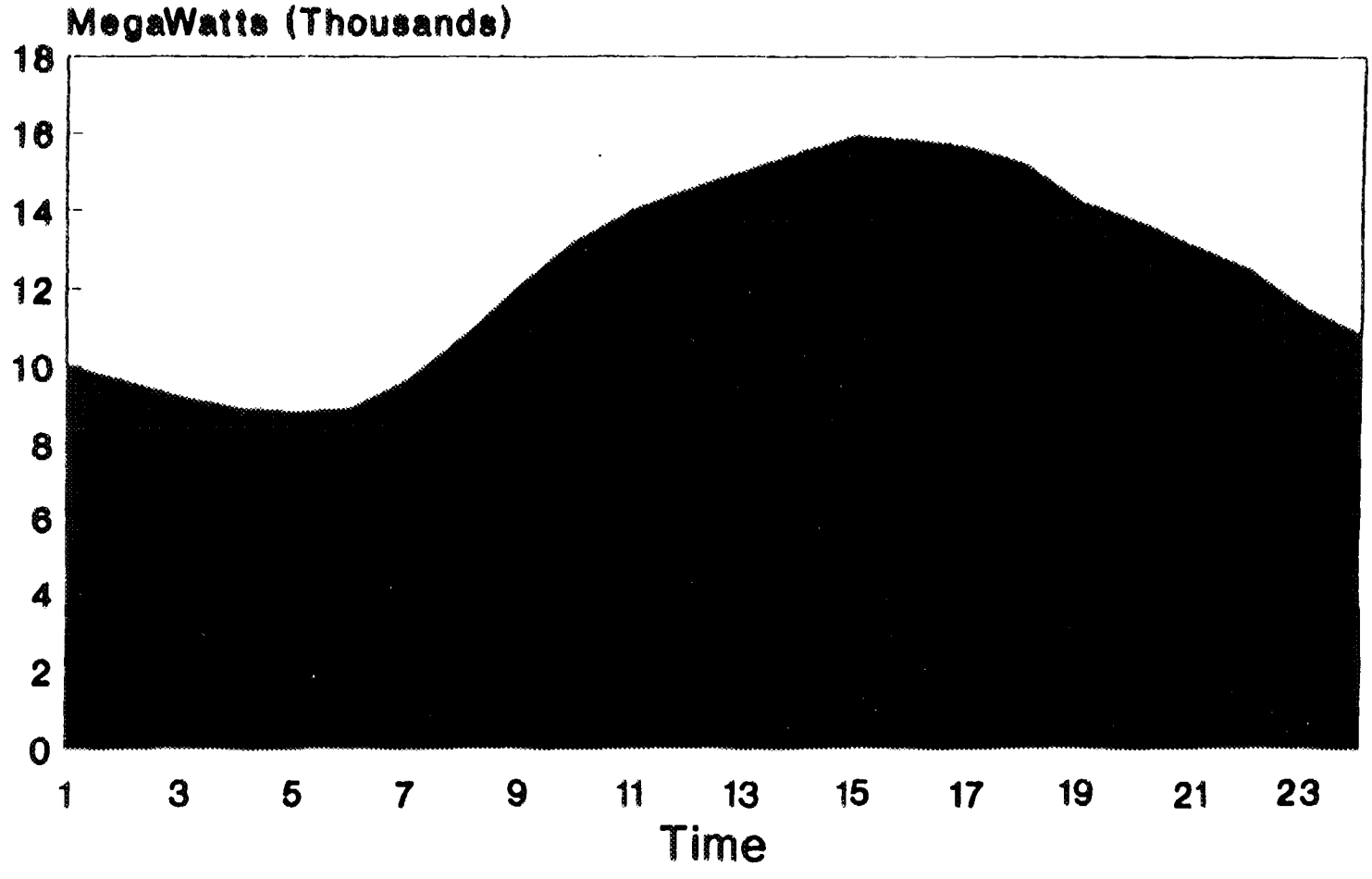
Nuclear Generating Stations

Fuel Types
Commonwealth Edison

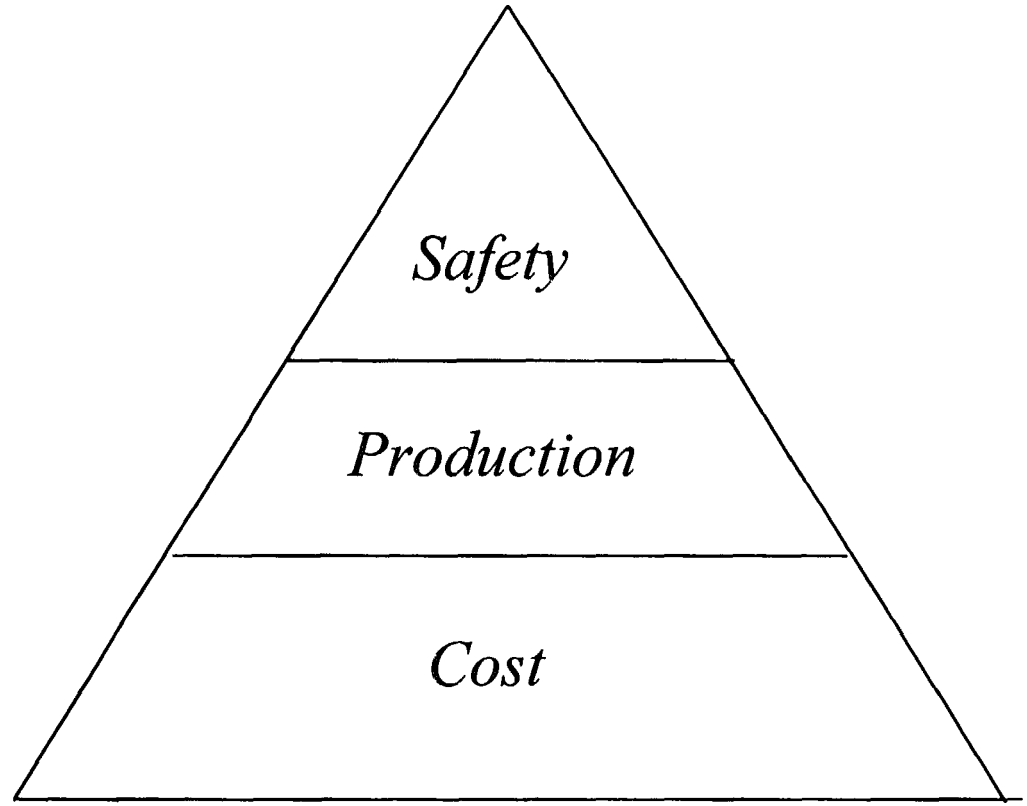


1990

Daily Power Peak
Commonwealth Edison



LEADERSHIP FOCUS



REGULATOR/OVERVIEW ORGANIZATIONS

Nuclear Regulatory Commission	(NRC)
Institute for Nuclear Power Operations	(INPO)
Illinois Commerce Commission	(ICC)
Electric Power Research Institute	(EPRI)
– Nuclear Safety Analysis Center	(NSAC)
Nuclear Utility Management and Resource Council	(NUMARC)
Joint Utilities Management Audits	(JUMA)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
(NRC)

- Regulation Development
- Regulation Implementation
- Regulation Enforcement
- Performs Systematic Assessment of Licensee Performance (SALP) for all plants
- Provides Inspection Programs for all Plants

INPO's MISSION

- Excellence in nuclear power plant operations.
- Train and qualify personnel to operate, maintain, and support nuclear plants.
- Identify possible precursors of serious events worldwide and disseminate the lessons learned.
- Use expertise and experience from outside the U.S. including exchange of information through the World Association of Nuclear Operators.

INPO's MISSION (Cont'd)

- Promote exchange of information and good practices among all nuclear operating organizations.
- Promote improved human resource management in the industry.
- Promote the highest levels of professionalism among all personnel involved in nuclear technology.

NUCLEAR QUALITY PROGRAMS DEPARTMENT

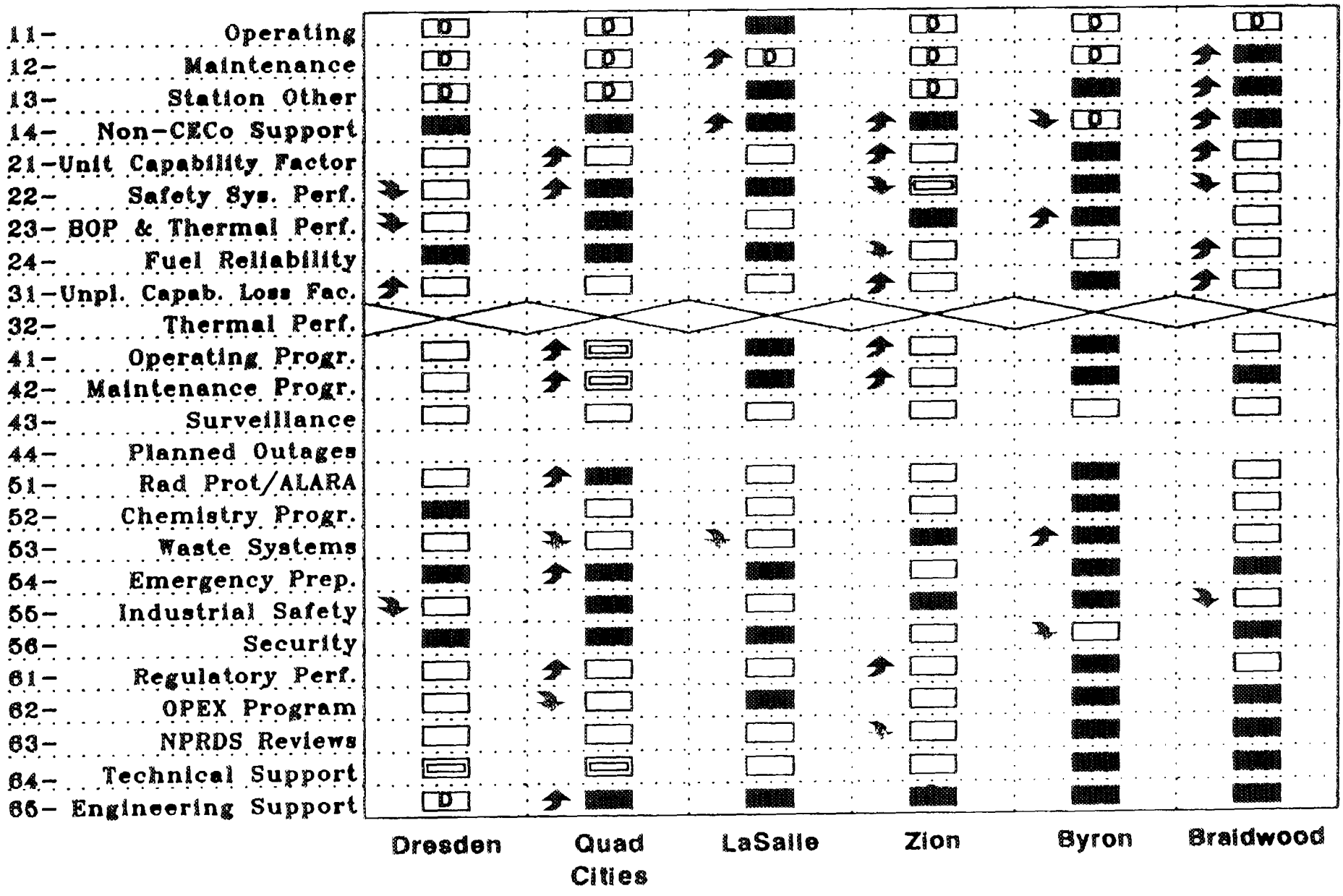
- On-site audits required by 10CFR50, Appendix B.
- On-site surveillances
- Off-site audits and vendor audits under the direction of QA/NS
- Independent review of such activities:
  - Safety-related maintenance work
  - Procurement
  - Radwaste shipping
  - Materials receiving

PERFORMANCE ASSESSMENT DEPARTMENT

- Manage self-assessments in the areas of chemistry and radwaste, engineering and technical support, emergency preparedness, maintenance and surveillance, operations, radiation protection, radwaste and training.
- Develop self-assessment tools and processes.
- Administer Company activities relating to INPO.
- Analyze the results of INPO evaluations.

PLANT MONITOR EVALUATION

Third Quarter 1991

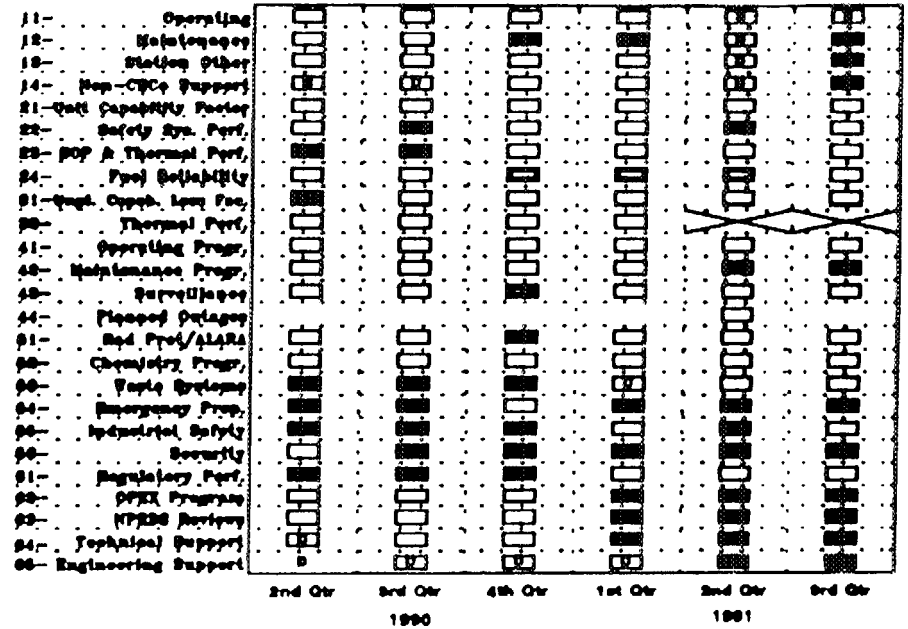


BRAIDWOOD STATION THIRD QUARTER 1991

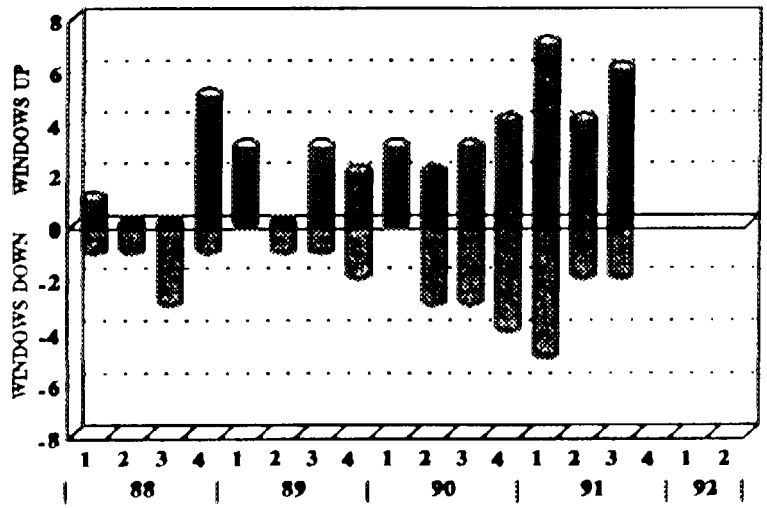
PERFORMANCE EVALUATION

PERSONNEL PERFORMANCE	OPERATIONS	MAINTENANCE	STATION ONSITE	WORK CTRL & SUPPORT		
	●	GREEN	GREEN	GREEN		
EQUIPMENT PERFORMANCE	UNIT CAPABILITY FACTOR	SAFETY SYSTEM PERFORMANCE	BOP & THERMAL PERFORMANCE	FUEL RELIABILITY		
	UNPLANNED CAPABILITY LOSS FACTOR					
MANAGEMENT SYSTEM PERFORMANCE	OPERATIONS PROGRAMS	MAINTENANCE PROGRAM GREEN	SURVEILLANCE PROGRAM	PLANNED OUTAGES		
	RADIATION PROTECTION & ALARA	CHEMISTRY PROGRAM	WASTE SYSTEMS	EMERGENCY PREPAREDNESS GREEN	ENVIRONMENTAL SAFETY YELLOW	SECURITY GREEN
	REGULATORY PERFORMANCE	OPEX PROGRAM GREEN	NRC/INPO REVIEWS GREEN	TECHNICAL SUPPORT GREEN	ENGINEERING SUPPORT GREEN	

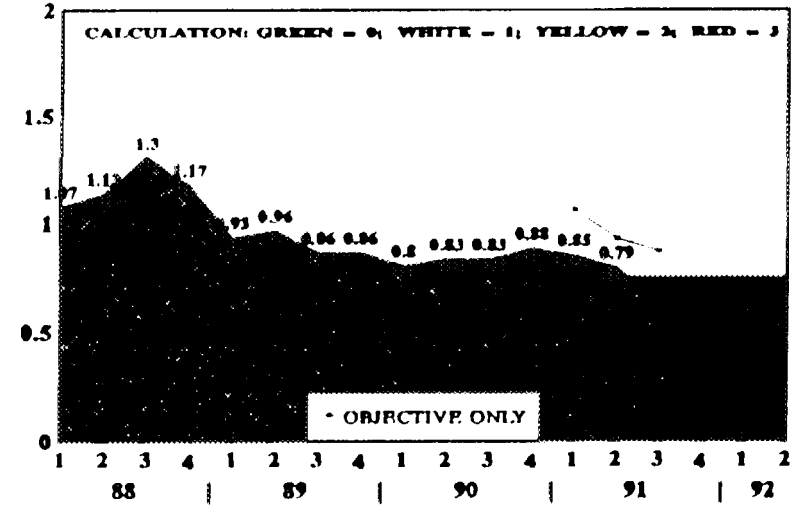
PLANT MONITOR TRENDS



UPS AND DOWNS

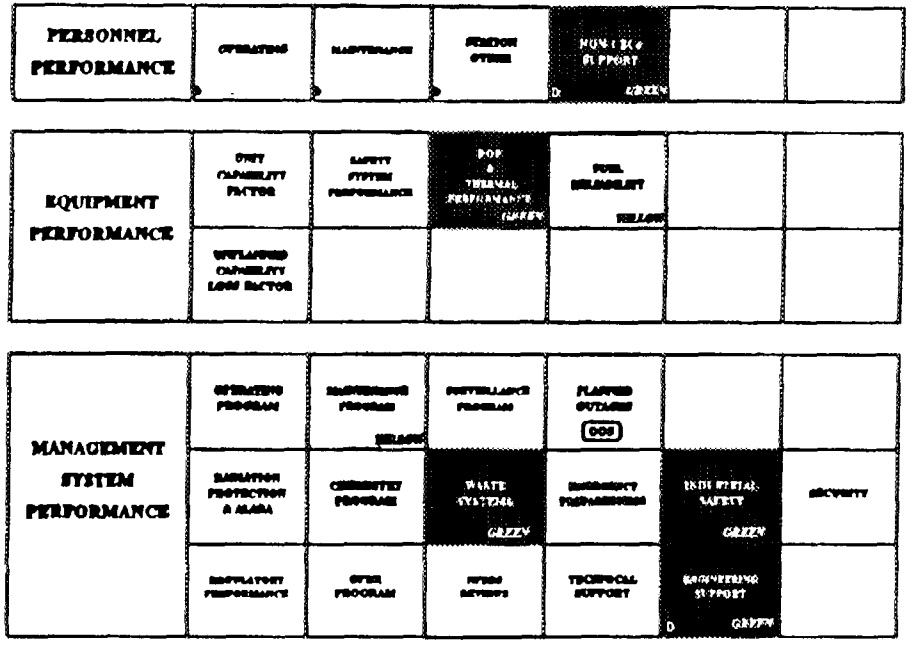


AVERAGE WINDOW COLOR

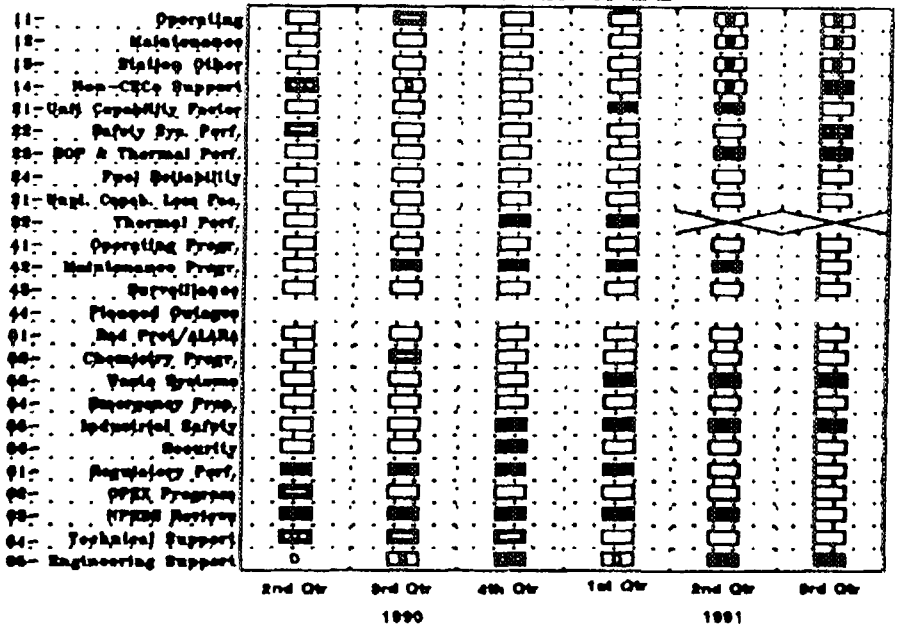


ZION STATION THIRD QUARTER 1991

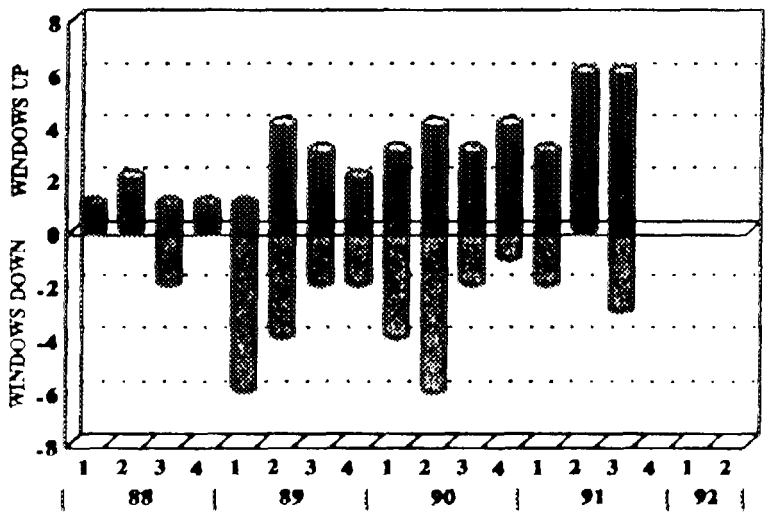
PERFORMANCE EVALUATION



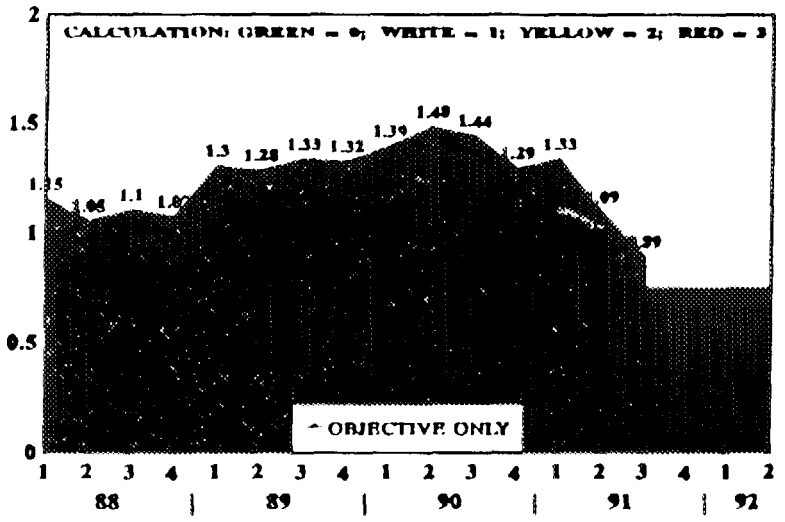
PLANT MONITOR TRENDS



UPS AND DOWNS

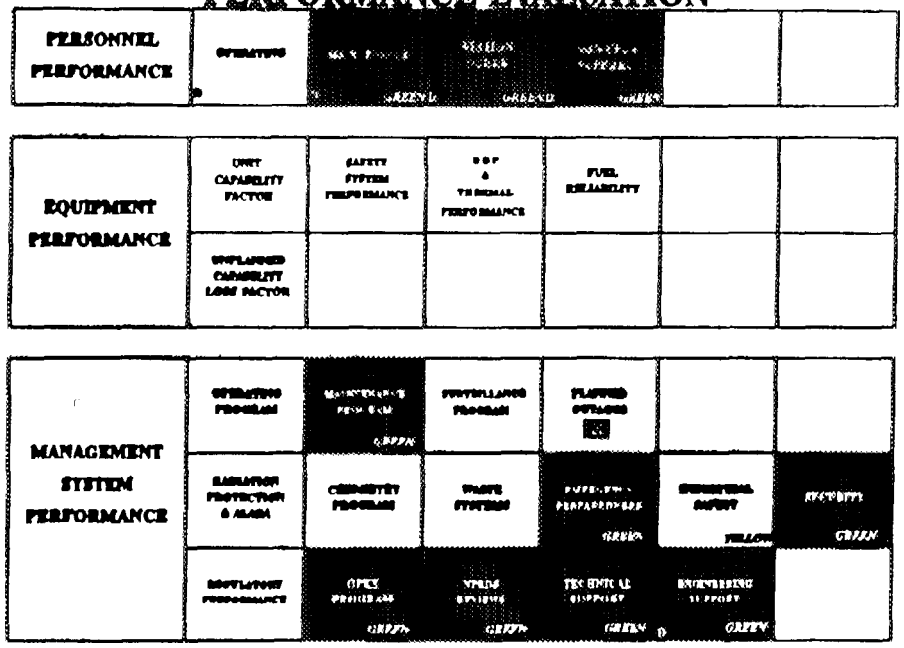


AVERAGE WINDOW COLOR

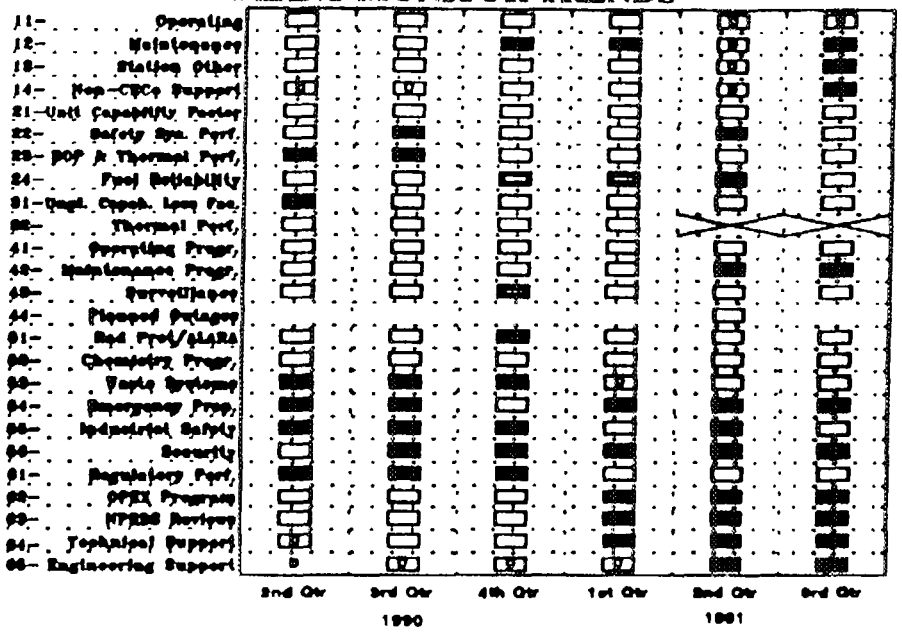


BRAIDWOOD STATION THIRD QUARTER 1991

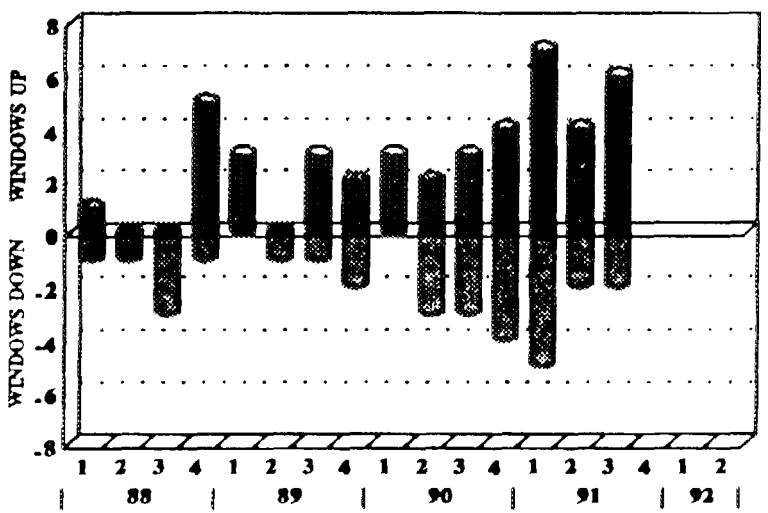
PERFORMANCE EVALUATION



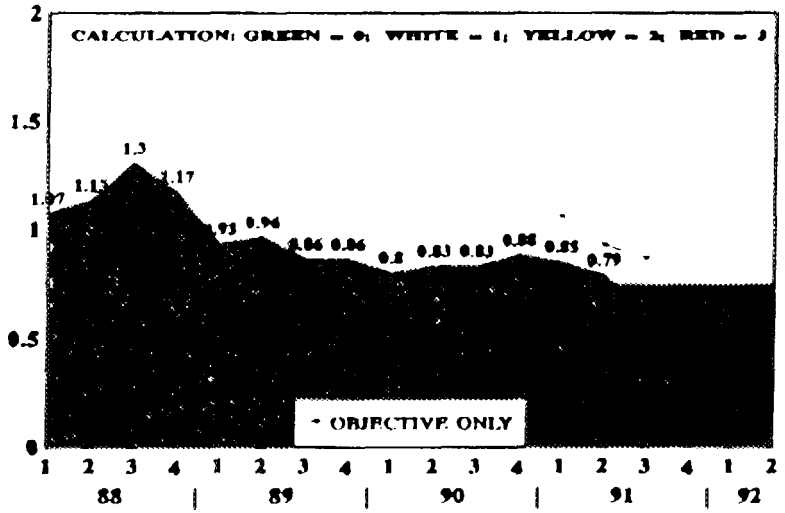
PLANT MONITOR TRENDS



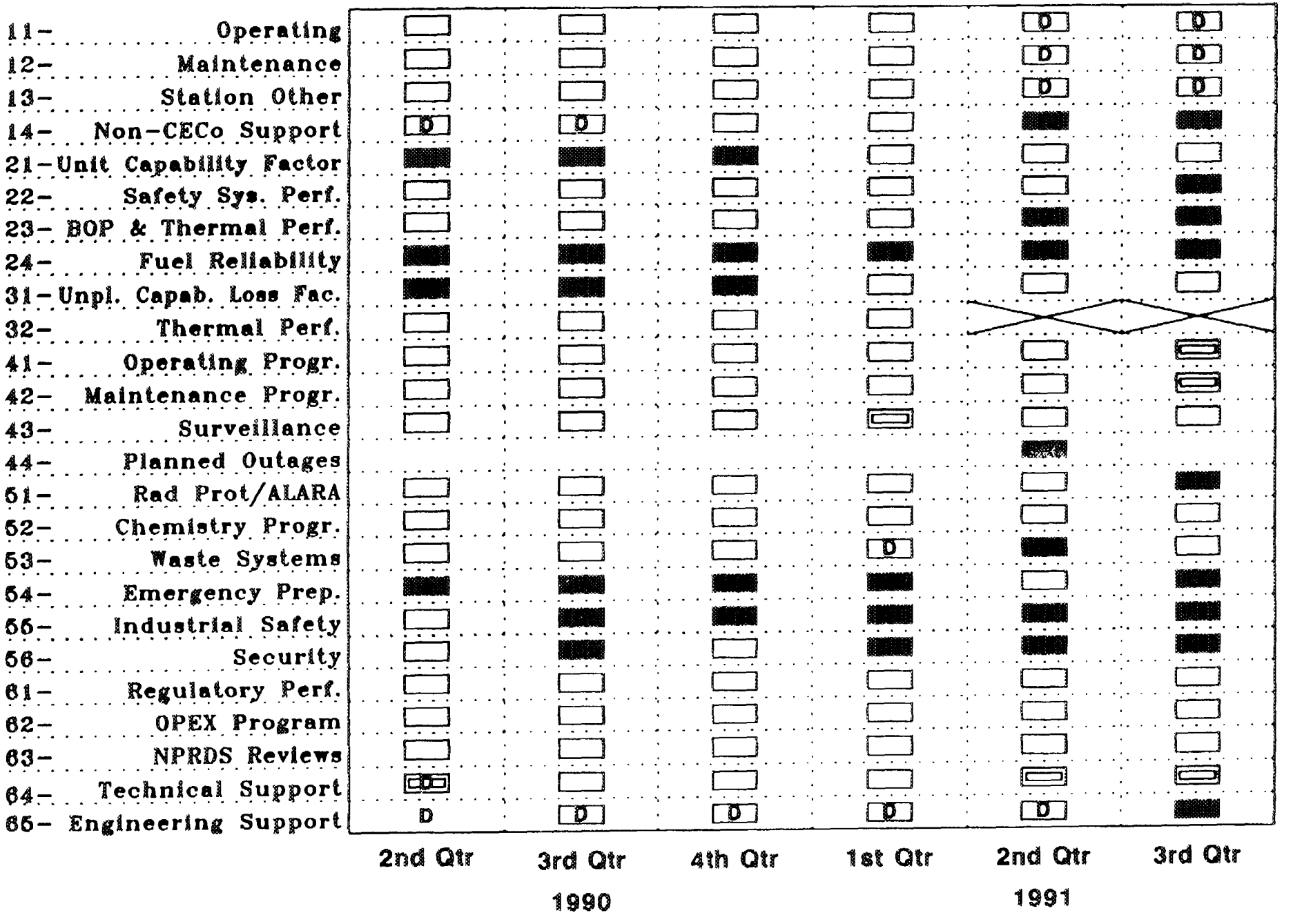
UPS AND DOWNS



AVERAGE WINDOW COLOR

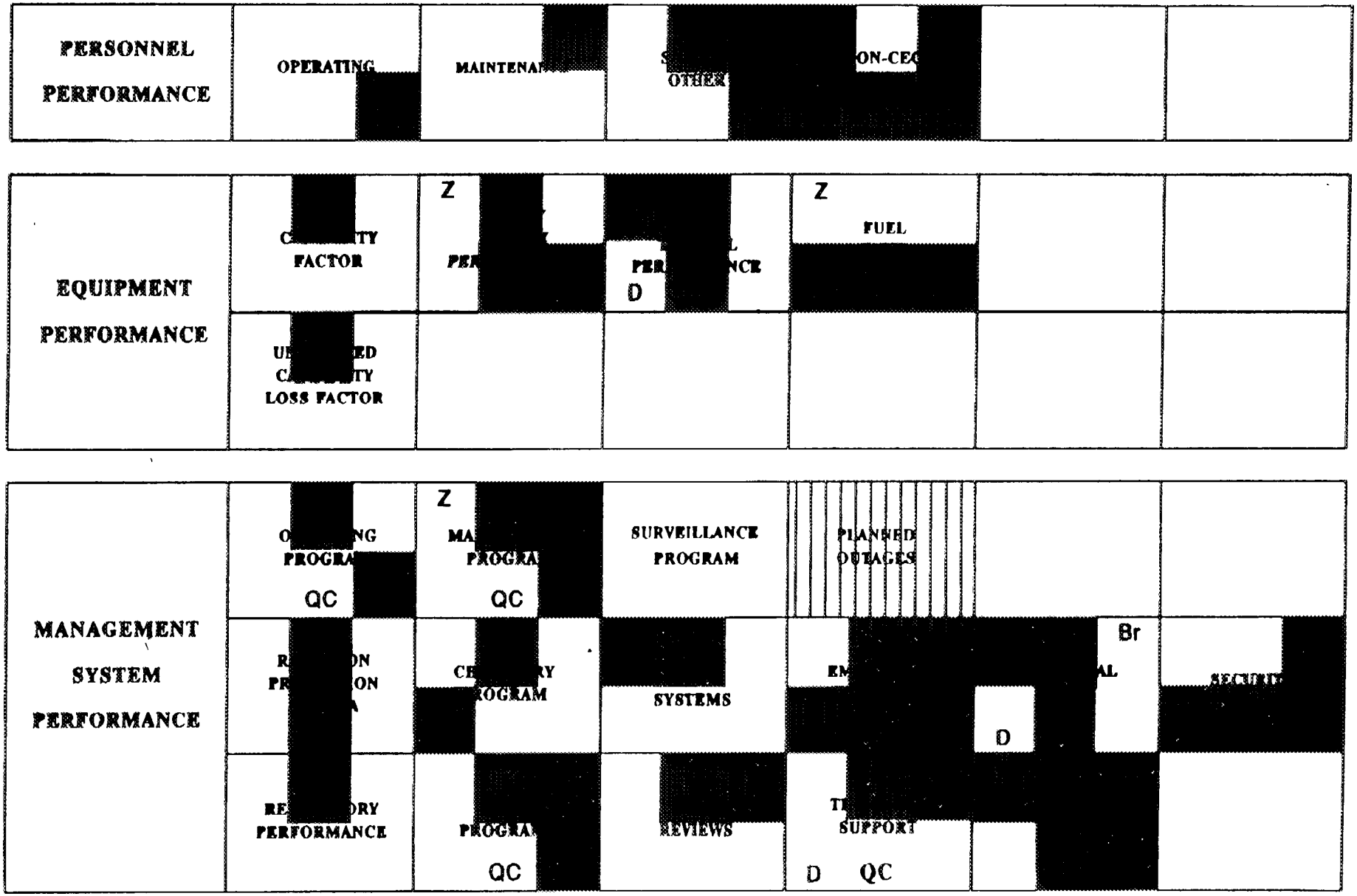


PLANT MONITOR TRENDS



INTEGRATED STATION PERFORMANCE SUMMARY

Third Quarter 1991



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The importance to improve the Safety Culture continuously

-or it will deteriorate

A Swedish illustration

Presentation by Erik Jende, SIP on the IAEA workshop for senior managers:
"ENHANCEMENT OF SAFETY CULTURE IN THE OPERATION OF NPPs."
Visaginas, Lithuania May 6-9, 1997.

A BWR plant with units commissioned in 1975 and 1977

Exellent production records up to 1991. Very good assessments by OSART and SKI

During 1991-96 several events occurred and recurred during outages and operation:

- violation of procedures
- lack of vigilance in control room work
- short-cut of the work permit routines
- identified deficiences in plant documentation were not corrected
- actions were taken without checking the preconditions
- deficiences in operational verifications after maintenance
- in some cases supervisors were not present at important work moments during outage
- recommended actions to prevent recurrance of events were not implemented
- in some cases actions were taken fast after insufficient preparations

It was also identified:

- poor external experience feed back
- low engagement in Quality Assurance
- maintenance back log

WHY did it happen?

The plant´s organisational history will indicate some answers

1. Build up phase 1975-85

- Small traditional operating organisation with strong technical support from corporate HQ
- Power production availability was the only main objective
- Good engineers were promoted managers
- Strong individual responsibilities for parts of the plant (ownership)
- Entrepreneurial like enthusiasm for work based on:
  - advanced technical development work
  - focus on results
  - low degree of formalism
  - small requirements on documentation of work

2. Administration phase 1985-90

- Very good production results
- Indications of complacency in the organisation
- More economic pressure from the owner, emphasis was moved from operation to maintenance
- Small and informal organisation with focus on short term issues
- Low delegation of management, a small group of people was heavily engaged in all projects
- Very strong and independent maintenance managers, weaker overall management and overview → indications of insufficient communication between the main departments

3. Development phase 1991-93

- The plant director identified need for development, but there wa little response from the organisation

- Stepwise minor changes were introduced:
  - objectives for safety, reliability and efficiency
  - integration of minor departments
  - group management in workshops, laboratories and stores in order to get more individual engagement
  - project organisations were introduced for outages and plant modifications
  - internal seminars were conducted (but with no success) to make aware the connection between objectives and quality of work

- Both units were shut down in 1992 because of problems with the ECCS. This was a clear indication for all that the plant was not perfect and that a steady and systematic work was needed for improvement.

- The project to correct the ECCS problems was not as effective as usual. This made it clear to the personnel that a change in organisation and work procedures was needed.

4. Renewal phase 1994-

- A comprehensive organisational change was implemented in 1994 after a very short period of preparation:
  - the operating organisation was made a complete utility
  - overall production management was introduced
  - all maintenance was organised in one integrated service department
  - the two units were divided and made different production organisations
  - internal invoicing of all services was introduced
  - internal monopolies were to be abolished
  - most of the personnel got new tasks

- Routines and procedures needed for the new organisation were not in place at the implementation:
  - a new quality system
  - a new economy system
  - new work procedures
  - competence analysis

- Many problems occurred in the new organisation because of unclear roles, lack of procedures and dubble work load.

- The new organisation was not accepted by all staff and a few key persons left the plant.

- After 3 years and several ambitious management programs to address the problems, the new organisation is stabilising and things are going better

Some lessons learned:

- Safety issues must always be in constant attention by plant management on all levels
- Decisions must be based on good analysis and always followed up by management
- Real actions taken or not taken by management are much more important for Safety Culture than words
- Efficient systematic methods for experience feed back and investigation of events must be in place
- Resources must be in place for long term planning and systematic safety work in order to avoid crash programs
- It is important to evaluate the NPP organisation, safety programs and work procedures on a regular basis in order to make well prepared adjustments in good time before problems accumulate
- In times of good plant performance safety issues must get extra attention
- Not only the objectives but also the processes to achieve safety must be defined, described and understood by all personnel

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Enhancement of Safety Culture in the Operation of Nuclear Power Plants
6-9 May 1997, Visaginas, Lithuania

Safety Culture in Ignalina NPP, Regulatory View

G.Maksimovas, Insp. of VATESI

General

Safety Culture *is that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.*

The definition of Safety culture is possibly the shortest and most precise definition of the general principle which has to be applied during performance of any activity to achieve expected results. INSAG-4, providing basic principles and indicators based on which the Safety Culture should be established and developed, propagates well known but better classified management principles that could easy be applied to any industrial facilities to get the safe and qualitative process. Safety Culture plays specific and fundamental role in management process only in relation with specific objective of nuclear facilities - Nuclear Safety. It is obvious, that weak Safety Culture can make even well designed safety barriers less effective and, on the contrary, well developed and implemented Safety Culture, in the frame of effective Quality Assurance system of NPP, could be, to some extent, a compensatory measure for some design limitations or weaknesses of procedures. We support the idea, that Safety Culture is not the service or product we can buy. Success on the way to a high level Safety Culture in Ignalina NPP may be achieved by daily, well motivated activities with good attitude and proper management participation, ensuring the development and proper implementation of Safety Culture principles within the activities of Operational organisation of Ignalina NPP.

The present situation at Ignalina NPP, Regulatory view

VATESI in it's annual report presenting the results of Regulatory analysis of Nuclear safety in Ignalina NPP during 1996, estimated the Safety culture as still of not satisfactory level. A few of indicators and conclusions related with safety culture are presented below.

- 16 % of events were caused by personal mistakes,
- 55 % of events were caused by failure of equipment,
- quality and effectiveness of preventive maintenance needs strong improvement to ensure its efficiency,
- the development of organisational management structure and procedures have to reflect INSAG-4 principles.

VATESI supports the main conclusions, concerning Safety Culture issues, presented in Safety Analysis Report tasks 8 & 9 and further recommended steps, which are to be taken by NPP to manage this situation:

- implementation of safety policy at all levels in the Operating organisation of Ignalina NPP,
- establishing of practice to encourage reporting of mistakes and errors,
- implementation of training programme on safety culture,
- establishing of safety culture evaluation system based on the IAEA ASCOT methodology.

VATESI agrees with RSR recommendations to put higher priority to the last two tasks. Comprehensive safety improvement program prepared by Ignalina NPP principally reflects all of this findings.

Our present condition of safety culture is the result of very formal attitude and was stipulated by weak legislative and normative basis for Safety culture we had until 1996. Statement presented in OPB-88 about necessity to form safety culture during all activities, that have impact on the safety of nuclear power plants, was not enough or, let us say, far from comprehensive development and reflection of safety culture principles in the regulations. It is also worth mentioning that the plant Management has relatively weak attitude concerning the implementation of fundamental principles of Safety culture into activities of Ignalina NPP.
As regulators we also share understanding of necessity to implement the safety culture principles into our activities. Today VATESI performs comprehensive process of self development mainly aimed to ensure proper management of licensing activities. The process includes the following:

- reviewing and development of regulatory documentation,
- development of internal QA system,
- changes in organisational structure of VATESI,
- improvement of TSO, transferring regulatory view to the safety culture,
- training of VATESI and TSO staff,
- new style of interactions between VATESI and NPP, reflecting INSAG-4 principles,
- clarifying of responsibilities of Regulatory Body and Ignalina NPP in accordance with new Nuclear Law, by giving some responsibilities to Ignalina NPP step by step (for example, supervision of suppliers, issuing some of permissions to them to perform safety related works in Ignalina NPP),
- and others

Today we are able to perform many of those steps, because we have legislative basis for taking such decisions.

Legislative and normative basis

Up to 1996 there was no legislative basis in Lithuania for establishing statements, based on which Safety Culture had to be developed in nuclear facilities. Normative

basis for that was given in General Rules for Nuclear Plant Safety Provision (OPB-88). But again there was just a declaration of necessity to form Safety Culture without further development of Safety Culture basic principles in other normative documents. Today Safety Culture has comprehensive legislative and normative basis. Nuclear Law was adopted by Lithuanian Parliament in November, 1996. It has established the following:

- the basis for the management of nuclear energy,
- the principles of state regulation of nuclear safety and radiation protection in sphere of nuclear energy,
- principal conditions for licensing in the sphere of nuclear energy,
- special conditions for nuclear facility design and construction,
- principal conditions for operating nuclear facilities
- principal conditions for export and import of nuclear materials and equipment,
- principal conditions for transportation and storage of nuclear and radioactive materials used in sphere of nuclear energy,
- basic requirements for the physical protection of nuclear facilities,
- basic requirements for the prevention and management of nuclear and radiological accidents,
- the principles of liability in sphere of nuclear energy,
- the major economic and financial conditions in sphere of nuclear activities,
- the specific features of labour relations in sphere of nuclear energy.

Nuclear Law gives all the responsibility for safety of nuclear facility to the Operating organisation.

On the basis of Article 27, General Provisions of the Activities of the Licence Issuing Authority, the institutions issuing licences for certain type of activity in the nuclear energy sector, are obliged to ensure, that enterprises, obtaining the licence, shall guarantee Nuclear Safety Culture during performance of licensed activities.

In January, 1995 VATESI worked out the Requirements to the Operational Organisation of NPP, which require to form safety culture in management level as well as develop the sense of personal responsibility of the staff for the safety of NPP.

In October, 1996 VATESI issued General Requirements for the Quality Assurance System in Nuclear Facilities VD-KS-BR- 001-0-95. Based on this Regulation:

- IAEA safety guides 50-C-QA, ISO standards and Safety report INSAG-4 are adopted as National regulations in accordance to which QA system in nuclear facilities are to be developed and maintained,
- Administration of nuclear facility is obliged to establish QA department, that would be independent from other departments and subordinated to General Manager of nuclear facility,
- the Operating Organisation of NPP is obliged to supervise and assess the acceptability of QA system and safety culture of main suppliers of services and

goods, to perform necessary audits for that and transfer the reports to the Regulatory Body.

Based on this umbrella type requirements and with support from Sydkraft Consult (Sweden) experts Ignalina NPP is close to conclude the first level of AQ program, which will be a good basis for further development of safety culture within the INPP activities. The next step and much more complicated task is to ensure proper understanding of main goals declared in QA policy and effective implementation of those goals into INPP activities

Safety Culture *is that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.*

- 16% EVENTS WERE CAUSED BY PERSONAL MISTAKES,
- 55% EVENTS WERE CAUSED BY FAILURE OF EQUIPMENT,
- QUALITY AND EFFECTIVENESS OF PREVENTIVE MAINTENANCE NEEDS STRONG IMPROVEMENT TO ENSURE ITS EFFICIENCY,
- THE DEVELOPMENT OF ORGANISATIONAL MANAGEMENT STRUCTURE AND PROCEDURES HAVE TO REFLECT INSAG-4 PRINCIPLES.

ISP, SAR, RSR FINDINGS AND RECOMMENDATIONS

- IMPLEMENTATION OF SAFETY POLICY AT ALL LEVELS IN THE OPERATING ORGANISATION OF IGNALINA NPP,
- ESTABLISHING OF PRACTICE TO ENCOURAGE REPORTING OF MISTAKES AND ERRORS,
- IMPLEMENTATION OF TRAINING PROGRAMME ON SAFETY CULTURE,
- ESTABLISHING OF SAFETY CULTURE EVALUATION SYSTEM BASED ON THE IAEA ASCOT METHODOLOGY

VATESI INTERNAL ACTIVITIES REFLECTING IMPLEMENTATION OF SAFETY CULTURE

- **REVIEWING AND DEVELOPMENT OF REGULATORY DOCUMENTATION,**
- **DEVELOPMENT OF INTERNAL QA SYSTEM,**
- **CHANGES IN ORGANISATIONAL STRUCTURE OF VATESI,**
- **IMPROVEMENT OF TSO, TRANSFERRING REGULATORY VIEW TO THE SAFETY CULTURE,**
- **TRAINING OF VATESI AND TSO STAFF,**
- **NEW STYLE OF INTERACTIONS BETWEEN VATESI AND NPP, REFLECTING INSAG-4 PRINCIPLES,**
- **CLARIFYING OF RESPONSIBILITIES OF REGULATORY BODY AND IGNALINA NPP IN ACCORDANCE WITH NEW NUCLEAR LAW, BY GIVING SOME RESPONSIBILITIES TO IGNALINA NPP STEP BY STEP (FOR EXAMPLE, SUPERVISION OF SUPPLIERS, ISSUING SOME OF PERMISSIONS TO THEM TO PERFORM SAFETY RELATED WORKS IN IGNALINA NPP),**
- **AND OTHERS**

THE NUCLEAR LAW GIVES:

⇒THE BASIS FOR THE MANAGEMENT OF NUCLEAR ENERGY,

⇒THE PRINCIPLES OF STATE REGULATION OF NUCLEAR SAFETY AND RADIATION PROTECTION IN SPHERE OF NUCLEAR ENERGY,

⇒PRINCIPAL CONDITIONS FOR LICENSING IN THE SPHERE OF NUCLEAR ENERGY,

⇒SPECIAL CONDITIONS FOR NUCLEAR FACILITY DESIGN AND CONSTRUCTION,

⇒PRINCIPAL CONDITIONS FOR OPERATING NUCLEAR FACILITIES

⇒PRINCIPAL CONDITIONS FOR EXPORT AND IMPORT OF NUCLEAR MATERIALS AND EQUIPMENT,

⇒PRINCIPAL CONDITIONS FOR TRANSPORTATION AND STORAGE OF NUCLEAR AND RADIOACTIVE MATERIALS USED IN SPHERE OF NUCLEAR ENERGY,

⇒BASIC REQUIREMENTS FOR THE PHYSICAL PROTECTION OF NUCLEAR FACILITIES,

⇒BASIC REQUIREMENTS FOR THE PREVENTION AND MANAGEMENT OF NUCLEAR AND RADIOLOGICAL ACCIDENTS,

⇒THE PRINCIPLES OF LIABILITY IN SPHERE OF NUCLEAR ENERGY,

⇒THE MAJOR ECONOMIC AND FINANCIAL CONDITIONS IN SPHERE OF NUCLEAR ACTIVITIES,

⇒THE SPECIFIC FEATURES OF LABOUR RELATIONS IN SPHERE OF NUCLEAR ENERGY.

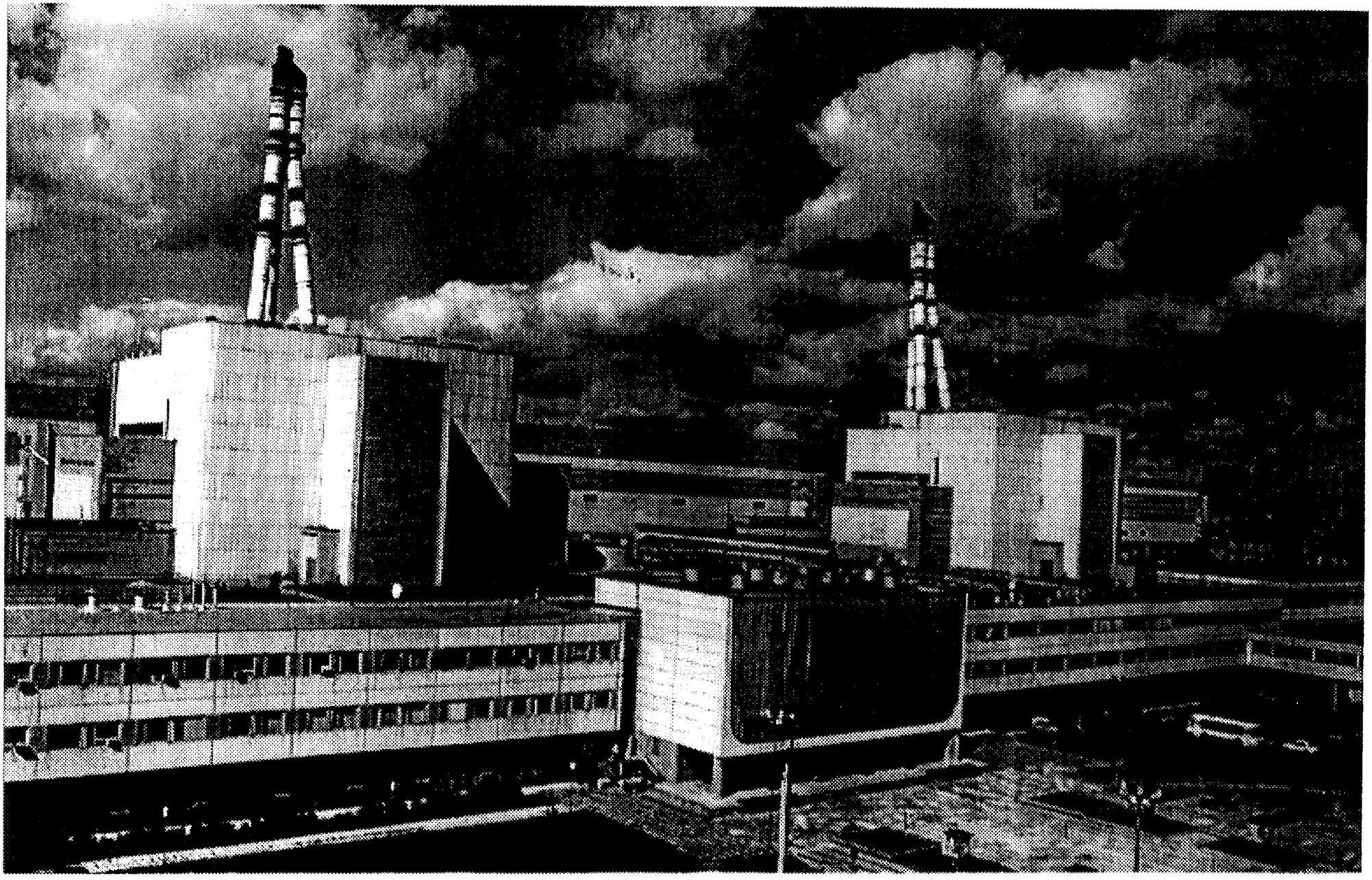
* ON THE BASIS OF ARTICLE 27, GENERAL PROVISIONS OF THE ACTIVITIES OF THE LICENCE ISSUING AUTHORITY, THE INSTITUTIONS ISSUING LICENCES FOR CERTAIN TYPE OF ACTIVITY IN THE NUCLEAR ENERGY SECTOR ARE OBLIGED TO ENSURE THAT ENTERPRISES OBTAINING THE LICENCE SHALL GUARANTEE NUCLEAR SAFETY CULTURE DURING PERFORMANCE OF LICENSED ACTIVITIES.
* IN JANUARY, 1995 VATESI WORKED OUT THE REQUIREMENTS TO THE OPERATIONAL ORGANISATION OF NPP, WHICH REQUIRE TO FORM SAFETY CULTURE IN MANAGEMENT LEVEL AS WELL AS DEVELOP THE SENSE OF PERSONAL RESPONSIBILITY OF THE STAFF FOR THE SAFETY OF NPP.
* IN OCTOBER, 1996 VATESI ISSUED GENERAL REQUIREMENTS FOR QUALITY ASSURANCE SYSTEM IN NUCLEAR FACILITIES VD-KS-001...

BASED ON THIS REGULATION

* IAEA SAFETY GUIDES 50-C-QA, ISO STANDARDS AND SAFETY REPORT INSAG-4 ARE ADOPTED AS NATIONAL REGULATIONS IN ACCORDANCE TO WHICH QA SYSTEM IN NUCLEAR FACILITIES ARE TO BE DEVELOPED AND MAINTAINED,
* ADMINISTRATION OF NUCLEAR FACILITY IS OBLIGED TO ESTABLISH QA DEPARTMENT, THAT WOULD BE INDEPENDENT FROM OTHER DEPARTMENTS AND SUBORDINATED TO GENERAL MANAGER OF NUCLEAR FACILITY,

* THE OPERATING ORGANISATION OF NPP IS OBLIGED TO SUPERVISE AND ASSESS THE ACCEPTABILITY OF QA SYSTEM AND SAFETY CULTURE OF MAIN SUPPLIERS OF SERVICES AND GOODS, TO PERFORM NECESSARY AUDITS FOR THAT AND TRANSFER THE REPORTS TO THE REGULATORY.

IGNALINA NUCLEAR POWER PLANT



Safety and Quality Assurance Policy of Ignalina Nuclear Power Plant

Realizing clearly that INPP management bears the full and official responsibility for the safety of the plant we state that:

The aim of Ignalina NPP is to become the most safe plant with RBMK type of reactor an economically competitive wise among the existing ones.

To reach this aim it is necessary that:

1. All work at INPP is performed with high level of quality and safety and in addition the safety of the plant should possess the highest priority. Good quality is achieved when all requirements and objectives of the owners are identified and fulfilled.

2. The INPP personnel understands the requirements and objectives of the INPP owners, VATESI and those required by population.

3. The INPP staff takes an active part in the improvement of safety and quality. In order to ensure such participation every employee should know the INPP goals, his own personal tasks and he should be constantly be informed about the results of the work performed at INPP

4. The INPP staff has adequate skills to perform its functions in compliance with the objectives of the plant The level of expertise of every employee is improved to strengthen both the INPP and every individual.

5. All INPP managers show personal activity and leadership. The main task of every manager is formulated in tasks and requirements for each subdivision. The personnel is informed about the tasks and requirements to ensure that every employee understands them and is able to meet them.

6. All work at INPP is continuously evaluated to improve quality and efficiency. INPP and its staff use their own experience and that of others to improve organization, operation and their own competence.

7. INPP and every employee are responsible to the community for meeting all regulations and laws with a safety margin. One of INPP goals is the welfare of its employees, their families and all population of Visaginas.

8. Efficient and integrated safety and quality assurance program is adopted at INPP.

If INPP Director General is able to give positive answers to each of the above mentioned items, the plant will operate to the required level of quality. If the employees are able to give positive answers to each of the above mentioned items, they will perform their job to the required level of quality.

In order to fulfil the mentioned tasks, Director General commits Safety and Quality Assurance Service to lead the work on the adoption of the Program, on the development of more detailed quality assurance procedures, their coordination with the documentation of other INPP subdivisions and also to conduct the training of the personnel in the field o quality.

ИАЭС

Культура безопасности - это такой набор характеристик и особенностей деятельности организаций и поведения отдельных лиц, который устанавливает, что проблемам безопасности АС, как обладающим высшим приоритетом, уделяется внимание, определяемое их значимостью.

IGNALINA NUCLEAR POWER PLANT

Культура безопасности

ИНИЦИАТИВЫ ИАЭС ПО ПОВЫШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ

- **Политика в области безопасности и Обеспечения качества (май 1995 года)**

- **Служба безопасности и Обеспечения качества (начало 1996 года)**

- **Показатели безопасности (1996 год)**

- **Комитет безопасности ИАЭС (1996 год)**

ЦЕЛЬ ИАЭС:

СТАТЬ САМОЙ БЕЗОПАСНОЙ СТАНЦИЕЙ С РЕАКТОРАМИ РБМК И БЫТЬ ЭКОНОМИЧЕСКИ КОНКУРЕНТНОСПОСОБНОЙ СРЕДИ ВСЕХ ЭНЕРГЕТИЧЕСКИХ УСТАНОВОК.

АДМИНИСТРАЦИЯ ИАЭС НЕСЕТ ПОЛНУЮ ОТВЕТСТВЕННОСТЬ ЗА БЕЗОПАСНОСТЬ СТАНЦИИ.

ДЛЯ ДЛИТЕЛЬНОГО ВЫЖИВАНИЯ ИАЭС, БЛАГОПОЛУЧИЯ ПЕРСОНАЛА ИАЭС И ЖИТЕЛЕЙ ВИСАГИНАСА МЫ ДОЛЖНЫ СЛЕДОВАТЬ СЛЕДУЮЩИМ ЦЕЛЯМ И ПОЛИТИКЕ:

1. РАБОТЫ НА ВСЕХ УРОВНЯХ ВЫПОЛНЯЛИСЬ БЕЗОПАСНО И С ВЫСОКИМ КАЧЕСТВОМ, ПРИ ЭТОМ БЕЗОПАСНОСТЬ СТАНЦИИ ОБЛАДАЛА БЫ НАИВЫСШИМ ПРИОРИТЕТОМ

- **МЫ СМОЖЕМ ДОСТИЧЬ ВЫСОКОГО УРОВНЯ БЕЗОПАСНОСТИ ТОЛЬКО ЧЕРЕЗ КАЧЕСТВО РАБОТЫ КАЖДОГО РАБОТНИКА НА ВСЕХ УРОВНЯХ**

- **ПРИ ПРИНЯТИИ ЛЮБЫХ РЕШЕНИЙ МЫ ДОЛЖНЫ ОТДАВАТЬ ПРИОРИТЕТ БЕЗОПАСНОСТИ СТАНЦИИ**

- **ЭТИ ЦЕЛИ ПРИВЕДУТ К НАДЕЖНОЙ РАБОТЕ СТАНЦИИ И ДОВЕРИЮ ОБЩЕСТВЕННОСТИ.**

2. ПЕРСОНАЛ ИАЭС ХОРОШО ПОНИМАЛ ТРЕБОВАНИЯ И ЦЕЛИ ВЛАДЕЛЬЦЕВ ИАЭС, VATESI И НАСЕЛЕНИЯ

- **ВЛАДЕЛЕЦ ОБЪЕКТА, VATESI И НАСЕЛЕНИЕ ИМЕЮТ СВОИ ЦЕЛИ И СООТВЕТСТВУЮЩИЕ ТРЕБОВАНИЯ**

- **МЫ ДОЛНЫ ПОНИМАТЬ, ПОЧЕМУ МЫ ДЕЛАЕМ НАШУ РАБОТУ ТАК, А НЕ ИНАЧЕ**

- **МЫ ДОЛНЫ СЛЕДОВАТЬ ПРОЦЕДУРАМ В ОБЛАСТИ БЕЗОПАСНОСТИ И ОБЕСПЕЧЕНИЯ КАЧЕСТВА**

- **МЫ ДОЛЖНЫ АНАЛИЗИРОВАТЬ И УЛУЧШАТЬ ЭТИ ПРОЦЕДУРЫ.**

3. ВЕСЬ ПЕРСОНАЛ ПРИНИМАЛ АКТИВНОЕ УЧАСТИЕ В ПОВЫШЕНИИ БЕЗОПАСНОСТИ И КАЧЕСТВА

- **КАЖДЫЙ РАБОТНИК ДОЛЖЕН ЗНАТЬ ЦЕЛИ ИАЭС И СВОИ СОБСТВЕННЫЕ ЗАДАЧИ**

- **КАЖДЫЙ РАБОТНИК ДОЛЖЕН ПОЛУЧАТЬ ИНФОРМАЦИЮ О РЕЗУЛЬТАТАХ РАБОТ НА ИАЭС**

4. ВЕСЬ ПЕРСОНАЛ ИМЕЛ ДОСТАТОЧНУЮ КВАЛИФИКАЦИЮ ДЛЯ ВЫПОЛНЕНИЯ СВОИХ ЗАДАЧ В СООТВЕТСТВИИ С ЦЕЛЯМИ СТАНЦИИ

- **МЫ ДОЛЖНЫ БЫТЬ ГОТОВЫ К НОВЫМ УСЛОВИЯМ И МЕТОДАМ РАБОТЫ**

- **МЫ ВСЕГДА МОЖЕМ СТАТЬ ЛУЧШЕ, ЧЕМ СЕЙЧАС**

5. ВСЕ РУКОВОДИТЕЛИ ИАЭС ПРОЯВИЛИ ЛИЧНУЮ АКТИВНОСТЬ И ЛИДЕРСТВО

- **РУКОВОДИТЕЛИ И ИХ ПЕРСОНАЛ ДОЛЖНЫ ХОРОШО ПОНИМАТЬ ЗАДАЧИ И ЦЕЛИ И БЫТЬ ПРИМЕРОМ В ИХ ВЫПОЛНЕНИИ**

6. ВСЕ РАБОТЫ НА ИАЭС ПОСТОЯННО ОЦЕНИВАЛИСЬ С ЦЕЛЬЮ ПОВЫШЕНИЯ ИХ КАЧЕСТВА И ЭФФЕКТИВНОСТИ

- **МЫ ДОРЛЖНЫ ИСПОЛЬЗОВАТЬ СВОЙ ОПЫТ ДЛЯ УЛУЧШЕНИЯ ПРОЦЕДУР И ПРАКТИКИ НА ИАЭС**

- **ОПЫТ ОШИБОК ДОЛЖЕН ИСПОЛЬЗОВАТЬСЯ ТОЛЬКО ДЛЯ УЛУЧШЕНИЯ ПРОЦЕДУР И ИХ ПРЕДОТВРАЩЕНИЯ**

- **НЕОБХОДИМО ИСПОЛЬЗОВАТЬ ОПЫТ ДРУГИХ СТАНЦИЙ И ОРГАНИЗАЦИЙ ДЛЯ УЛУЧШЕНИЯ СВОЕЙ РАБОТЫ**

7. ИАЭС И КАЖДЫЙ ЕЕ РАБОТНИК НЕСЛИ ОТВЕТСТВЕННОСТЬ ПЕРЕД ОБЩЕСТВОМ

- **ВСЕ ЗАКОНЫ И НОРМАТИВНЫЕ АКТЫ СОБЛЮДАЮТСЯ С ДОСТАТОЧНЫМ ЗАПАСОМ**

- **МЫ ДОЛЖНЫ БЫТЬ НЕ ТОЛЬКО БЕЗОПАСНЫ, НО И БЫТЬ СПОСОБНЫМИ УБЕДИТЬ В ЭТОМ ОБЩЕСТВЕННОСТЬ**

8. НА ИАЭС ВНЕДРЯЛАСЬ ЭФФЕКТИВНАЯ ПРОГРАММА УПРАВЛЕНИЯ И ОБЕСПЕЧЕНИЯ КАЧЕСТВА

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- **ПРОГАРММА ОБЕСПЕЧЕНИЯ КАЧЕСТВА -**

ЭФФЕКТИВНЫЙ ИНСТРУМЕНТ ДЛЯ ТОГО, ЧТОБЫ ПОДДЕРЖАТЬ НАС В ВЫПОЛНЕНИИ НАШЕЙ ПОЛИТИКИ

ПОКАЗАТЕЛИ БЕЗОПАСНОСТИ (начало 1996 г.)

Невозможно управлять тем , что ускользает от измерения.

Следующие показатели используется для оценки безопасности и эффективности работы станции.

- количество выработанной электроэнергии;
- коэффициент готовности;
- незапланированные автоматические остановы реактора;
- радиоактивные выбросы в окружающую среду;
- коллективная и индивидуальная доза облучения персонала (принцип ALARA);
- работоспособность систем безопасности;
- число значимых для безопасности событий (INES);
- показатель надежности ядерного топлива;
- показатель потерь рабочего времени из-за несчастных случаев;
- объем твердых радиоактивных отходов.

КОМИТЕТ БЕЗОПАСНОСТИ ИАЭС (начало 1996 г.)

Общее:

Осуществляет обзор безопасности станции и работ, проводимых на ИАЭС.

Комитет является Консультативным органом Генерального директора и не имеет исполнительной ответственности.

Все члены Комитета на заседаниях представляют только себя, а не свои организации.

КОМИТЕТ БЕЗОПАСНОСТИ ИАЭС

Состав:

9 человек обеспечивают широкую и полную компетентность.

Приглашены представители сотрудничающих организаций.

Заседания:

Протоколы заседаний рассылаются:

- генеральному директору;
- VATESI;
- в подразделения ИАЭС, которых касаются рекомендации.

КОМИТЕТ БЕЗОПАСНОСТИ ИАЭС

Ответственность, полномочия:

Комитет безопасности ответственный только за свои рекомендации Генеральному директору.

Ответственность за безопасность лежит на Генеральном директоре или на тех, кому он ее делегировал.

КОМИТЕТ БЕЗОПАСНОСТИ ИАЭС

Комитет безопасности рассматривает:

- важные модификации станции;
- изменения Регламента и изменение важных ремонтных и эксплутационных процедур;
- изменения основных требований и правил по безопасности;
- отчеты о нарушениях в работе ИАЭС;
- программы испытаний и экспериментов;
- Политику и Программу обеспечения качества.

Культура безопасности

НЕДАВНИЕ ИНИЦИАТИВЫ ИАЭС ПО ПОВЫШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ

- **Аудиты Культуры безопасности (начало 1997 года)**

- **Подготовка буклета с конкретным содержанием Политики**

- **Новые показатели безопасности на 1997 год**

IGNALINA NUCLEAR POWER PLANT

Культура безопасности

НЕДАВНИЕ ИНИЦИАТИВЫ ИАЭС ПО ПОВЫШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ

- **Регулярные совещания Администрации, посвященные проблемам безопасности**

- **Семинары, посвященные принципам Культуры безопасности**

- **Довести до всего персонала доклад INSAG-7 о Чернобыльской аварии**

Культура безопасности

НЕДАВНИЕ ИНИЦИАТИВЫ ИАЭС ПО ПОВЫШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ

- **Политика открытости в области ошибок персонала**

- **Издать буклет «Правила для персонала ИАЭС»**

- **Новое Руководство по сообщениям о необычных событиях на ИАЭС и их анализу**

НЕДАВНИЕ ИНИЦИАТИВЫ ИАЭС ПО ПОВЫШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ

- **Семинар по самооценке Культуры безопасности**
- **Программа Обеспечения Качества ИАЭС**
- **Внедрение Системы Обеспечения Качества ИАЭС**

Структура документов QA Программы

что делать

- ***Уровень 1***

Руководство по обеспечению качества

кто делает

- ***Уровень2***

Процедуры управления

как делать

- ***Уровень 3***

Рабочие инструкции
Технические описания
Чертежи
Планы и графики

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Internal Safety Review Team at Comanche Peak SES

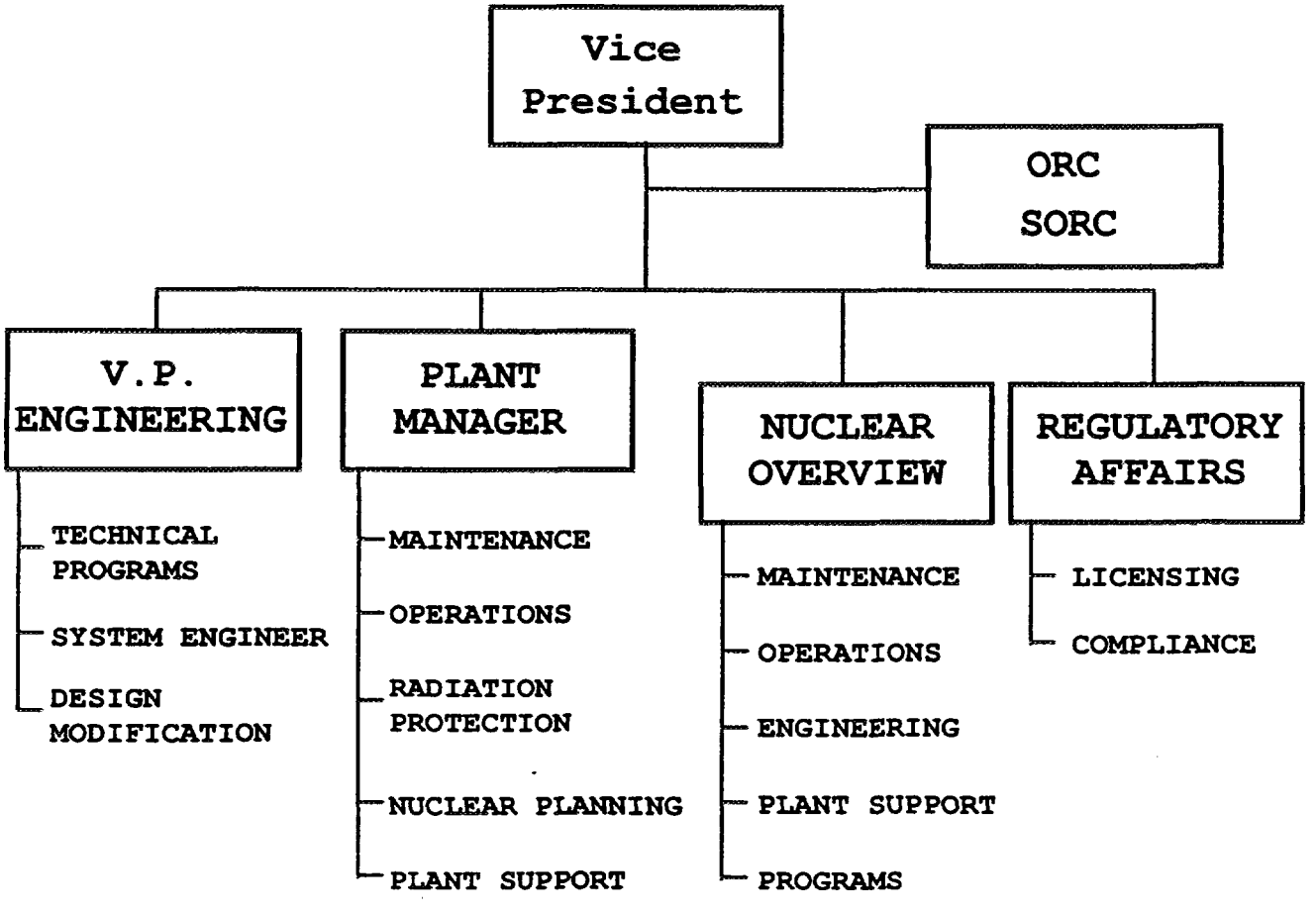
by Doug Davis

Nuclear Overview Manager

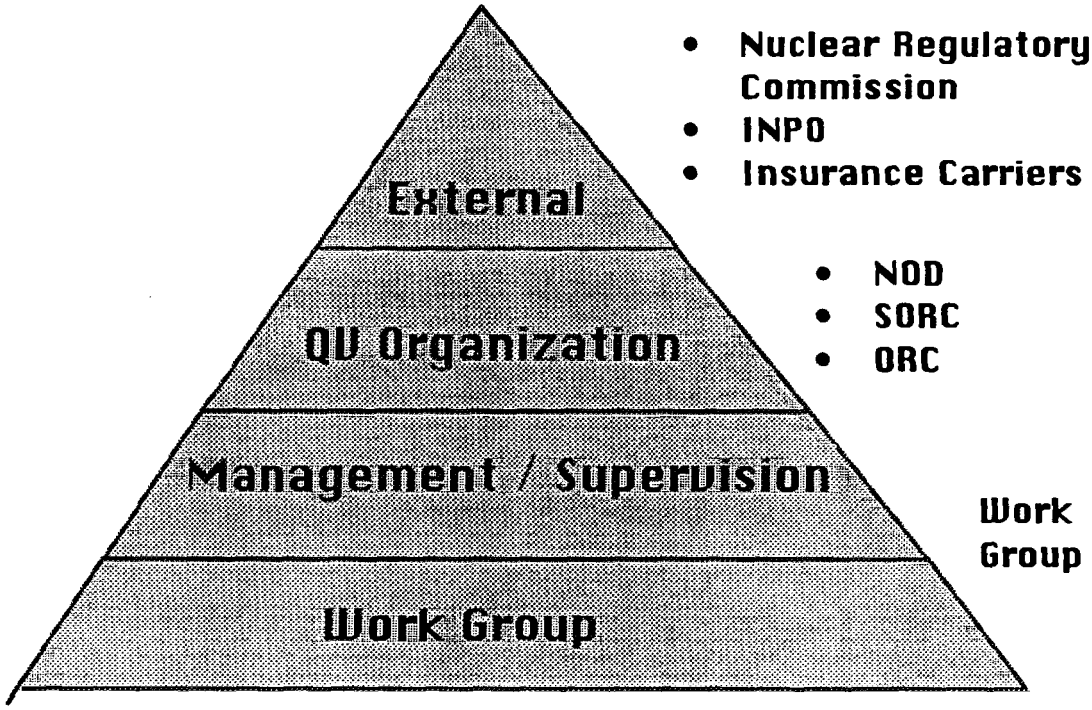
Comanche Peak Steam Electric Station

Texas Utilities

ORGANIZATION



LEVELS OF DEFENSE IN DEPTH



INTERNAL SAFETY REVIEW ORGANIZATIONS

LINE MANAGEMENT - SELF ASSESSMENT

NUCLEAR OVERVIEW - INDEPENDENT ASSESSMENT / EVALUATION

STATION OPERATIONS REVIEW COMMITTEE

OPERATION REVIEW COMMITTEE

METHODS USED TO PERFORM SAFETY ASSESSMENT

- ☑ SELF ASSESSMENT
- ☑ EVALUATION / AUDIT
- ☑ SAFETY COMMITTEE REVIEW
- ☑ QUALITY VERIFICATION

- ☑ ROOT CAUSE ANALYSIS
- ☑ INDUSTRY OPERATING EXPERIENCE REVIEW
- ☑ TECHNICAL ASSESSMENTS
- ☑ TRENDING

SELF ASSESSMENT

OWNER'S OWN ASSESSMENT OF THE PROGRAM PERFORMANCE, EFFECTIVENESS AND PRODUCTS

EVALUATION / AUDIT

ACTIVITY, BY AN INDEPENDENT ORGANIZATION, TO MONITOR, EXAMINE, APPRAISE, ANALYZE ELEMENTS OF A SYSTEM, PROCESS, ACTIVITY OR EVENT

SAFETY COMMITTEE REVIEW

COMMITTEE REVIEW OF CONDITIONS, PROCEDURES, EVALUATIONS AND EVENTS FOR IMPACT ON NUCLEAR SAFETY

QUALITY VERIFICATION

VERIFICATION THAT A PHYSICAL ATTRIBUTE IS CONSISTENT WITH IT'S SPECIFICATION

ROOT CAUSE ANALYSIS

DETERMINATION OF CAUSES OF AN EVENT AND ACTIONS TO CORRECT AND PREVENT IT'S REOCCURRENCE

HUMAN PERFORMANCE PROGRAM

PREVENTION OF EVENTS BY DETECTING AND REDUCING HUMAN ERRORS

INDUSTRY OPERATING EXPERIENCE

LEARNING FROM THE EXPERIENCE OF OTHERS AND SO PREVENTING SIMILAR EVENTS FROM OCCURRING AT OUR PLANT

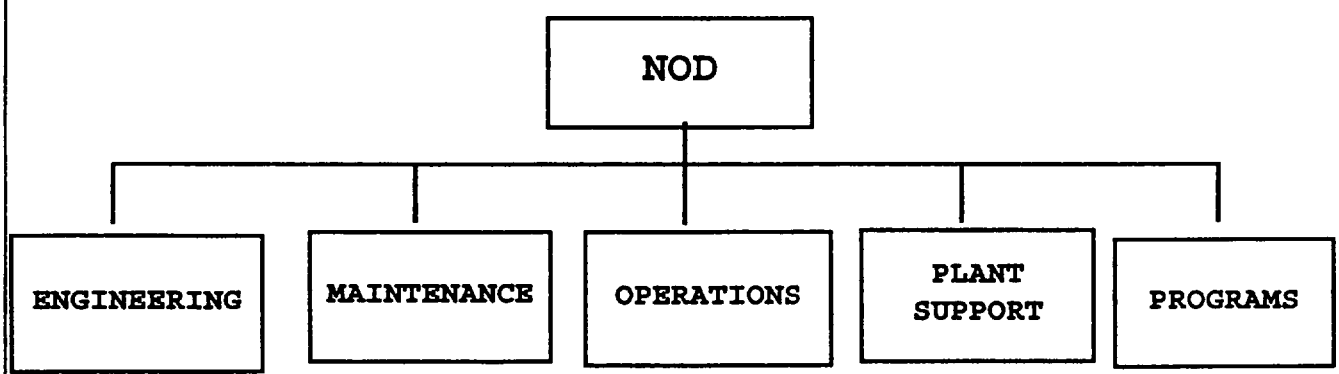
TECHNICAL ASSESSMENTS

ACTIVITY, BY AN INDEPENDENT ORGANIZATION, TO MONITOR, EXAMINE, APPRAISE, ANALYZE ELEMENTS OF A SYSTEM, PROCESS, ACTIVITY OR EVENT

TRENDING

ANALYSIS OF DATA, GATHERED OVER TIME, TO DETECT THE ONSET OF ADVERSE CONDITIONS AND FOCUS ATTENTION BEFORE THE CONDITION BECOMES SIGNIFICANT

FUNCTIONAL ORGANIZATION



FUNCTIONS

- ✓ Evaluations
- ✓ Industry Operating Experience Report/ Independent Safety Engineering Group (IOER/ISEG)
- ✓ Plant Incident Reports/ Root Cause Analysis
- ✓ Inspection Program
- ✓ Non-Destructive Examination Program
- ✓ Self Assessment
- ✓ Trending
- ✓ Procurement Overview
- ✓ Quality Program Maintenance
- ✓ Human Performance Evaluation System
- ✓ NOD Planning/Scheduling

/06

PROMENT LTD
Thomas Eckered
7 May 1997

WORKSHOP FOR SENIOR MANAGERS:
"ENHANCEMENT OF SAFETY CULTURE IN THE OPERATION OF NPPs"

Ignalina NPP, Lithuania, from 6 to 9 May 1997

Review of the Conclusions of the 1996 Workshop on Safety Culture, in Forsmark, Sweden

The IAEA/SiP Senior Managers Workshop on International Promotion of Safety Culture for the NPPs with RBMK reactors was organised by IAEA and the Swedish International Project Nuclear Safety (SiP). It took place at the Forsmark NPP, Sweden, from 1 to 4 October 1996.

The objectives of the workshop were to provide a forum for senior managers to exchange national and international experience on factors influencing safety culture, to better understand these factors and to further enhance promotion of safety culture.

The Workshop participants started work by agreeing to seek the answers to the following three questions:

1. What constitutes a good Safety Culture?
2. What is good and bad in our own countries and plants from a Safety Culture point of view?
3. Where can we find advice and help from our colleagues to improve our own Safety Culture?

This was the first workshop specifically addressing Safety Culture in RBMK countries. The aim was therefore not to produce good practices, but to lay a foundation for further work and development. A follow-up workshop should deepen the understanding of the SC concept and address specific SC matters identified at this Workshop.

The INSAG-4 definition of Safety Culture was taken as a starting point for the discussions, but at the start of the Workshop participants did not seem to have the same understanding of what is contained in the Safety Culture context. Specifically the difference between measures taken to improve safety and establishing a proper Safety Culture level was discussed with useful

results. Several participants also requested proposals for quantitative safety culture indicators, but there was no agreement at this stage about how to define such indicators.

It was obvious that much Safety Culture work is going on in Russia, Ukraine and Lithuania, and not only at the nuclear power plants but also at regulators, utilities and ministries. The tools that are used are different, but the workshop participants agreed that the work proceeds in the right directions. The economic development will influence the speed of implementation of a proper Safety Culture, but not the direction, ambitions and willingness of the parties involved to establish and maintain it.

At the beginning of the Workshop the participants were asked to formulate expectations for the Workshop. At the end they stated that the expectations had been met to a great extent, but that this kind of workshops must be continued with a similar choice of participants. The next one should be organised in about a years time. Then more specific Safety Culture matters should be discussed. The continued IAEA support in the Safety Culture area was requested.

It was not the intention to have neither agreed conclusion or recommendations as a result of the workshop. However, views were expressed and observations were made, that were shared by most or all participants. A number of those are presented below, in the order they were discussed at the Workshop:

- No quantitative Safety Culture **Indicators** were agreed. It was even questioned by some participants if useful such indicators can be defined.
- Safety culture enhancement work is going on in Lithuania, Russia and Ukraine. Approaches and methods of work were different in the three countries, but all work headed in the right direction.
- The participants achieved good understanding of the answers to the following three questions:
  - What constitutes a good Safety Culture?
  - What is good and bad in our own countries and plants from a Safety Culture point of view?
  - Where can we find advice and help from our colleagues to improve our own Safety Culture?
- There should be a second Workshop with more specific Safety Culture matters to be discussed.
- The participants demonstrated successful use of Team Work on the following subjects:
  - Examples of good and bad Safety Culture
  - Judging the Safety Culture level in the RBMK countries
  - International co-operation on Safety Culture issues
  - The roles of government, regulator and operator
- RBMK reactors have been greatly improved technically. Now the staff, on all levels, in all organisations, must change attitudes
- Good Safety Culture begins with
  - Awareness of the importance of each and every job
  - Responsibility of each individual
  - Awareness of the dependency on each other
  - Communication and dialogue.

- Obstacles to good Safety Culture are
  - Over-staffing
  - Bad house-keeping
  - Economic problems
  - Delays in salary payments
  - Uncertainty about political decisions
- Important contributions to a good Safety culture:
  - Establishment of a Safety Committee
  - Management training
  - IAEA Missions and Peer Reviews.
- Excellence in human performance is based on clear, simple structures.
- Safety culture starts with Learning.
- An existing Safety Culture level can always be improved.
- Safety Culture is a never ending effort.

At the summing up of the Workshop there was general agreement that that very much of that had been achieved. There was still work to be done and the participants had strongly requested that another Workshop should be arranged, preferably as an IAEA arrangement. In the meantime the participants had got new means for continuing their efforts to enhance safety culture in their respective countries. They had learnt from each others experiences and they had made contacts that would be useful in their work. It was said that the goods results were due to the active participation by everybody during the week.

The Forsmark very much concentrated on the **Organisational Framework** aspects of Safety Culture. That is entirely understandable because the Workshop was the first of its kind and intended to be a starting point for future similar activities. Therefore what was presented and discussed at Forsmark were matters related to

- Policies
- Strategies
- Procedures
- Instructions, and
- Plans.

What was covered at the Forsmark Workshop was therefore mostly the "hard" aspects of Safety culture. The "soft", human aspects were left for a later occasion, namely for instance:

- Attitudes
- Moral
- Common goals
- Behaviour

Those aspects are related to the **Attitudes of Individuals**, the second main pillar of Safety Culture.

Also when an organisation - the government, the regulator or the operator - has managed to sort out the organisational framework of Safety Culture in a satisfactory way, the attitudes have to be the right ones. There are still difficult **obstacles** in that respect, like

- Ignorance
- Laziness
- Greed
- Criminal behaviour
- Lack of confidence in others
- Egoism
- Effects of unsatisfactory tasks or work conditions,
- and many more .....

Nobody would today argue against the necessity of enhancing Safety Culture. But it is always prudent not to believe too much in what people are saying about Safety Culture, but rather **believe in what they are doing - or not doing - for Safety Culture.**

Организация работы по повышению Культуры безопасности на атомных электростанциях с реакторами типа РБМК-1000 концерна «РОСЭНЕРГОАТОМ»

Заявление о политике концерна «Росэнергоатом » декларирует приоритет обеспечения безопасности атомных станций на всех этапах жизненного цикла над производством электрической и тепловой энергии.

Осуществление такой политики в части обеспечения централизованного управления атомными электростанциями со стороны Эксплуатирующей организации строилось и будет строится исходя из следующих основополагающих принципов:

-все лица и организации , причастные к жизненному циклу атомной станции на всех его этапах , должны руководствоваться в своих действиях и взаимоотношениях принципами «Культуры безопасности»;

-ответственность концерна «Росэнергоатом » , как Эксплуатирующей организации , никоим образом не уменьшается в связи с самостоятельной деятельностью и ответственностью проектировщиков , изготовителей и поставщиков оборудования , строителей , других предприятий и организаций , органов государственного управления, надзора и контроля.

Реализация настоящих принципов проводится и будет проводится впредь руководством концерна «Росэнергоатом», как Эксплуатирующей организации атомных станций, в своей постоянной и повседневной деятельности.

Ядерная безопасность АЭС является высшим приоритетом в деятельности концерна «Росэнергоатом», атомных станций и поддерживающих организаций.

Исходя из убеждения, что «Культура безопасности » является фундаментальным принципом управления безопасной эксплуатацией АС концерном «Росэнергоатом» к настоящему времени разработаны и введены в действие следующие документы:

-«Концепция организации деятельности Эксплуатирующей организации по повышению культуры безопасности»

-«Программа деятельности Эксплуатирующей организации по совершенствованию культуры безопасности»

-«Типовое положение о Совете по культуре безопасности на АЭС, предприятиях и организациях в системе концерна «Росэнергоатом»

-«Положение о Бюро по культуре безопасности Эксплуатирующей организации»

-«Методические указания по разработке программы по повышению культуры безопасности для АЭС, предприятий и организаций в системе концерна «Росэнергоатом»

-«Рабочая расчетная программа для ЭВМ по определению показателей культуры безопасности на АЭС»

К уже действующим документам в 1996 году подготовлены проекты руководящих документов и направлены на отзыв на АЭС:

-«Положение о годовых отчетах по состоянию Культуры безопасности на АЭС концерна «Росэнергоатом»»:

- Руководство по организации информационной системы «обратной связи» и реализации принятых мер по повышению культуры безопасности на АЭС.

До ввода в действие указанных документов запланировано в провести в 1997 году их предварительную обкатку на Курской и Смоленской АЭС.

Отчеты Курской и Смоленской АЭС по состоянию Культуры безопасности по результатам работы за 1996 год, выполненные в соответствии с проектом «Положения о годовых отчетах по состоянию культуры безопасности на АЭС концерна «Росэнергоатом»» будут направлены для анализа во ВНИИАЭС.

По результатам анализа должны быть разработаны предложения по корректировке содержания отчетов, номенклатуре и целесообразности использования отдельных показателей Культуры безопасности.

Создание в организациях атмосферы, исключающей самоуспокоенность, развитие чувства персональной ответственности за безопасность АЭС, как высшего приоритета, обобщается в понятии «Культура безопасности».

Культура безопасности начинается вверху, на уровне руководителя и достигается активной работой всего персонала организации, через осознание ответственности каждого человека.

К настоящему времени заложены основы нормативной базы в области культуры безопасности.

В 1997 г. планируется обобщить замечания атомных станций и утвердить указанные документы. Это позволит выполнить анализ состояния культуры безопасности в 1994 - 1996 годах, выявить тенденции и разработать мероприятия по совершенствованию культуры безопасности на каждой АЭС.

Таким образом 1997 год становится основным, базовым для всей последующей работы по улучшению состояния культуры безопасности в атомной энергетике.

СЕМИНАР РУКОВОДЯЩИХ РАБОТНИКОВ СТАРШЕГО УРОВНЯ ПО УЛУЧШЕНИЮ КУЛЬТУРЫ БЕЗОПАСНОСТИ НА СТАНЦИЯХ С РЕАКТОРАМИ ТИПА РБМК, ЛИТВА 6 - 9 МАЯ 1997г.

Е. Долганов.
Отдел контроля безопасности.
Ленинградская АЭС.
Россия.

Политика эксплуатирующей организации "Ленинградская АЭС" в вопросах культуры безопасности.

г. Сосновый Бор
1997г.

Приверженность культуре безопасности на уровне эксплуатирующей организации отражена в Заявлении о политике безопасности, где безопасность декларируется выше вопросов выработки электроэнергии, причем всю полноту ответственности за обеспечение безопасности эксплуатирующая организация принимает на себя.

В соответствии с разработанными МАГАТЭ " Основными принципами безопасности атомных станций" культура безопасности считается одним из фундаментальных принципов управления в атомной энергетике. Для успешного решения вопросов культуры безопасности создана укрупненная структура управления эксплуатирующей организации "Ленинградская АЭС", включающая в себя "Управление по контролю безопасности эксплуатации".

Формирование приверженности культуре безопасности у руководителей всех уровней и персонала станции, деятельность которых оказывает влияние на безопасность станции, осуществляет отдел контроля безопасности, в задачу которого также входит обеспечение контроля достигнутого уровня безопасности, разработка рекомендаций, мер и способов повышения культуры безопасности, анализ и пересмотр критериев и требований к персоналу и руководителям.

В своей деятельности отдел руководствуется "Общими положениями обеспечения безопасности атомных станций" (ОПБ - 88) с учетом рекомендаций МАГАТЭ.

Директором ЛАЭС возложена обязанность на руководителей подразделений по организации работы по формированию культуры безопасности у работников подразделений.

В каждом подразделении созданы комиссии по культуре безопасности.

Отделом контроля безопасности выпускаются "Бюллетени", которые предназначены для формирования культуры безопасности. " Бюллетени" выдаются на рабочие места.

Для достижения цели по формированию в коллективе станции культуры безопасности разработаны следующие документы:

- бланк - карта записей при обходе рабочих мест руководителями и специалистами;
- руководство по культуре безопасности. (Для работников среднего и низшего звена);
- " Памятка по культуре безопасности".

Каждый вновь поступающий на работу на ЛАЭС проходит вводный инструктаж по культуре безопасности.

Отделом контроля безопасности организуются и проводятся " Дни безопасности АЭС ", а также осуществляется контроль за проведением " Дней безопасности " в подразделениях.

Важной составляющей культуры безопасности является квалифицированность и подготовка оперативного персонала, понимания и осознания им культуры безопасности.

На ЛАЭС создан учебно - тренировочный центр, включающий в себя полномасштабный и аналитический тренажеры, лабораторию психофизиологического обеспечения оперативного персонала.

В программы подготовки персонала и в экзаменационные билеты включены вопросы по культуре безопасности.

Для того, чтобы двигаться вперед в повышении уровня культуры безопасности, необходимо оценить достигнутый уровень культуры безопасности. Эксплуатирующей организацией разработано " Положение о годовых отчетах по оценке уровня культуры безопасности АЭС ".

Годовые отчеты по оценке культуры безопасности являются планируемым мероприятием в системе контроля за эксплуатационной безопасностью энергоблоков и предназначены для:

- выявления и прогнозирования тенденций изменения состояния эксплуатационной безопасности энергоблоков;
- оценки эффективности мер, принимаемых для повышения уровня культуры безопасности;
- выявления направлений деятельности, требующих особого внимания при обеспечении безопасной эксплуатации атомной станции;
- выработки рекомендаций по повышению эксплуатационной безопасности энергоблоков;
- сравнительного анализа показателей уровня культуры безопасности на энергоблоках с учетом результатов внешних проверок и инспекций.

За основу содержания отчета принята совокупность эксплуатационных и других данных, которые ранее включались в отчеты по оценке текущего состояния безопасности. В дополнение к ранее применяемой методологии часть данных обрабатывается таким образом, что получаемые показатели характеризуют состояние уровней и барьеров глубокоэшелонированной защиты.

Показатели и индикаторы культуры безопасности конкретного энергоблока и АЭС определяют все многообразие элементов деятельности по эксплуатации атомной станции, основными направлениями которой являются:

- деятельность персонала в процессе эксплуатации и работа с персоналом;
- контроль и управление реактивностью, охлаждение активной зоны реактора;
- состояние защитных барьеров;
- события и их тяжесть;
- готовность систем безопасности к выполнению функций;
- работа по модернизации систем блока и усовершенствованию систем безопасности;
- выполнение мероприятий по повышению безопасности энергоблоков;
- выполнение требований по обеспечению необходимого ресурса компонентов оборудования;
- облучение персонала и радиоактивные выбросы;
- состояние окружающей среды.

В последующем, когда станет возможным ретроспективный анализ ежегодных показателей, отчетные материалы будут основой для анализа тенденций: стабильность, улучшение или деградация глубокоэшелонированной защиты и культуры безопасности как фундаментальных принципов в обеспечении целей безопасности.

Приемлемость формы применения количественных условных показателей для оценки уровня культуры безопасности и эффективность методологии формализации можно будет оценить, как минимум, при наличии сравнительной базы (с предыдущими годами, с другими АЭС, с аналогичными энергоблоками).

Для оценки состояния уровня культуры безопасности в подразделениях станции разработано " Положение о проведении самооценки уровня культуры безопасности в подразделениях Ленинградской АЭС ".

Самооценка уровня культуры безопасности производится персоналом подразделения по направлениям производственной деятельности и индикаторов их соответствия целям безопасности.

Оценка индикаторов уровня культуры безопасности производится в произвольной форме: "да", "нет", "хорошо", " плохо ". В тех случаях, когда индикатор оценивается отрицательно, как правило, необходимо прокомментировать это обстоятельство.

По результатам самооценки составляется отчет и передается в отдел контроля безопасности для разработки мероприятий по повышению безопасности. Отчет не подлежит утверждению у руководства станции и не визируется в отделах станции и эксплуатирующей организации.

Главное состоит в том, чтобы возбудить мысль, а не предписывать что - либо.

Очень полезной для станции была миссия ASSET МАГАТЭ, проведенная в июне 1996г., по тематическому анализу происшествий, отражающих вопросы культуры безопасности.

Выводы миссии ASSET о состоянии культуры безопасности на станции:

Культура безопасности развивается в правильном направлении с 1993г., и проведенный ЛАЭС самоанализ является доказательством того, что возможен дальнейший прогресс в плане совершенствования способности станции определять проблемы безопасности и извлекать уроки.

Ignalinos AE

Наименование раздела:	9.2.1 КУЛЬТУРА БЕЗОПАСНОСТИ ПРЕДПРИЯТИЯ
Title:	9.2.1 COMPANY SAFETY CULTURE

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Дата редакции:	03.09.96	**Ред. 0**
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The management team recognise that priority 1 and 2 recommendations are important to the safety enhancement of INPP. Signing of this document by INPP does not mean automatic commitment to implement the recommendations herein. Decision on implementation by INPP will be made after a final overall review of all these recommendations by the Management Team prior to final submission of the SAR report. P3 recommendations are advisory only.

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LIST OF ACRONYMS

ASCOT.....Assessment of Safety Culture in Organizations Team

IAEA.....International Atomic Energy Agency

ISO.....International Standards Organization

OSART.....Operational Safety Review Team

RCPS.....Reactor Control and Protection System

VATESI.....Lithuanian Nuclear Power Safety Inspectorate

9.2.1 COMPANY SAFETY CULTURE

9.2.1.1 Issue Description

Safety culture is defined as that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.

Safety culture is a necessary characteristic to achieve safety in nuclear power plants and it is important that INPP demonstrate that it is implementing measures to progressively enhance safety culture, and has the means to measure the current culture and its subsequent evolution.

The function and process addressed by this SAR task is the assessment of the current status and trend of safety culture at INPP, as well as the means used by the plant to measure and improve it.

9.2.1.2 Performance Objectives and Expectations

Safety culture has three components. The first is the necessary **framework within the organization** and is the responsibility of management. The second is the **attitude of staff at** all levels in responding to and benefitting from the framework. The third is management assumption of the responsibility to ensure the two are linked in a feedback loop which continuously corrects safety problems.

In addition to the plant itself, the contributions of external, supporting organizations that affect safety culture at the plant must be considered, including government, regulatory agencies, design organizations, and research organizations. The performance of contractors performing work in the plant must be considered in assessing safety culture.

A. Government

1. The body of legislation is satisfactory, emphasizing the primary importance of nuclear safety, and clearly defining the responsibilities of regulatory organizations.

2. Government provides strong support to the regulator, including delegated powers and sufficient funding for all activities.

B. Regulatory Agency

1. Regulator recognizes the primary responsibility for nuclear safety rests with the plant and not itself. Thus, its requirements are not overly prescriptive and rather focus on review of management processes.

2. Open and honest communication with the plant on safety matters, and mutual respect.

3. Technical expertise in all required disciplines.

4. Clear communication of requirements to plant.

C. *Corporate Safety Policy and Practices*

1. A clear management policy which expresses the overriding demand for nuclear safety has been issued by the plant director to all employees, and explained to them in direct meetings.

2. Managers and workers fully understand the management policy statement and its implications, and have internalized it into their work activities.

3. Management stresses that safety is of the utmost importance, overriding if necessary commercial considerations and power production.

4. There is an active nuclear safety review committee reporting at the corporate level.

D. Highlighting Safety

1. Regular meetings of the plant director with his staff solely devoted to safety issues, as well as meetings at lower levels

2. Plant is open to external reviews, such as OSART mission.

3. Process exists for lower level employees to report safety concerns directly to plant director.

4. Constructive process for reporting and evaluating individual errors.

5. A constructive system for sanctions and rewards for safety performance of individuals.

E Definition of Responsibilities

Safety responsibilities and detail practices at all plant levels are clearly defined, documented, and reviewed.

F. Performance of Managers

1. Attitude on safety is a selection criteria for managers.

2. Attention to nuclear safety issues is a documented expectation for all managers, and is included in their performance evaluations.

G. Review of Safety Performance

1. Regular reviews of safety performance are sent to senior management, who take documented actions on negative trends. Results of reviews are acted on in timely manner and changes are identified based on the results.

2. An effective process for review of operating experience and events.

3. An effective system of safety performance indicators, managers aware of trends and corrective action plans.

4. A full time safety review group or committee reporting directly to the plant director, which is positively accepted by plant staff and regulator. Demonstrating specific documented impact on safety improvement.

5. Effective systems to track outstanding deficiencies, with positive trends.

H. Training

1. Training and retraining results in **formal** assessment of trainees and approval for duty,or identification of additional training requirements.

2. Adequate resources applied for training (personnel time, funding).

3. Periodic formal review of training results including management review.

4. Staff clearly understands significance of **operating limits** in their areas of responsibility.

5. Staff is trained in the importance of following procedures and of their safety bases.

6. Regular management review of the effectiveness of training

7. Evidence of procedure changes implemented after evaluation of operator errors. events.

8. Training addresses **safety culture.**

I. Field Supervision by management

1. Management makes first hand inspections of work they are responsible for.

2. Managers do regular tours of inspection.

J. Attitudes of Managers

1. Conflict between safety and production of electricity is discussed with staff prior to resolution.

2. Outage schedules and content are reviewed by independent safety group.

3. Managers explain their commitment to safety culture to staff.

4. Managers require staff to bring safety concerns to attention.

5. Managers have a positive attitude to audits and safety reviews of their activities.

6. Managers give recognition to employees that take actions beneficial to safety.

7. Managers alert to staff weaknesses and need for training.

K. Attitudes of Individuals

1. Staff clearly understands their responsibilities and documents defining them.

2. Procedures are followed strictly, or possible deficiencies in them are discussed with supervisors.

3. Staff attentive to completeness and accuracy of logs, records, documents.

4. Control room operators show a watchful and alert attitude.

L. Design Review Process

Plant modifications are subject to comprehensive independent design verifications and safety reviews. Design review process is audited by Quality Assurance.

9.2.1.3 Current Applicable Lithuanian Standards

The applicable standard is OPB-88, General Regulations for Nuclear Power Plant Safety.

9.2.1.4 Current Plant Practice

A. Corporate Safety Policy(Expectation "C")

In May 1995 the Manager of the Ignalina NPP declared the safety and quality assurance policy of the plant.

The following is stated in the declaration:

- the NPP management bears full and formal responsibility for the station safety;
- the plant safety has a top priority in contrast to production necessity and plan;
- the NPP management is willing to ensure irreproachable performance of all works linked with safety and strives for the improvements.

The declaration was circulated among the station personnel and was sent to the VATESI, to the Ministry of Energy and Ministry of Industry and Commerce, and was published.

The declaration was in general welcomed by the station staff, because it was considered as an additional corroboration that the staff conservative efforts would be approved by the management.

B. Review of Safety Performance(Expectation "G")

At the beginning of 1995 the department for *Safety* and Quality Assurance subordinated directly to the NPP Manager was established at the INPP.

The NPP Manager delegated to that department the responsibility for monitoring and evaluation of safety of the INPP. The department is responsible, as well, for the elaboration and adoption of the safety assurance programs for the INPP.

Appendices 1, 2 present the declaration of safety and quality assurance policy and the appeal of the station Manager to the station staff in this connection.

The INPP management and staff understand that it is impossible to control something eluding measuring, and that is why safety indicators that will be used for evaluation.

C. Indicators of Safety Performance (Refer to Section 9.5.3)

The following indices are selected as indicators of safety and operation quality:

	Description of indicator	Numerical Value
	Reactor unplanned automatic shutdowns	
	Proportion of forced idle time	
	Number of safety essential events	Level 1 Level 2 Level 3 and higher
	Leakages from reactor primary circuit	
	Number of failures of diesel-generators including failures under testings	
	Individual dose	
	Collective dose	
	Number of accidents	
	Releases through the stack/discharges	

There are no numerical values of the safety indicators in the report as they are to be studied in detail.

D. Rules Governing Safety Performance

"Technical Regulations for Operation of INPP", inv. N. O-380, is the main document specifying the safe operation of the INPP.

Chapter 5 of those rules presents the limits and conditions of the station safe operation, as well as measures to be taken by an operator in case of their violation.

In case of any deviations, an operator should estimate whether that deviation has resulted in violation of the limits or conditions of safe operation. When the limits or conditions of safe operation are violated an operator has to take measures to shutdown or unload the reactor.

Operators are given full authority for decision making, with respect to the Operating Policies or Limits and Condition Rules.

Cases of violation of the requirements set forth in the "Technical Regulations" are considered

at the INPP as extreme events.

E. Typical Plant Events Demontrating Aspects of Safety Culture

Two events that took place at the INPP in 1994 may serve as examples demonstrating that safety is the top priority for our station.

Event 1: Failure of Control Rod Manual Managemnt Circuit

27.01.94 an operator of the 2-nd power unit 2 reactor saw that the indicator of rod selection for shifting did not light up in one of CPS rods after the selection button was pushed, the rod was uncontrolled.

The operator checked operation at some more rods, and they were uncontrolled as well.

The operator identified the failure as a failure of the rod manual management circuit and the reactor was immediately shutdown.

Though measures taken by the operator were admitted to be too conservative ones at subsequent reviewand analysis of the event, the NPP management estimated the operator efforts positively and evaluated them as a positive experience.

Event 2: Leakage from Primary System

16.02.94 the radiation monitoring system of unit 2 recorded a slight inrease of activity in the leaktight compartment where there are ball-type flowmeters and isolating and control gate valves of the reactor process channels. Program of that compartment observation was expanded. The leak was equal to about 5 l/h.

25.02.94 the NPP management decided to shut down the unit. Coolant leakage in that case constituted 7 l/h (the limit of safe operation constitutes 150 l/h) and formally it was possible to continue the unit operation.

It is necessary to take account of the fact that decision was made in winter time characterized by a certain shortage of electric power.

9.2.1.5 Validation of Plant Function

A plant validation meeting was held in November 16-17 1995. Mr Dvoretsky, manager of Safety Surveillance and Quality Control Department participated.

Current plant activities related to safety culture were discussed. The following points were confirmed:

- *Safety Policy*

A policy statement on nuclear safety issued by the plant manager V Shevaldin has been provided as guidance to all plant staff (app 1).

- ***Definition of Responsibilities***

INPP has stated in the policy statement that "the INPP management has full and formal responsibility for plant safety".

- ***Training on Safety Culture***

All line managers will participate in INSAG 4-courses.

- ***Review of Safety Performance***

In accordance with the Lithuanian Law and safety standards for nuclear energy INPP produce reports with different frequencies which includes production and performance indicators.

Nuclear safety matters are discussed on regularly meetings at different organization levels for exchange of information and for decisions.

To review and measure the management system a number of safety performance indicators (targets) are selected and under development.

9.2.1.6 Assessment of Plant Function and Non-Compliances

9.2.1.6.1 Comparison to Current Lithuanian Standards and Practices

INPP complies with requirements defined in OPB-88, regarding safety culture.

9.2.1.6.2 Comparison to Current Western Standards and Practices

General

National standard OPB-88, Para. 1.2.7 is generally consistent with western standard IAEA INSAG-3, regarding safety culture, but does not provide sufficient detail to fully assess this issue in accordance with standards demonstrably equivalent to accepted Western practices. OPB-88 must be supplemented with applicable western standards:

-IAEA INSAG-3, Para. 3.1.1, Basic Safety Principles for Nuclear Power Plants

-IAEA INSAG-4, Safety Culture

-IAEA-TECDOC-743, ASCOT Guidelines (Assessment of Safety Culture in Organizations Team)

-IAEA Report TECDOC-821/Experience with strengthening safety culture inNPPs, Sept. 1995

INSAG-4 is useful for assessement since it provides a list of organization and personnel characteristics that can be examined as tangible evidence of safety culture. Paragraph 9.2.1.2 follows the outline of this standard, as does the following assessment. A comparison against each of the expectations from Section 9.2.1.2 follows:

A. Government

1. The body of legislation is satisfactory, emphasizing the primary importance of nuclear safety, and clearly defining the responsibilities of regulatory organizations:

There are several concerns and findings in this area. Refer to Section 9.1 and related recommendations.

2. Government provides strong support to the regulator, including delegated powers and sufficient funding for all activities:

There are several concerns and findings in this area. Refer to Section 9.1 and related recommendations.

B. Regulatory Agency

1. Regulator recognizes the primary responsibility for nuclear safety rests with the plant and not itself. Thus, its requirements are not overly prescriptive and rather focus on review of management processes.

2. Open and honest communication with the plant on safety matters, and mutual respect.

3. Technical expertise in all required disciplines.

4. Clear communication of requirements to plant:

There are several concerns and findings in these areas. Refer to Section 9.1 and related recommendations. Also, it is noted that the Plant Director Declaration (Appendix 1) **does not clearly state that the INPP management is primarily responsible for nuclear safety.** This is an area of primary concern in the SAR and is discussed further in Section 9.1.

C. Corporate Safety Policy

1. A clear management policy which expresses the overriding demand for nuclear safety has been issued by the plant director to all employees: **This has been accomplished.**

2. Managers and workers should fully understand the management policy statement and its implications, and have internalized it into their work activities: **Finding:** There is not yet widespread understanding or appreciation of the policy within the organization. This is understandable in that at this stage only a high level, rather abstract policy exists. The policy is a good start but to move ahead it must be translated into specific, auditable**action plans at all levels of the organization.** In the near term it would be helpful to provide some focused training on the safety culture concept. The plant also needs to establish methods to**measure** safety culture.

Recommendation 9.2.1-1:

a. Take actions to implement the safety policy at all levels in the organization and to improve safety culture. INPP management should establish a nuclear safety performance improvement program, with specific, measureable targets, based on the policy, communicated to the organization and with monitoring of progress against targets. Implementation must start at the Management level, but proceed with involvement of the entire Operations, Maintenance, and Technical Support organization. Smaller focus groups(teams), led by line managers who will receive the training in INSAG-4, should meet to discuss changes and improvements in their specific activities to fulfill the spirit of INSAG-4 and the Directors Nuclear Safety Policy. These specific action steps should be provided to Management for consideration in development of the overall plan for implementation. Managers at each department should be responsible that actions are monitored and completed. **Safety Significance: Priority P1** - The basic importance of safety culture to overall plant safety is axiomatic. The actual implementation of a nuclear safety policy and safety culture will not occur without a specfic detail plan prepared with participation of the entire organization. All barriers in the defence in depth concept are potentially affected.

Recommendation 9.2.1-2: Provide training on safety culturefor the entire organization. This could be done via the same team meetings discussed above. **Priority P2**

Recommendation 9.2.1-3 Provide training in Englishto management personnel to speed up the process and get more efficiency in evaluating international experienc feedback. **Priority P3**

Recommendation 9.2.1-4: Establish a system to measure safety culture. Consider use of techniques such as the IAEA ASCOT service or self-assessment guidelines. The concept of measuring culture using tangible performance provides a way to focus the organization and seek improvement. **Priority P2**

3. Management should stress that safety is of the utmost importance, overriding if necessary commercial considerations and power production:

The two plant events discussed in 9.2.1.4 are good examples of a proper balance between the needs of safety and production. They are indicative of a **positive trend** in this aspect of safety culture. The declaration on safety made by the Plant Director (Appendix 1) states:

"All works at INPP should be performed safely and with high quality and **safety has the top priority".**

This statement would have been stronger if it had added: ..., "overriding if necessary commercial considerations and power production". It is expected that this point will be stressed in future training on safety culture that is planned by INPP.

4. There should be an active nuclear safety review committee reporting at the corporate level:

The committee has been instituted by INPP (refer to Section 9.5.1).

D. Highlighting Safety

1. Regular meetings of the plant director with his staff solely devoted to safety issues, as well as meetings at lower levels: Such meetings are now held regularly by Plant Director and Chief Engineer.

2. Plant is open to external reviews, such as OSART mission: Even considering the large number of such reviews that have taken place, the plant seems to remain open to them and willing to consider valid suggestions for improvements. This is a positive indicator.

3. Process exists for lower level employees to report safety concerns directly to plant director: Process exists

4. Constructive process for reporting and evaluating individual errors: **Finding:** Based on study of some of the recent operating events at INPP a constructive process doesnot exist. In these cases, for example the event involving overexposure of a worker during incore instrument calibration (Fall 1995), as well as the 1995 event related to SFA transfer for can-free storage, the individuals did not report the occurence or their errors. This is indicative of an expectation of punishment by the individuals, and the lack of a culture that encourages personnel to admit and learn from mistakes and to bring concerns out in the open for resolution - **a negative indicator. Recommendation 9.2.1-5:** INPP management, through training and discussions in safety meetings, by pubicly commending individuals who report errors and safety concerns, and by advertising successful lessons-learned from mistakes, should start to change the expectations of personnel and to thus improve safety culture. Candid and honest review and evaluation of operating events, with definition of corrective measures is one of the most effective ways to improve safety performance.
Priority P1

5. A constructive system for sanctions and rewards for safety performance of individuals: **Finding:** There is no particular formal system of rewards for safety performance. Informal practice includes of course positive feedback from supervisors. There is no formal performance evaluation and review process. Sanctions for performance problems consist of graded disciplinary actions: counselling or first offense, time off for second offense, change position or dismissal for third offense. Prior to the national independence, a system of rewards for performance existed consisting of public recognitions, paid excursions, etc.

Recommendation 9.2.1-6: INPP management should consider various specific ways to

assess and reward safety performance. A formal system of performance appraisal including prior written expectations by the supervisor that are discussed with the employee beforehand, a formal written appraisal by the supervisor at the end of the review period that includes recommendations for improvement and goals for the next period and is discussed with the employee, is typical for some Western countries. Whatever is chosen must of course be consistent with local social culture. **Priority P2**

E. *Definition of Responsibilities*

Safety responsibilities and detail practices at all plant levels are clearly defined, documented, and reviewed: **Finding:** There is an extensive system and documentation of responsibilities within the organization which superficially appears efective. However, examination of plant events raises some concerns about definition of safety responsibilities. For example, the event involving overexposure of a worker (see Section 9.5.5.5) raises questions: (1) Who was responsible to define dose measuring instrumentation for the job - the worker was in effect relying on a fixed area monitor that was not effective since it was in calibration simultaneously? (2) Who was responsible to coordinate the two efforts? (3) Did the Radiation Protection Specialist fully understand his responsibility by waiting in his office, rather than being at the job site? (4) Could the single person responsible for the task overall be identified?

Recommendation 9.2.1-7: Include discussions about definition of safety responsibility in the training workshops that are planned for Safety Culture. **Priority P2**

F. *Performance of Managers*

1. Attitude on safety is a selection criteria for managers: This is in practice at INPP

2. Attention to nuclear safety issues is a documented expectation for all managers, and is included in their performance evaluations: Expectation is documented in position descriptions: See Recommendation 9.2.1-2 regarding performance evaluations.

G. *Review of Safety Performance*

1. Regular reviews of safety performance are sent to senior management, who take documented actions on negative trends. Results of reviews are acted on in timely manner and changes are identified based on the results: INPP now has several processes in place that result in regular reviews of various components of safety performance. Reference is made to discussions in SAR Sections 9.2.3, 9.5.1, and 9.5.3. Management of action items (corrective actions) within the plant is discussed in Sections 8.3 and 9.3.

2. An effective process for review of operating experience and events:. A generally effective process is in place at INPP. Refer to discussion in Section 9.5.3.

3. An effective system of safety performance indicators, managers aware of trends and corrective action plans: A generally effective process is in place. Refer to discussion in Sections 9.5.1.

4. A full time safety review group or committee reporting directly to the plant director, which is positively accepted by plant staff and regulator, and demonstrating specific documented impact on safety improvement: The "INPP Safety Committee" has been instituted and is operational at the plant. Evidence has been seem of its impact on nuclear safety, for example review of a completed modification due to concerns raised about its acceptability and resulting recommendations to change the configuration of the modification and to consider generic procedure changes (modification dealing with cooing of safety injection pumps).

5. Effective systems to track outstanding deficiencies, with positive trends: INPP has taken actions to put processes in place that address this expectation (see Sections 9.2.3, 9.2.4, 9.5.1, and 9.5.3). Future monitoring will determine effectiveness.

H. Training

Refer to Section 8.2.

I. Field Supervision by management

1. Management makes first hand inspections of work they are responsible for: In general there is evidence of a good presence of supervisors and managers in the plant working areas. Manaagers up to and including the Chief Engineer are present in the field. However, review of typical event reports (refer to Section 9.5.3 and 9.5.5) indicates cases of lack of supervisory control at the work site as a cause of human error. It is expected that this concern would be addressed in the training and meetings on safety culture that INPP plans for the future.

2. Managers do regular tours of inspection: Considered Acceptable, based on observation of activites of Operations and Maintenance personnel.

J. Attitudes of Managers

1. Conflict between safety and continued operation of the plant is discussed with staff prior to resolution: Event 2 discussed herein is a positive indicator.

2. Outage schedules and content are reviewed by independent safety group: This topic has been included in the scope of the new Nuclear Safety Advisory Committee. Content of the next planned maintenance outage was discussed in the first meeting held.

3. Managers explain their commitment to safety culture to staff; Managers encourage staff to bring safety concerns to attention; Managers give recognition to employees that take actions beneficial to safety: It is expected that these topics will be included in planned Safety Culture training workshops.

4. Managers have a positive attitude to audits and safety reviews of their activities: **Finding:** There is a variation in attitudes. Some managers do not yet appreciate the concept of constructive criticism and a willingness to admit errors, and to evaluate and learn from them. It is expected that this topic will be included in plannned Safety Culture training workshops.

5. Managers alert to staff weaknesses and need for training: Considered Acceptable. Event corrective actions often include need for training.

K. Attitudes of Individuals

1. Staff clearly understands their responsibilities and documents defining them: INPP has a comprehensive system of responsiblility definition documents for all working levels, and a formal acknowledgement process by the individuals. Thus the documentation part is effective, while review of typical operating events suggests the need for improvement in implementation. Should be included in safety culture training.

2. Procedures are followed strictly: Review of operating events indicates need for improvement. Another concern is that some procedures are not structured for strict step by step execution where they should be (refer to Section 8.4 and recommendations).

3. Staff attentive to completeness and accuracy of logs, records, documents: Considered Acceptable

4. Control room operators show a watchful and alert attitude: Considered to be good based on observations made in the unit control rooms.

L. Design Review Process

1. Plant modifications are subject to comprehensive independent design verifications and safety reviews: **This area requires improvement (refer to Recommendations 8.5-16b and e).**

2. Design review process is audited by Quality Assurance: **This area requires improvement (refer to Recommendation 8.5-17).**

9.2.1. References

1. IAEA INSAG-3, Para. 3.1.1, Basic Safety Principles for Nuclear Power Plants

2. IAEA INSAG-4, Safety Culture

3. IAEA-TECDOC-743, ASCOT Guidelines (Assessment of Safety Culture in Organizations Team)

4. IAEA Report TECDOC-821/Experience with strengthening safety culture in NPPs, Sept. 1995

Appendices

Appendix 1: Declaration of Safety and Quality Assurance Policy of the IGNNP

Appendix 2: Manager General Appeal to the NPP Staff.

Appendix 1

Declaration on Safety and Quality Assurance Policy of the Ignalina Nuclear Power Plant

The aim of the INPP is to become the most safe plant with RBMK type reactor, economocally competitive among all power units both in the East and in the West.

To reach this aim it is necessary that:

1. All works at INPP should be performed safely and with high quality and safety has the top priority. Good quality is attained in case when all the requirements and aims of the owners are observed. The population of Lithuania believes in safety of the INPP.

2. The INPP staff should understand the requirements and aims of the INPP owners, of the VATESI and of the population.

3. The INPP staff should take an active part in the improvement of safety and quality. In order to ensure such participation every employee should know the purposes of the INPP, its personal tasks and should be informed about the results of works performed at the INPP.

4. The INPP staff must have adequate skill to perform its functions in compliance with the aims of the plant. The level of expertise of every employee should be improved to strengthen both the INPP and every person.

5. All the INPP managers should manifest personal activity and leadership. The main task of every manager boils down to formulate tasks and requirements faced by the subdivision, to bring them to the evaluated form, to inform the personnel about them and to ensure for every employee conditions corresponding to the fulfilled task.

6. All works at INPP should be constantly evaluated to improve their quality and efficiency. The INPP and its staff should use their own experience and that of the others to improve arrangement, operation and their own expertise.

7. The INPP and every its employee should bear responsibility to the community. All the laws and regulations should be observed with a safety margin. Prosperity of the INPP employees, of their families and all the population of Visaginas is one of the aims of the INPP.

8. Efficient and integrated control and safety assurance program should be adopted at the INPP. This program will pursue the ISO 9000 International Standard.

Only in case, if the Manager General of the INPP can give positive answer to each of the mentioned above provisions, the plant will operate with the required quality level. Only in case, when every employee can give positive answer to each of the mentioned above provisions, he/she will perform its job with the required quality level.

To implement the mentioned tasks the Manager General entrusts the supervision and quality control service to take efforts to adopt the program, to elaborate detail procedures to ensure quality, to coordinate them with documents of other subdivisions of the INPP, as well as, to train personnel in quality.

The INPP Manager General V.Shevaldin

Appendix 2

Manager General Appeal to the INPP Staff

At present the INPP faces most serious difficulties.

If the INPP faces difficulties, all its employees and Visaginas population face them, as well. I know you are concerned about your present life and about your future.

I believe that our station has future. I will tell you how we can ensure the station survival and its development. Only in case the INPP operates safely the life will become better and more safe for all of us, for our families and for our neighbors.

Our plant is now the best RBMK type NPP in the world. We takes much more efforts that any other RBMK type NPP to eliminate drawbacks of the plant design. We take efforts to improve both the design of the plant and the management control. A wide program of further improvements is available.

The nuclear community considers the INPP as an example of how one can approach the problem of reduction of probability of severe the Chernobyl type accident occurrence with high responsibility. And we will do our best not to disappoint them. I can tell you that in 10 years Lithuania will be a prosperous country. In 10 years the INPP will generate nuclear power and Visaginis will be a nice place to live in.

But it can not happen by itself. Both you and me bear full responsibility for realization of those plans as we bear the responsibility for the improvement of the INPP operation and parameters.

We need an effective Quality Assurance Program to fulfil those tasks. It is important to know that we can ensure Quality via individual efforts of every one of us. I am aware that the INPP

employees have ideas, ambitions and skill that can make our plant better. The Quality Assurance Program will aid us to realize that energy of people.

The main aims of the Program boil down to the following:

- All activities at the INPP are performed with high level of safety and quality;
- Complete understanding of the requirements and demands of the operating organization, the VATESI and the community is available;
- All INPP employees are involved in the program of safety assurance and of the plant improvement;
- All the employees of the INPP have the right to implement their personal aims;
- All the plant managers manifest their personal, active and evident leadership;
- All types of the activities performed at the INPP are constantly analyzed to make them more efficient and better;

- All the plant managers and every employee bear personal responsibility;

- The efficient and integrated program for quality assurance is under adoption at the INPP.

It should be stressed that in case I can give positive answer to each of the mentioned above provisions, the INPP will operate safely and with the required quality level. And in case any of you can give positive answer to each of the mentioned above provisions, it will mean that you do your job with the required quality.

The quality policy implies your duty to cast doubt on the rules, instructions and orders and to introduce innovations to improve safety and quality. Errors and incidents should be used to improve the procedures and design.

The Quality Supervision and Control Service subordinated directly to me was established at the plant. It is a new department responsible for the elaboration and development of the quality program at the plant. But you should bear in mind that:

- they are not responsible for the quality of works at the plant, you are responsible for it;

- they will not work instead of you;

- they will aid you and will provide you with the instrument to improve safety and quality.

Special training courses in cooperation with foreign experts will be arranged to adopt the quality assurance program.

I would like every one to regard the problems of safety, economical efficiency and efficient operation of the plant with attention.

I would like every one to regard the problem linked with improvement of the plant operation with attention.

I would like every one to be embued with understanding of the safety and quality requirements.

V.Shevaldin

A policy statement is a good start but it is only the foundation you need to start building.

INPP is just in the beginning of a long way to Safety Culture.

It is not enough to have engagement on policy level. You also need engagement among managers and among individuals. All personnel must be engaged. It is most essential and also a key to sucess.

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ПЕРЕЧЕНЬ СОКРАЩЕНИЙ

ASCOT - Организация команды для оценки культуры безопасности)

IAEA - Международное агенство по атомной энергии

ISO - Международные стандарты в области управления качеством

OSART - Команда по проверке эксплуатационной безопасности

PSPC - Система управления и защиты реактора (0*) {*Здесь и далее значком* - (...*) *отмечены примечания редактора этой версии, которые расположены в конце текста*}.

VARESI - Государственный регулирующий орган Литовской Республики

9.2.1 КУЛЬТУРА БЕЗОПАСНОСТИ ПРЕДПРИЯТИЯ

9.2.1.1 *Описание проблемы*

Культура безопасности - это такой набор характеристик и особенностей деятельности организаций и поведения отдельных лиц, который устанавливает, что проблемам безопасности атомной станции, как обладающим высшим приоритетом, уделяется внимание, определяемое их значимостью.

Культура безопасности - это необходимая характеристика для достижения безопасности на атомных электростанциях, и важно, чтобы ИАЭС продемонстрировала, что она внедряет меры обеспечивающие поступательный подъем культуры безопасности, и обладает средствами для текущего измерения культуры безопасности и ее последующего развития.

Функция и процесс, посредством которых выполняется эта задача SAR - это оценка текущего состояния и тенденций культуры безопасности на ИАЭС, а также средств, используемых станцией для ее измерения и улучшения.

9.2.1.2 *Цели выполнения и ожидания*

Культура безопасности имеет три компонента. Первый - это разделение ответственности руководства внутри организации. Второй - взаимоотношения персонала всех уровней и совершенствование разделения ответственности (совершенствование структуры). Третий - руководство несет ответственность за то, что первые два звена связаны между собой обратной связью, образуют кольцо, что гарантирует постоянную работу над решением проблем безопасности.

Кроме этого, нужно учесть вклады внешних, поддерживающих организаций, которые оказывают влияние на культуру безопасности на станции, включая правительство, регулирующие органы, проектные и исследовательские организации.

A. Правительство

1. Основная часть законодательства удовлетворительна, акцентируя первостепенное значение ядерной безопасности и четко определяя ответственность регулирующих организаций.

2. Правительство обеспечивает сильную поддержку регулирующему органу, включая делегирование полномочий и достаточное финансирование всех видов деятельности.

B. Регулирующий орган

1. Регулирующий орган признает, что первичная ответственность за ядерную безопасность лежит на станции, а не на нем самом. Таким образом, его требования не являются чрезмерно предписательными, а скорее сосредотачиваются на проверке процессов управления.

2. Общение со станцией по вопросам безопасности открытое и честное и основывается на взаимном уважении.

3. Регулирующий орган технически компетентен во всех необходимых дисциплинах.

4. Требования регулирующего органа ясно и однозначно доводятся до станции.

C. Станционная политика безопасности и практика

1. Ясная политика администрации, которая определяет приоритет ядерной безопасности, была опубликована Генеральным директором для всех работников и дополнительно разъяснена им на соответствующих совещаниях.

2. Руководители и рабочие полностью понимают заявление администрации о политике, его значение, и используют его в своей трудовой деятельности.

3. Администрация подчеркивает, что безопасность имеет наивысшее значение, преобладающее, если необходимо, над коммерческими соображениями и производством электроэнергии.

4. Существует действующий комитет по проверке ядерной безопасности, представляющий свои отчеты на станционном уровне.

D. Выдвижение безопасности на первый план

1. Генеральный директор имеет регулярные встречи со своим персоналом, которые посвящаются исключительно проблемам безопасности, также как и встречи на более низких уровнях.

2. Станция открыта для внешних проверок, например таких, как миссия OSART.

3. Существует процесс для того, чтобы работники более низкого уровня имели возможность сообщить непосредственно директору станции о своей озабоченности вопросами безопасности.

4. Существует конструктивный процесс по разработке отчетов и оценке ошибок персонала.

5. Имеется конструктивная система санкций и поощрений персонала за обеспечение безопасности.

E. Распределение ответственности

Ответственность за безопасность и детальная практика на всех уровнях станции четко определены, документируются и проверяются.

F. Управление

1. Отношение к безопасности - это один из критериев подбора руководителей.

2. Внимание к проблемам ядерной безопасности является документированным ожиданием для всех руководителей и используется для оценки их работы.

G. Проверка состояния безопасности

1. Регулярные обзоры состояния безопасности направляются высшей администрации, которая предпринимает документированные действия при выявлении негативных тенденций. Реакция на результаты проверок является своевременной, изменения идентифицируются, основываясь на результатах.

2. Процесс обзора эксплуатационного опыта и происшествий эффективен.

3. Система показателей (индикаторов) состояния безопасности эффективна, руководители в курсе тенденций и планов по корректирующим действиям.

4. Штатная группа по проверке безопасности или комитет, подчиняющийся непосредственно Генеральному директору, положительно воспринимается станционным персоналом и регулирующим органом. Специальными документами показано улучшение безопасности.

5. Системы для слежения за недостатками эффективны и имеют положительные тенденции.

H. Обучение

1. Результаты подготовки и переподготовки используются для **официальной** оценки обучавшихся при выдвижении на должность или определения необходимости дополнительного обучения.

2. Ресурсы, направленные на обучение, соответствуют необходимым потребностям (время персонала, финансирование).

3. Существует периодическая официальная проверка результатов обучения, включая проверку администрацией.

4. Персонал ясно понимает значение эксплуатационных пределов в областях своей ответственности.

5. Персонал обучен и ясно понимает важность четкого выполнения процедур и основ безопасности.

6. Администрация проводит регулярную проверку эффективности обучения.

7. Изменения процедур, осуществляемых после выявления ошибок операторов или происшествий, очевидны.

8. Обучение направлено на формирование (повышение) культуры безопасности.

I. Области контроля администрацией

1. Администрация прежде всего контролирует (проверяет) работы, за которые она несет ответственность.

2. Руководители проводят регулярные обходы для осуществления контроля (проверки).

J. Позиция руководителей

1. Противоречия между безопасностью и производством электроэнергии обсуждается с персоналом до тех пор, пока не будет найдено удовлетворительное решение.

2. Графики и содержание планово-предупредительных ремонтов проверяются независимой группой по безопасности.

3. Руководители объясняют персоналу свою приверженность культуре безопасности.

4. Руководители стимулируют персонал обращать внимание на безопасность.

5. Руководители имеют положительное отношение к аудитам и проверкам безопасности своей деятельности.

6. Руководители выражают признательность работникам, которые осуществляют действия, благоприятные для безопасности.

7. Руководители проявляют чуткость к слабостям персонала и их потребности в обучении.

K. Позиция персонала

1. Персонал ясно понимает свою ответственность и документы, определяющие ее.

2. Процедуры (инструкции) строго выполняются. Возможность отклонения от них обсуждаются с вышестоящим руководством.

3. Персонал внимателен к точности ведения журналов, записей, документов.

4. Операторы щитов управления проявляют осторожность и чуткость.

L. Процесс проверки проектов

Станционные модификации являются предметом всесторонних независимых верификаций проекта и проверок безопасности. Процесс проверки проектов подвергается аудиту Службой обеспечения качества

9.2.1.3 *Текущие нормативы, применяемые в Литовской Республике*

Общие положения обеспечения безопасности атомных электростанций (ОПБ-88) являются приемлемым стандартом.

9.2.1.4 *Текущая станционная практика*

A. Станционная политика безопасности (Ожидание "C")

В мае в 1995 г. директор Игналинской АЭС провозгласил политику безопасности и обеспечения качества станции.

В заявлении констатируется следующее:

- Администрация АЭС несет полную и официальную ответственность за станционную безопасность;
- Станционная безопасность имеет высший приоритет в отличие от производственной необходимости и плана;
- Администрация АЭС будет стремиться обеспечить безупречное выполнение всех работ, связанных с безопасностью и стремится к усовершенствованиям.

Заявление было распространено среди станционного персонала и направлено в VATESI, в Министерство энергетики и опубликовано.

Заявление, в общем, было одобрено станционным персоналом, потому что оно являлось дополнительным подтверждением того, что консервативный подход персонала к решению проблем будет одобрен администрацией.

B. Проверка состояния безопасности (Ожидание "G")

В начале 1995 г. на ИАЭС была организована Служба безопасности и обеспечения качества, которая подчинена непосредственно директору АЭС.

Директор АЭС делегировал этой Службе ответственность за контроль и оценку безопасности ИАЭС. Эта Служба также несет ответственность за разработку и принятие Программ безопасности для ИАЭС.

В Приложениях 1 и 2 представлены заявление Генерального директора о политике безопасности и обеспечения качества и его обращение к станционному персоналу в этой связи.

Администрация ИАЭС и персонал понимают, что невозможно управлять чем-либо, что невозможно измерить и, именно поэтому, сейчас разрабатываются показатели (индикаторы) безопасности, которые можно использовать для оценки Культуры безопасности (1*).

C. Показатели безопасности (Представлены в разделе 9.5.3)

Следующие индексы отобраны в качестве показателей безопасности и качества работы:

№№	Описание показателя	Численное значение
1.	Внеплановые автоматические остановы реактора	
2.	Пропорция вынужденного времени простоя	
3.	Число происшествий существенных для безопасности	Уровень 1 Уровень 2 Уровень 3 и выше
4.	Утечки из КМПЦ	
5.	Число отказов дизельных генераторов, включая отказы при испытаниях	
6.	Индивидуальная доза облучения	
7.	Коллективная доза облучения	
8.	Количество аварий	
9.	Выбросы в окружающую среду	

Численных значений показателей безопасности в отчете не приведено, поскольку они должны быть изучены более подробно.

D. Внедрение государственных правил безопасности

"Технологический регламент по эксплуатации Игналинской АЭС с реактором РБМК-1500", инв. № О-380 - это главный документ, определяющий безопасную эксплуатацию ИАЭС.

Глава 5 этого документа представляет пределы и условия безопасной эксплуатации станции, а также меры, которые должен предпринять оператор в случае их нарушения.

В случае любых отклонений, оператор должен оценить, привело ли это отклонение к нарушению пределов или условий безопасной эксплуатации. В случае, когда пределы или условия безопасной работы

нарушены, оператор должен предпринять меры для останова или разгрузки реактора.

Операторы несут полную ответственность за принятие решений в соответствии с принятой Политикой эксплуатации, пределами и условиями, указанными в Правилах.

Случаи нарушения требований, сформулированных в "Технологическом регламенте по эксплуатации Игналинской АЭС с реактором РБМК-1500" считаются на ИАЭС чрезвычайными происшествиями.

E. Типичные станционные события, демонстрирующие аспекты Культуры безопасности

Два происшествия, которые имели место на ИАЭС в 1994 г., могут служить примерами, демонстрирующими, что безопасность является высшим приоритетом для Игналинской АЭС.

Событие 1. Отказ ручного управления стержней СУЗ

27.01.94 Оператор реактора 2-ого энергоблока увидел, что не светится индикатор выбора стержня для передвижения на одном из СП СУЗ после нажатия кнопки выбора, т.е. стержень был неуправляем.

Оператор проверил работу еще нескольких стержней; они были тоже неуправляемы.

Оператор определил тот дефект, как отказ схемы ручного управления стержней, и реактор был немедленно остановлен.

Хотя было признано, что меры, предпринятые оператором, были слишком консервативны, при последующем всестороннем анализе происшествия, администрация АЭС оценило усилия оператора положительно и расценило их, как положительный опыт.

Событие 2. Течь из КМПЦ

16.02.94 система контроля радиации 2-ого энергоблока зарегистрировала небольшое увеличение активности в герметичном отсеке, где расположены расходомеры (ШАДРы) и запроная арматура (ЗРК) технологических каналов реактора. Программа наблюдения за этим отсеком была расширена. Утечка составляла приблизительно 5 л/ч.

25.02.94 администрация АЭС решила заглушить 2-ой энергоблок, утечка теплоносителя в этом составляла 7 л/ч (предел безопасной эксплуатации составляет 150 л/ч и формально была возможность продолжать эксплуатацию энергоблока).

Необходимо принять во внимание тот факт, что решение было сделано в зимнее время, которое характеризовалось некоторой нехваткой электроэнергии.

9.2.1.5 *Валидация функционирования станции*

16-17 ноября 1995 проведена встреча с автором русской версии отчета г-ном Дворецким А.Л, который является руководителем Службы безопасности и обеспечения качества.

Обсуждались текущие станционные работы, связанные с культурой безопасности. Были подтверждены следующие пункты:

· *Политика безопасности*

Заявление о политике по ядерной безопасности, выпущенное директором станции В Шевалдиным, было представлено, как руководство. для всего станционного персонала (Приложение 1).

· *Распределение ответственности*

ИАЭС констатировала в заявлении о политике, что " у администрации ИАЭС - полная и официальная ответственность за безопасность станции".

· *Обучение по культуре безопасности*

Все линейные руководители направлений будут участвовать в курсах INSAG 4.

· *Проверка состояния безопасности*

В соответствии с литовскими законами и нормами безопасности для ядерной энергетики, ИАЭС выдает отчеты с различной периодичностью, которые включают производственные показатели и показатели (индикаторы) состояния.

Проблемы ядерной безопасности обсуждаются на регулярных встречах, на различных уровнях для обмена информацией и для принятия решений.

Для проверки и измерения системы управления количественные показатели (цели) состояния отобраны и находится в процессе развития.

9.2.1.6 *Оценка функционирования станции и отклонений*

9.2.1.6.1 Сравнение с текущими стандартами Литовской Республики и практикой

ИАЭС выполняет требования, определенные в ОПБ-88, относительно культуры безопасности.

9.2.1.6.2 Сравнение с текущими Западными стандартами и практикой

Общие положения

Правила ОПБ-88, пункт 1.2.7, признанные Правительством Литовской Республики, в общем соответствует западному стандарту МАГАТЭ INSAG-3, относительно культуры безопасности, но не обеспечивают достаточной детальности для полной оценки культуры безопасности в соответствии с нормами, принятыми на Западе. ОПБ-88 должен дополняться следующими нормами, принятыми на Западе:

- МАГАТЭ INSAG-3, Параграф 3.1.1, Основные принципы безопасности для атомных электростанций
- МАГАТЭ INSAG-4, Культура безопасности
- МАГАТЭ-TECDOC-743, Руководство ASCOT (Организация команды для оценки культуры безопасности)
- МАГАТЭ Отчет TECDOC-821 / Опыт улучшения культуры безопасности на АЭС, Сентябрь 1995.

Документ INSAG-4 полезен для оценки, т.к. он дает перечень характеристик персонала и организации в целом, которые могут быть использованы для оценки культуры безопасности. Раздел 9.2.1.2 следует за схемой этого стандарта и дает следующую оценку. Сравнение с каждым из ожиданий раздела 9.2.1.2 представлено ниже:

A. Правительство

1. Основная часть законодательства удовлетворительна, акцентируя первостепенное значение ядерной безопасности и четко определяя ответственности регулирующих организаций.

Имеется несколько вопросов, вызывающих озабоченность, и открытий в этой области. Представлено в Разделе 9.1 и рекомендациях связанных с ним.

2. Правительство обеспечивает сильную поддержку регулирующему органу, включая делегирование полномочий и достаточное финансирование всех видов деятельности.

Имеется несколько вопросов, вызывающих озабоченность, и открытий в этой области. Представлено в Разделе 9.1 и рекомендациях связанных с ним.

B. Регулирующий орган

1. Регулирующий орган признает, что первичная ответственность за ядерную безопасность лежит на станции, а не на нем самом. Таким образом, его требования не являются чрезмерно предписательными, а скорее сосредотачиваются на проверке процессов управления.

2. Общение со станцией по вопросам безопасности открытое и честное и основывается на взаимном уважении.

3. Регулирующий орган технически компетентен во всех необходимых дисциплинах.

4. Требования регулирующего органа ясно и однозначно доводятся до станции.

Имеется несколько вопросов, вызывающих озабоченность, и открытий в этой области. Представлено в Разделе 9.1 и рекомендациях связанных с ним. А также, имеется замечание о том, что в Заявлении Генерального директора (Приложение 1) **не достаточно ясно указано, что администрация Игналинской АЭС несет первичную ответственность за ядерную безопасность**. Эта область первой заботы SAR и обсуждается в разделе 9.1.

С. Станционная политика безопасности

1. Ясная политика администрации, которая определяет приоритет ядерной безопасности, была опубликована Генеральным директором для всех работников: **Это выполнено**.

2. Руководители и рабочие полностью понимают заявление администрации о политике, его значение, и используют его в своей трудовой деятельности.

Находка: Понимание или уважение этой политики еще не нашло широкого применения внутри организации. Это понятно, т.к. на этой стадии существует только политика высокого уровня, абстрактная политика все еще имеет место. Эта политика - хороший задел, но для продвижения вперед ее нужно внедрить (разработать) конкретные, поддающиеся аудиту планы действия на всех уровнях организации. В ближайшем будущем было бы полезно сфокусировать обучение на концепции культуры безопасности. Станция также испытывает потребность во введении методов для измерения культуры безопасности.

Рекомендации 9.2.1-1:

а) **Необходимо предпринять действия для внедрения политики безопасности на всех уровиях и для улучшеиия культуры безопасиости**. Администрация ИАЭС должна ввести программу улучшения состояния ядерной безопасности с конкретными, поддающимися измерению целями, основываясь на политике, принятой на ИАЭС, и с контролем продвижения вперед к поставленным целям. Внедрение должно начаться на уровне администрации, но продолжаться с участием всей Эксплуатационной службы, Службы технического обслуживания и ремонта и Службы технической поддержки. Меньшие группы (бригады) во главе с руководителями, которые пройдут подготовку по INSAG-4, должны встречаться для обсуждения изменений и усовершенствований в своих конкретных

видах деятельности, чтобы добиться соответствия своей деятельности духу INSAG-4 и Политики директора в области ядерной безопасности. Эти конкретные шаги-действия должны быть представлены администрации для рассмотрения при разработке общего плана внедрения культуры безопасности. Руководители в каждом отделе должны быть ответственны за то, чтобы действия контролировались и завершались.

Значение для безопасности: Приоритет P1 - основополагающее значение культуры безопасности для общей безопасности станции - это аксиома. Фактическое внедрение политики ядерной безопасности и культуры безопасности не произойдет без конкретного детального плана, подготовленного с участием всей организации. При этом потенциально затрагиваются все барьеры концепции защиты в глубину.

Рекомендация 9.2.1-2:

b) **Обеспечить обучение по культуре безопасности** для всей организации. Это могло бы осуществляться через те же самые собрания бригад, которые были рассмотрены выше. **Приоритет P2**

Рекомендация 9.2.1-3:

c) Обеспечить обучение английскому языку управленческого персонала для ускорения процесса и достижения большей эффективности при оценке международного опыта получения обратной связи. **Приоритет P3.**

Рекомендация 9.2.1-4:

d) Необходимо разработать систему измерения культуры безопасности. Следует рассмотреть возможность использования службы ASCOT МАГАТЭ для самооценки культуры безопасности. Концепция измерения культуры безопасности с использованием показателей, поддающихся измерению, это путь для сосредоточения усилий организации и поиска улучшения. **Приоритет P2.**

(2*)

3. Администрация подчеркивает, что безопасность имеет наивысшее значение, преобладающее, если необходимо, над коммерческими соображениями и производством электроэнергии.

Два станционных происшествия, обсуждавшиеся в 9.2.1.4 - хорошие примеры надлежащего равновесия между потребностями безопасности и производства. Они показывают положительную тенденцию в этом аспекте культуры безопасности. Заявление Генерального директора (Приложение 1) гласит:

"Работы на всех уровнях на ИАЭС должны выполняться безопасно и с высоким качеством, **при этом безопасность станции обладала бы наивысшим приоритетом".**

Это Заявление должно быть дополнено: "... преобладающим, если это необходимо, над коммерческими соображениями и производством электроэнергии". Ожидается, что этим пунктом будет сделано ударение на будущее обучение персонала культуре безопасности.

4. Существует действующий комитет по проверке ядерной безопасности, представляющий свои отчеты на станционном уровне.

Такой комитет был организован на ИАЭС (Представлено в разделе 9.5.1)

D. Выдвижение безопасности на первый план

1. Генеральный директор имеет регулярные встречи со своим персоналом, которые посвящаются исключительно проблемам безопасности, также как и встречи на более низких уровнях: Такие же встречи регулярно проводятся и Главным инженером (Техническим директором).

2. Станция открыта для внешних проверок, например таких, как миссия OSART: Даже отмечается, что станция имеет большое количество таких проверок. Станция, кажется, остается открытой для них и готовой рассмотреть значимые предложения по усовершенствованиям. **Это - положительный показатель.**

3. Существует процесс для того, чтобы работники более низкого уровня имели возможность сообщить непосредственно директору станции о своей озабоченности вопросами безопасности: Процесс существует.

4. Существует конструктивный процесс по разработке отчетов и оценке ошибок персонала.

Находка: Основываясь на изучении некоторых из недавних эксплуатационных событиях на ИАЭС, вынуждены отметить, что конструктивного процесса не существует. Например, при переоблучении рабочего во время калибровки инструмента внутри активной зоны (осень 1995 г.), а также в событии в 1995 г., связанным с передачей ОТВС на бесконтейнерное хранение, персонал не сообщил об этих событиях или своих ошибках. Это показывает, что персонал ожидает наказания, что свидетельствует о недостатке культуры безопасности, которая должна стимулировать персонал на признание ошибок и извлечение уроков. Все это и отсутствие сообщений - отрицательный показатель.

Рекомендация 9.2.1-5: Администрация ИАЭС, через обучение и обсуждения на собраниях по безопасности, посредством публичного одобрения персонала, которые сообщают об ошибках и озабоченности безопасностью, и рекламируя хорошие уроки, усвоенные из ошибок, должна начать изменять ожидания персонала и таким образом улучшить культуру безопасности. Искренняя и честная проверка и

оценка эксплуатационных происшествий с определением корректирующих мер - это один из наиболее эффективных способов улучшить состояние безопасности.
Приоритет P1

5. Имеется конструктивная система санкций и поощрений персонала за обеспечение безопасности.

Находка: Отсутствует какая-либо официальная система поощрений за безопасную работу. Неофициальная практика включает, конечно, положительную обратную связь от лиц, осуществляющих контрольные функции. Нет официальной оценки эволюции и процесса проверки. Санкции для разрешения проблемам состоят из дифференцированных дисциплинарных действий: первое предупреждение, временное отстранение за второе нарушение, изменение должности или увольнение за третье нарушение. До приобретения национальной независимости Литовской Республикой существовала система поощрений за хорошую работу, которая состояла из общественной признательности, оплаченных экскурсий и т.д.

Рекомендация 9.2.1-6: Администрация ИАЭС должна рассмотреть вопрос о разнообразных и конкретных способах вознаграждения за безопасную работу. Для некоторых Западных стран типична официальная система оценки работы, включая ранее записанные ожидания со стороны лиц, осуществляющих контрольные функции, которые обсуждаются с работником заранее; официальная письменная оценка контролером в конце периода проверки, которая включает рекомендации по улучшению и цели для следующего периода и обсуждается с работником,. Что бы ни было выбрано, оно, конечно, должно согласовываться с местной социальной культурой.
Приоритет P2

E. Распределение ответственности

Ответственность за безопасность и детальная практика на всех уровнях станции четко определены, документируются и проверяются.

Находка: Имеется обширная система и документация, определяющая ответственность в рамках организации, которая на первый взгляд кажется эффективный. Однако, расследование станционных происшествий вызывает некоторую озабоченность относительно определения ответственности за безопасность. Например, происшествие с переоблучением рабочего (см. Раздел 9.5.5.5) поднимает вопросы: (1) Кто должен был нести ответственность за определение необходимой дозиметрической аппаратуры для работы - рабочий фактически полагался на локальный стационарный дозиметр, который не функционировал, т.к. он в это время находился в калибровке? (2) Кто должен был нести ответственность за координацию этих двух работ? (3) Полностью ли понимал специалист по защите от

радиации свою ответственность, ожидая в своем оффисе, а не находясь на месте работы? (4) Можно ли было бы одному человеку, нести ответственность за всю задачу в общем?

Рекомендация 9.2.1-7: Необходимо включить в обсуждения определение ответственности за безопасность на курсах, где планируется обучение по культуре безопасности. **Приоритет P2**

F. Управление

1. Отношение к безопасности - это один из критериев подбора руководителей: Такая практика существует на ИАЭС

2. Внимание к проблемам ядерной безопасности является документированным ожиданием для всех руководителей и используется для оценки их работы: Ожидание документировано в должностных инструкциях. См. Рекомендацию 9.2.1-2 относительно оценок работы.

G. Проверка состояния безопасности

1. Регулярные обзоры состояния безопасности направляются высшей администрации, которая предпринимает документированные действия при выявлении по негативных тенденций. Реакция на результаты проверок является своевременной, изменения идентифицируются, основываясь на результатах: Теперь ИАЭС имеет несколько процессов, которые являются результатом внедрения регулярных обзоров различных компонентов безопасности. Представлено для обсуждения в разделах SAR 9.2.3, 9.5.1 и 9.5.3. Корректирующие действия на станции представлены для обсуждения в разделах 8.3 и 9.3.

2. Процесс обзора эксплуатационного опыта и происшествий эффективен: Представлено для обсуждения в разделе 9.5.3.

3. Система показателей (индикаторов) состояния безопасности эффективен, руководители в курсе тенденций и планов по корректирующим действиям: В общем это эффективный процесс. Представлено для обсуждения в разделе 9.5.1.

4. Штатная группа по проверке безопасности или комитет, подчиняющийся непосредственно Генеральному директору, положительно воспринимается станционным персоналом и регулирующим органом. Специальными документами показано улучшение безопасности: "Комитет безопасности" организован и действует на станции. Его влиянием на ядерную безопасность служит следующий пример: проверка внедренной модификации возбудила вопрос о ее приемлемости и последующие рекомендации изменили конфигурацию этой модификации в соответствии с изменением первоначальной процедуры (модификация связанная с аварийными питательными насосами).

5. Системы для слежения за недостатками эффективны и имеют положительные тенденции: ИАЭС принимает меры по внедрению таких процессов (см. разделы 9.2.3, 9.2.4, 9.5.1 и 9.5.3). Будущий контроль определит их эффективность.

H. Обучение

Представлено в разделе 8.2

I. Области контроля администрацией

1. Администрация прежде всего контролирует (проверяет) работы, за которые она несет ответственность: В общем очевиден хороший персональный надзор руководителей в производственных (работающих) зонах. Руководители, вплоть до главного инженера, представлены в этой области. Однако, при обзоре типичных отчетов о событиях (представлено в разделах 9.5.3 и 9.5.5) отмечены случаи недостатка надзора работ по месту, что привело к человеческой ошибке. Ожидается, что это будет адресовано (учтено) в обучении и совещаниях по Культуре безопасности, которые планируются на ИАЭС в будущем.

2. Руководители проводят регулярные обходы для осуществления контроля (проверки): Принято на основании наблюдений за деятельностью оперативного и ремонтного персонала.

J. Позиция руководителей

1. Противоречия между безопасностью и производством электроэнергии обсуждается с персоналом до тех пор, пока не будет найдено удовлетворительное решение: Событие 2, которое обсуждалось в данном отчете, является положительным показателем.

2. Графики и содержание планово-предупредительных ремонтов проверяются независимой группой по безопасности: Эта тема была включена в сферу действия нового Консультативного комитета по ядерной безопасности. Содержание следующего планово-предупредительного ремонта было обсуждено на первой проведенной встрече.

3. Руководители объясняют персоналу свою приверженность культуре безопасности: руководители поощряют персонал доводить озабоченность безопасностью до внимания руководства; руководители выражают признательность тем работникам, которые предпринимают действия, благоприятные для безопасности: ожидается, что эти темы будут включены в запланированные учебные курсы по культуре безопасности.

4. Руководители имеют положительное отношение к аудитам и проверкам безопасности своей деятельности.

Находка: Имеется некоторое колебание в отношениях. Некоторые руководители еще не ценят концепцию конструктивной критики и готовность к признанию ошибок, к оценке и извлечению из них уроков. Ожидается, что эта тема будет включена в запланированные учебные курсы по Культуре Безопасности.

5. Руководители проявляют чуткость к слабостям персонала и их потребности в обучении: Принято. Даже корректирующие действия часто включаются в обучение.

K. Позиция персонала

1. Персонал ясно понимает свою ответственность и документы, определяющие ее: ИАЭС имеет исчерпывающую систему документов, определяющую ответственность персонала всех уровней, которая официально признана. Таким образом документальная часть эффективна, однако обычные обзоры эксплуатационных событий предполагают необходимость внедрения дальнейших улучшений. Должно быть включено в обучение по Культуре безопасности.

2. Процедуры (инструкции) строго выполняются: Обзор эксплуатационных событий показывает необходимость улучшений. Иными словами, некоторые процедуры не структурированы для жесткого выполнения "шаг за шагом", ожидается, что это будет выполнено (представлено в разделе 8.4 и рекомендациях).

3. Персонал внимателен к точности ведения журналов, записей, документов: Принято.

4. Операторы щитов управления проявляют осторожность и чуткость: Принято на основании наблюдений на БЩУ.

L. Процесс проверки проектов

1. Станционные модификации являются предметом всесторонних независимых верификаций проекта и проверок безопасности: **Эта область требует улучшений (представлено в рекомендациях 8.5-16b и e)**.

2. Процесс проверки проектов подвергается аудиту Службой обеспечения качества: **Эта область требует улучшений (представлено в рекомендациях 8.5-17)**

9.2.1.7 Ссылки:

1. МАГАТЭ INSAG-3, Параграф 3.1.1, Основные принципы безопасности для атомных электростанций
2. МАГАТЭ INSAG-4, Культура безопасности

3. МАГАТЭ-TECDOC-743, Руководство ASCOT (Организация команды для оценки культуры безопасности)
4. МАГАТЭ Отчет TECDOC-821 / Опыт улучшения культуры безопасности на АЭС, Сентябрь 1995.

Приложения:

Приложение 1. Заявлениео политике Игналинской атомной Электростанции в области безопасности и обеспечения качества

Приложение 2. Обращение Генерального директора к персоналу АЭС.

Приложение 1

Заявление о политике Игналинской атомной Электростанции в области безопасности и обеспечения качества

Цель ИАЭС- стать самой безопасной станцией с реактором РБМК, экономически конкурентоспособной среди всех электрических установок как на востоке так и на западе.

Для достижения этого необходимо чтобы:

1. **Работы на всех уровнях на ИАЭС выполнялись безопасно и с высоким качеством, при этом безопасность станции обладала бы наивысшим приоритетом**. Хорошее качество достигается тогда, когда соблюдаются все требования и цели владельцев, а население Литвы верит в безопасность ИАЭС.

2. **Персонал ИАЭС хорошо понимал требования и цели владельцев ИАЭС, VATESI и населения.**

3. **Весь персонал ИАЭС принимал активное участие в повышении безопасности и качества. Для того, чтобы** обеспечить такое участие, каждый работник должен знать цели ИАЭС, свои собственные задачи и постоянно получать информацию о результатах работ, проводимых на ИАЭС.

4. **Весь персонал ИАЭС имел достаточную квалификацию для выполнения своих задач в соответствии с целями станции.** Уровень компетенции каждого работника должен повышаться с тем, чтобы укрепить как ИАЭС так и каждую личность в отдельности.

5. **Все руководители ИАЭС проявляли личную активность и лидерство.** Главная задача каждого руководителя состоит в том, чтобы сформулировать задачи и требования, стоящие перед подразделением, привести их к оцениваемому виду, довести до всего персонала и создать для каждого из работников соответствующие выполняемым задачам условия.

6. **Все работы на ИАЭС постоянно оценивались с целью повышения их качества и эффективности.** ИАЭС и ее персонал должны использовать

свой опыт и опыт других для улучшения организации, процесса эксплуатации и своей компетентности.

7. **ИАЭС и каждый ее работник несли ответственность перед обществом.** Все законы и нормативные акты должны соблюдаться с достаточным запасом. Одной из целей ИАЭС является благополучие ее сотрудников, их семей и всех жителей Висагинаса.

На ИАЭС внедрялась эффективная и интегрированная программа управления и обеспечения качества. Эта программа будет следовать международному стандарту ИСО 9000.
Только в том случае, если Генеральный директор ИАЭС сможет ответить ДА на каждый из вышеприведенных пунктов, станция будет работать с нужным уровнем качества. Только в том случае, если каждый сотрудник ИАЭС сможет ответить ДА на каждый из вышеприведенных пунктов, он будет выполнять свою работу с нужным уровнем качества.

Для выполнения указанных задач, Генеральный директор поручает Службе надзора и контроля качества вести работы по внедрению Программы, разработку более детальных процедур по обеспечению качества, их координацию с документами других подразделений ИАЭС, а также проводить необходимое обучение персонала в области качества.

Генеральный директор **В. Шевалдин**

Приложение 2

Обращение
Генерального директора к персоналу АЭС.

Никогда на ИАЭС не было более трудной ситуации, чем сейчас.

Если ИАЭС переживает трудности, то с ними сталкиваются и все работники станции и все жители Висагинаса. Я знаю, что вы обеспокоены и нынешней ситуацией и вашим будущем.

По моему мнению у нашей станции есть будущее и я верю в это будущее. Я расскажу вам, как мы вместе сможем обеспечить выживание станции и ее развитие.

Только в том случае, если ИАЭС будет работать безопасно, жизнь будет лучше и безопаснее для всех нас, наших семей и наших соседей.

Наша станция сегодня является лучшей АЭС с РБМК в мире. Мы делаем гораздо больше, чем любая другая АЭС с РБМК по устранению недостатков конструкции станции. Мы усовершенствуем как конструкцию станции, так и административное управление, мы имеем обширную программу дальнейших усовершенствований.

Ядерное общество уже смотрит на ИАЭС, как пример того, как можно с высокой ответственностью подходить к вопросу снижения вероятности тяжелых аварий типа Чернобыльской. И мы не разочаруем их.

Я могу сказать вам, что через 10 лет Литва будет процветающей страной. Через 10 лет на ИАЭС по прежнему будет вырабатываться ядерная энергия и Висагинас будет прекрасным местом для проживания.

Но все это может прийти само по себе. И вы, и я несем полную ответственность за претворение в жизнь этих планов, поскольку мы несем ответственность за претворение в жизнь этих планов, поскольку мы несем ответственность за улучшение эксплуатации и характеристик ИАЭС.

Чтобы помочь нам выполнить эти задачи, нам необходима эффективная Программа Обеспечения качества. Важно знать, что Качество может быть обеспечено нами только персонально каждым. Я знаю, что у сотрудников ИАЭС есть идеи, амбиции и квалификация, которые могут сделать нашу станцию лучше. Программа Обеспечения качества поможет использовать эту энергию людей,

Основные идеи Программы заключаются в следующем:

- Все действия на ИАЭС проводятся при высоком уровне безопасности и качества.
- Имеет место полное понимание требований и запросов эксплуатирующей организации, VATESI и общественности.
- Все сотрудники ИАЭС участвуют в программе обеспечения качества и совершенствования станции.

- Все сотрудники ИАЭС имеют право на реализацию собственных целей.
- Все руководители демонстрируют персональное, активное и очевидное лидерство.
- Все виды деятельности на ИАЭС постоянно анализируются с тем, чтобы сделать их лучше и эффективнее.
- Все руководители и каждый сотрудник станции несут персональную ответственность
- На ИАЭС внедряется эффективная и интегрированная программа обеспечения качества.

Следует подчеркнуть, что только если я смогу сказать ДА на каждый из вышеперечисленных пунктов, ИАЭС будет работать безопасно и при нужном уровне качества. И если каждый из вас сможет сказать ДА на каждый из вышеперечисленных пунктов, то это будет означать, что вы делаете свою работу с нужным качеством.

Политика качества также подразумевает вашу обязанность подвергать сомнению правила, инструкции и приказы, и предлагать усовершенствования для повышения безопасности и качества. Ошибка и инциденты необходимо использовать для усовершенствования процедур и конструкции.

На станции создана Служба надзора и контроля качества, которая подчинена непосредственно мне. Этот новый отдел будет отвечать за разработку и внедрение Программы качества на ИАЭС. Но помните:

- они не отвечают за качество работы на ИАЭС, за это отвечаете вы сами.
- они не будут работать за вас.
- они не будут помогать вам и обеспечат вас инструментом для повышения безопасности и качества.

Для внедрения Программы обеспечения качества будут организованы специальные курсы обучения, проводимые в сотрудничестве с западными специалистами.

Я хочу, чтобы каждый из Вас со всей душой отнесся к проблемам безопасности, экономичности и эффективной эксплуатации станции.
Я хочу, чтобы каждый из вас со всей душой подошел к проблеме улучшения работы станции.
Я хочу, чтобы каждый из вас поднялся до понимания требований безопасности и качества.

В. Шевалдин.

ПРИМЕЧАНИЯ

0* - во всей версии SAR принято иное сокращение Системы управления и защиты реактора - CPS (Control and protection system)

1* - Показатели (индикаторы) безопасности разработаны. Выпущен документ "Цели деятельности ИАЭС", инв. № О-844.

2* - следует отметить, что Служба безопасности и обеспечения качества уже приступила к проверкам состояния Культуры безопасности в подразделениях ИАЭС, см.отчет ПТОот-024500-6.

3* - отмечено некоторое несоответствие пунктов: раздел ***J. Позиция руководителей*** в главе 9.2.1.2 имеет 7 пунктов, а тот же раздел в главе 9.2.1.6.2 имеет 5 пунктов.

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APPROACHES TO SAFETY CULTURE EVALUATION: ASCOT METHODOLOGY

W. ZHONG
IAEA

Visaginas, 6 - 9 May 1997

ASCOT

Methodology for the Assessment of Safety Culture in Organizations

I. ASCOT GUIDELINES

Guidelines for:

- **Self Assessment** of Safety Culture
- **Conducting a Review** by the Assessment of Safety Culture in Organizations Team

- Safety Culture is generally **intangible** (attitudes, morale, motivation, commitment to safety)
- Nevertheless, such qualities lead to **tangible manifestations** - methodology uses these tangible manifestations to test Safety Culture
- Another important feature of the ASCOT review is that it covers **all organizations** which have an impact on nuclear safety

INTERFACES

In order to properly assess Safety Culture it is necessary to consider the **contribution of all organizations** which have an impact on it:

- Government and its Organizations
- Operating Organization
  - Corporate level
  - Plant level
- Research Organizations
- Design Organizations

GOVERNMENT AND ITS ORGANIZATIONS

- **Regulatory policy** should emphasize regulator's strong commitment to:
  - implement legislation
  - promote plant safety and protect individuals, public and the environment
- **Interface** with the licensee is examined:
  - reg. safety objectives are annunciated clearly
  - comments are sought on reg. requirements
  - mutual respect
  - regular joint discussions
  - reliance on plant internal safety processes
  - reg. presence at the plant

UTILITY CORPORATE LEVEL

- The **safety policy** at the corporate level is examined
- **It must be**:
  - clear
  - provided to all staff
  - declare a commitment to excellent safety performance
- Plant must have confidence in the **competency** and **expertise** at corporate level on nuclear safety matters
- Establishment of an **effective** and **credible** nuclear safety review group at corporate level
- No gap between the corporate and plant staff's interpretations of **safety responsibilities**

PLANT LEVEL

- **The bulk of questions** in the ASCOT Guidelines are at the plant level
- **Questions are** deliberately **open** to invite discussion and explanation
- **Supplementary questions** are necessary, tailored to different jobs
- **No scoring** or **numerical rating** as no comparison to other plants should be performed

PLANT LEVEL

- Highlighting Safety
- Definition of responsibilities
- Selection of managers
- Relations between plant management and regulators
- Review of safety performance
- Training
- Local Practices
- Field supervisions by management
- Attitudes of managers
- Attitudes of individuals

SUPPORTING ORGANIZATIONS

- **Supporting organizations** include those responsible for:
  - design
  - manufacture
  - construction
  - research
- Their primary contribution to safety is the **quality** of their products
- The basis for safety culture in such an organization is the **directive**, establishing policy and practices to achieve quality

STEPS OF ASCOT REVIEW

1. **Discussions at government/regulator office(s)**
   - Commitment to safety
   - Safety policy statement
2. **A visit to corporate headquarters**
   - Commitment to safety
   - Safety policy statement
   - Interaction with the NPP
3. **A tour to the NPP**
   - Initial walk-through
   - Documentation overview
   - Discussions with NPP personnel

* Questionnaires

ASCOT AT THE PLANT

1. **Plant walk-through**
   - Access control
   - General state of the plant
   - Housekeeping
   - Use of protective equipment
   - Alertness of control room staff
   - Availability of procedures & manuals
2. **Documentation overview**
   - Availability of safety policy
   - Identification of safety responsibilities
   - Organization charts
   - Policy on adherence to procedures
   - Log-books and associated documents
   - Records of operation & maintenance
   - Number of pending issues
   - Training programme for key activities
   - Existence of safety review committee

- The **assessment method concentrates** on:
  - individual and collective attitudes and knowledge rather than
  - the technical content of procedures and systems
- The assessment covers **conventional, radiological** and **reactor safety** aspects.

EXAMPLE OF ASCOT ASSESSMENT

1. Technical audit

ASCOT will consider:

- Is auditors' competence acknowledged by those being audited?
- Is managers' support seen by staff?
- Do managers make their own time available for briefings with auditors?
- Is the audit report communicated to the relevant staff?
- Are corrective actions keenly debated and enthusiastically taken?
- Are good practices praised by the auditors and passed on?

Remarks: Audits should be used to stimulate interest and promote staff's active participation in safety matters, but not just mechanically carried out to fulfil policy and regulatory requirements.

EXAMPLE OF ASCOT ASSESSMENT (Cont.)

2. Striving for improvements

ASCOT considers the tendency to question existing systems and seek improvements as good safety culture:

- Training improvements: time, number of staff, quality, qualification system
- Technical improvements: quality of procedures, introduction of new safety assessment methodologies
- Operational improvements: plant modifications, working environment
- Trying to anticipate problems: programme aimed at reporting and learning from "near misses"
- Developing indicators that can be used to show the trend in safety performance

ASCOT GUIDELINES STRUCTURE

Based entirely on 75-INSAG-4

ASCOT Guidelines are basically the set of possible **questions** and **key indicators**, the responses to which would reveal the effectiveness of Safety Culture

- Basic INSAG Questions
- Guide Questions
- Key Indicators

QUESTIONS ADDRESS TO:

I - Individual (apply to NPP only)

M - Management (apply to NPP only)

C - Corporate (utility headquarters)

R - Regulator/Government

S - Supporting organizations (design...)

KEY INDICATORS

- The INDICATORS are restricted to key words or phrases indicative of effective safety culture. A more comprehensive set of INDICATORS may be developed for a specific organization for successive reviews.
- The INDICATORS are not to "MEASURE" the safety culture of a specific organization but rather indicate the need for a "FAULT FINDING" process to improve some of the different contributors to safety culture.
- The existence of operational safety problems could be traced back to safety culture problems. The INDICATORS are trying to give a warning before the problem occurs.

QUESTIONS AND INDICATORS

Q: Do legislation and government policy statements emphasize safety as a prerequisite for the use of nuclear power?

I: Clear, concise statements with adequate emphasis on safety as a prerequisite.

There is an independent supervising regulatory agency with enough manpower and with necessary enforcement rights, defined in the legislation.

The regulatory agency periodically assesses the safety of nuclear plants against well defined safety requirements

QUESTIONS AND INDICATORS (Cont.)

Q: Is funding sufficient to allow the hiring of staff of adequate competence?
Does the government provide adequate funding for necessary safety research?

I: Adequate staffing levels and low turnover of qualified staff.
Positive trends of funding for research organizations.
Documented research results and programmes for planned research into areas of safety concern.

QUESTIONS AND INDICATORS
(Cont.)

Q: Does the plant manager hold periodic meetings with his senior staff that are devoted solely to safety?
Do these meetings cover safety significant items at the plant, other plants in the world?
Are there opportunities for non-management staff to participate in meetings devoted to safety?

I: Regular safety meetings.
Documented actions and close out.
Circulation of safety meeting minutes and actions for review.
Positive feedback from staff on the applicability and access to safety meetings.

QUESTIONS AND INDICATORS
(Cont.)

Q: Does senior management receive regular reviews of the safety performance of the plant?
Are the results of safety reviews acted on in a timely way?
Can managers identify changes that resulted from reviews?

I: Records of safety information sent to senior management.
Documented action plans for resolution of safety issues.
Tracking system for monitoring safety issues status.
Established mechanisms for feedback of completed actions.
Positive feedback from staff on resolution of safety issues.

QUESTIONS AND INDICATORS
(Cont.)

Q: Are staff trained in the special importance of following procedures?
Are they regularly reminded?
Are they trained in the safety basis of the procedures?

I: Clear understanding of policy on procedure adherence.
Knowledge of bases for procedures with a realization that procedures may not cover all eventualities.
Operators are involved in the procedure validation and improvement process.
Operator confidence in procedure accuracy and format.

QUESTIONS AND INDICATORS
(Cont.)

Q: Do staff use mechanisms for reporting on safety shortcomings and suggesting improvements?
Is the mechsnism used to report individuals' errors?
Is it used even when no detrimental effect is apparent?
What effect would a safety error have on a worker's position in the plant?

I: Reports of staff inputs on safety shortcomings.
Existence of staff safety committees.
Rewards and awards programme established.
Healthy attitude to safety reporting.

Safety Culture

Enhancements Through
Self-Critical Organizations

Senior Nuclear Executive

- Must Want Their Organization to be Self-Critical (See Things the Way They Really Are)
- The Ability of the Organization to be Self-Critical is Ultimately a Reflection of the Attitudes and Intentions of Senior Nuclear Executives

Four Elements

- Problem Reporting
- Root Cause Evaluation
- Management Assessment and Analysis
- Independent Oversight

Problem Reporting

- Management Must Insist that Problems Encountered be Reported
- Problems Include: Near Misses, Personnel Errors, Questionable Work Practices, and Procedure Deficiencies
- Communication of Management Expectations Must be Continuous

Problem Reporting

- Requires a Lot of Convincing to Get People to Report Honestly and Candidly When it Involves Their Own Errors
- Weak Programs Will Take a Year or More of Hard Work Before You Can Begin to Have Confidence That Most Performance Problems are Being Reported

Problem Evaluation

- Selected Problems Should be Scrutinized In-Depth to Assure Root Causes are Understood
- Treating Every Problem This Way Would Dilute Efforts and Effectiveness,
- Restrict the Number of People Who Perform Root Cause Analysis

Problem Evaluation

- People Sometimes Have Trouble Getting to the Real Root Causes
- Especially When the Root Causes Involve Personnel and Management Performance Issues

Problem Evaluation

- Too Often the Process Stops at Recommendations for Procedure Changes, Quick Training Sessions, or other "Painless" Fixes

Management Assessment

- This is the Most Important Element
- Problem Reports and Root Cause Evaluations Must be Analyzed for Underlying Problems and Significance
- Upper Level Management Must be Involved With this Process to Promote Ownership of Improvement Actions

Management Assessment

- Must be Management's Process or it Becomes Just Another Costly and Distracting Burden on the Organization
- Failures Occur Because the Analysis is not Performed or Because it is Delegated to Lower Management Levels

Independent Oversight

- Ideally, this Element Isn't Necessary if the Other Three Elements are Working Well
- Realistically, a Strong and Intrusive Independent Oversight is Essential for the Process to Maintain its Edge

Independent Oversight

- Independent Identification of Problems and Analysis Serves as a Balance or Check on the Effectiveness of the Other Three Elements
- The Independent Oversight Manager Should be a Full Partner With High Level Line Management in Evaluating the Meaning and Significance of Issues

Safety Culture at KKL

- **Management policy**
- **Organisation and processes**
- **Individual attitudes at all levels**

Safety Culture at KKL

- **Prior to OSART**
- **OSART preparation, mission and follow-up-mission**
- **Current situation and future plans**

Safety Culture at KKL

Pre-OSART

- **Awareness of safety culture concept**
  - * INSAG document
  - * Seminar for managers and regulators
  - * Internal discussions
- **Many elements addressed**
- **All activities influenced by safety culture (positive and negative)**

Safety Culture at KKL

Pre-OSART (continued)

- **Significant effort to reduce number of scrams and other safety related incidents**
  - * Ergonomy (control room, alarm concept)
  - * Event analysis
  - * Training
- **Active internal safety committee**
- **Re-evaluation / implementation of QA-program**
- **Management Survey and Follow-up Program**

Safety Culture at KKL

Pre-OSART (continued)

- **Relatively open communication**
- **Some conflicts**
  - * Internal regulations vs. knowledge, capability and responsibility of individual
  - * Evaluation and assessment vs. trust in employees

Safety Culture at KKL

OSART Mission

- **Improvement in some processes**
  - * Safety committee
  - * Setting / following of measurable goals, with use of indicators
  - * Lowering threshhold for root cause analysis
- **Improvement in training program**
  - * Well trained stable workforce
  - * More structured training (re-training program)

Safety Culture at KKL

OSART Mission (continued)

- **Main emphasis on critical attitude and avoidance of complacency (good plant, good people, good results)**

Safety Culture at KKL

Enhancement Program

Organisation / Processes

- Simpler goal setting program with measurable indicators
- Increasing number of events analysed and increased number of root cause analyses
- Improved action follow-up
- Near miss program
- Safety committee meets monthly with fixed agenda; broader membership
- Committee for industrial safety established to support safety officer

Safety Culture at KKL

Enhancement program (continued)

- **Improved licensing response:**
  - * More communication
  - * Quicker close-out of open items
- **Simplification of QM-program started**
- **More internal audits in areas which are critical from the safety point of view**
- **Safety attitude and behaviour added to agenda for the annual personnel evaluations**

Safety Culture at KKL

Enhancement Program

Attitude of individuals - general principles

- **At all levels**
- **Strengths and weaknesses more visible and important at higher levels**
- **Understand and communicate issue**
- **Encourage and discuss development**
- **Assess results**

Safety Culture at KKL

Attitude of individuals

Goals:

Questionning, critical attitude	**+**	**prudent, careful approach**	**+**	**willingness to learn from experience**

Safety Culture at KKL

Attitude of individuals (continued)

Boundary conditions:

- **Safety has highest priority**
- **Plant goals known at all levels**
- **Individuals put these goals before their group or own personal goals**
- **Ability to give and receive advice**

Safety Culture at KKL

Attitude of individuals (continued)

- **Programs within the line organisation**
  - * Responsibility of department managers
  - * Feedback to plant manager
- **KKL program (SAFE) with coordinating group and external support**
  - * Approved and monitored by plant manager
- **Synergy between both programs**
  - * SAFE should provide catalyst for line programs

Safety Culture at KKL

KKL SAFE Program

- S = Self critical Attitude
- A = Understand your job (what, why and how)
- F = Recognise possibility or occurrence of errors --> take appropriate action
- E = Learn from your mistakes / experience and that of others

Safety Culture at KKL

KKL SAFE Program

Communication of SAFE concept:

- **Kick-off show**
  - * All available KKL employees
  - * On-site
  - * Circus artists + moderator + plant manager
  - * Illustration by artists; explanation by moderator; relevance by plant manager
  - * Introduction of "SAFE" mascot
  - * Introduction of "SAFE" poster program

Safety Culture at KKL

KKL SAFE Program

Communication of SAFE concept:

- **Poster program**
  - Posters at various locations
  - Illustrations of "SAFE" concept
  - Awareness of programs (eg. near miss)
  - Transparency of results (no. of incidents)

Safety Culture at KKL

KKL SAFE Program

Communication of SAFE concept:

- Articles in plant magazine
- Subject at regular employee information meetings
- Review of experience; feedback for 1997 program

Safety Culture at KKL

KKL SAFE Program

Program in line organisations:

- **Each department sets goals**
  e.g. specific program for: - critical attitudes
  - communication of safety culture
- **Training programs within departments**
- **Departmental seminars with supporting activities**

Safety Culture at KKL

KKL SAFE Program

Program in line organisations:

- **Job specific activities**
  - * Instrumentation and control technicians
  - * Draughtsmen and document control staff.
- **Specific improvements at**
  - * Internal safety committee meetings
  - * Plant managers meeting

Safety Culture at KKL

KKL SAFE Program

Program in line organisations:

- **Specific improvements at (continued)**
  - * Morning meetings
  - * Staff information meetings
  - * Meeting with authorities
  - * Meetings with plant owners

Safety Culture at KKL

KKL SAFE Program

Future activities:

General

- **Can´t stop improving safety culture**
- **Continuous, never ending effort**
- **Always be aware of risk of complacency**
- **Try to improve all processes**
- **Listen to others**

Safety Culture at KKL

KKL SAFE Program

Future activities:

Specific

- **Continue SAFE program**
  - * Poster program
  - * Use of mascot
  - * Periodic "events"
  - * Staff information meetings
  - * Articles in plant magazine

Safety Culture at KKL

KKL SAFE Program

Future activities:

- **Maintain efforts in line organisations**
  - * Training
  - * Discussions, learning from current activities
  - * Lead by example at all levels

FUNCTIONAL ORGANIZATION

OPERATIONS

- ✓ Conduct of Operations
- ✓ Status Control Program
- ✓ Emergency Operations Procedure
- ✓ Technical Specification Program
- ✓ Outage Interface
- ✓ Chemistry

PLANT SUPPORT

- ✓ Emergency Response
- ✓ Radiological Effluent Program
- ✓ Fire Protection Program
- ✓ Radiation Control Program
- ✓ Security Program
- ✓ Site Access Control
- ✓ Training/Qualification Program
- ✓ Procurement Control
- ✓ Material Control Program

PROGRAMS

- ✓ Corrective Action Program

EVALUATION IMPLEMENTATION

- ✔ Schedule evaluations baesd on evaluation plan
- ✔ Coordinate schedule with plant events
- ✔ Evaluation planning
- ✔ Determine tools to use:
  - ▸ Surveillance
  - ▸ Trending
  - ▸ Inspection
  - ▸ Audit
  - ▸ Interviews
  - ▸ Root Cause Tools
  - ▸ Observation
- ✔ Perform evaluation

Enhancing Operational Safety

1

Licensed Control Room Supervision

- Must Remain in a Supervisory Role
  - Operations Supervisory Personnel and Training Instructors Routinely Observe Control Room and Simulator Activities

2

Licensed Control Room Supervision

- Carefully Manage Control Room Environment to Minimize Distractions
  - Annunciators Lit More than 14 Days
  - Controllers in Manual for More than 21 Days
  - Limit Number of People in Control Room
- Refrain From Manipulating Plant Equipment

3

Personnel Access to Control Room

- Enter Only if Assigned to Perform Specific Duties Within the Control Room
- Don't go Forward of the Unit Supervisors Platform nor Enter the Dark Carpet Zone Without Obtaining Specific Permission of the Control Room Operators

4

Reactivity Changes

- Control Rods are Only Withdrawn in a Deliberate, Carefully Controlled Manner While Constantly Monitoring Nuclear Instrumentation and Redundant Indications of Reactor Power Level and Neutron Flux
- Reactor Operators Announce Intentions to Change Reactivity and Receive Acknowledgment Prior to Initiating Action

5

Reactivity Changes

- A Yellow Plaque has Been Placed Next to the Rod Control Switch to Focus the Attention of the Reactor Operator Prior to Moving the Control Rods
- CAUTION: Never Pull Control Rods Except in a Deliberate Carefully Controlled Manner, While Closely Monitoring the Reactor's Response

6

Reactivity Changes

- Simulator Reactivity Changes are Made in the Same Manner as Control Room Reactivity Changes

7

Simulator Training

- Shift Supervisor Develops a Training Plan Which Includes Standards for the Crew to Emphasize During Simulator Exercises
- Simulator Exercise Pre-Briefings Include a Review of the Standards and Performance Expectations

8

Simulator Training

- Crew and Individual Performance During Simulator Exercises is Monitored by the Shift Supervisor and Feedback is Provided to the Team and Individuals at the Conclusion of Each Training Session
- Good Practices are Identified and Coaching Provided to Enhance the Team's Performance

9

Simulator Training

- At the Conclusion of the Training Week, the Shift Supervisor Evaluates the Team Performance and Identifies Areas to Focus on During the Next Training Week

10

Examples of Standards

- Believe and Respond to Instrument Indications Unless They are Proven to be Incorrect
- If Unexpected Indications are Identified During an Activity, the Activity is Stopped Until the Indications are Thoroughly Understood and it is Known that the Activity can Safely Proceed

11

Examples of Standards

- A Conservative Approach is Used for All Decisions and Planned Evolutions
- The Shift Supervisor is Responsible to Direct Conservative Action if Activities or Continued Power Generation Jeopardizes the Safe Operation of the Plant

12

Safety Culture at KKL

KKL SAFE Program

Future activities:

- **Maintain efforts in line organisations**
  - Training
  - Discussions, learning from current activities
  - Lead by example at all levels

THE SAFETY ANALYSIS REPORT (SAR): IMPORTANCE AS THE MAIN LICENSING DOCUMENT

ComEd

An Unicom Company

Dr. D. Elias

May 6 - 9, 1997

Ignalina Nuclear Power Plant, Lithuania

CONTENTS OF THE UPDATED FINAL SAFETY ANALYSIS REPORT (FSAR)

- Initial SAR provides information used to license a nuclear power plant.
- The NRC grants an operating license and Technical Specifications (used to operate)
- The FSAR is updated to reflect changed made to the facility; all safety evaluations performed to support license amendments; and all analyses of new safety issues.
- The FSAR is the main source of licensing documentation for a plant.
- Periodic updates to the FSAR are required to be submitted to the NRC every 24 months.

LICENSING DOCUMENTATION

- FSAR - Certified by Utility
- Technical Specifications - Issued by NRC
- Changes to Technical Specifications - Approved by NRC
- FSAR Changes - Made by Utility
  - 50.59e Process
  - Must not be an Unreviewed Safety Issue
  - Audited by NRC

REDUCING RISKS

- Thousands of people at 12 nuclear power plants
- FSAR/Technical Specification Controlling Documents
- Never violate Technical Specifications
- Need flexibility to improve operation or hardware
- Use 50.59e to assure that an action (modification, operational evaluation, ...) not "unreviewed safety issue"

NRC CONCERNS

- In 1995-1996, the NRC became concerned in the area of design and licensing basis controls.
- Severe weaknesses and discrepancies in the design basis and corresponding maintenance identified.
- Growing regulatory concern with the 10 CFR 50.59 process.
- Licensee's too liberal in their application of the 50.59 process.
- FSAR not reflecting actual plant configurations.

FUTURE CHANGES

- April 28, 1997 meeting between NEI/NRR to discuss the possible development of interim guidance with respect to implementation of 10 CFR 50.59.
- Some of the key issues within SECY 97-035 regarding 10 CFR 50.59 and operability evaluations are as follows:
  - When a licensee plans to implement compensatory actions, such as to satisfy operability requirements, until such time as the plant can be restored to the original design bases or an alternative solution is implemented. Such compensatory actions are viewed as the licensee "making changes to the facility or procedures as described in the safety analysis report," and thus require a 10 CFR 50.59 evaluation against the FSAR-described condition before they are implemented.
  - When a licensee intends to implement a final resolution for a degraded or nonconforming condition other than full restoration. If a licensee needs to change the design bases contained or referenced in the safety analysis report, the licensee must evaluate the final resolution against the criteria in 10 CFR 50.59 and determine if an unreviewed safety question exists.

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FUTURE CHANGES (CONT'D)

- When a discovered nonconforming or degraded condition is not permanently resolved at the first available opportunity. The NRC has concluded that delay beyond the first available opportunity is in essence a de facto change to the facility that should be evaluated under 10 CFR 50.59. If the fix is planned for the next available opportunity, and that opportunity has not presented itself because the plant needs to be in a hot or cold shutdown, there has not been adequate time for design, review, approval or procurement, or specialized equipment to accomplish the repair is unavailable, delay in implementation of the corrective action is acceptable if the licensee is making reasonable efforts to resolve the matter promptly. Under these conditions, assuming operability can be demonstrated, operation in a degraded or nonconforming condition may continue up to the next outage of reasonable duration and timing to effect the corrective action.

FUTURE CHANGES (CONT'D)

- If, however, such an outage occurs and the licensee does not fix the degraded or nonconforming condition, the staff would conclude that the issue is no longer simply part of an Appendix B corrective action process, but that the licensee has decided to continue the de facto change, which will require a prompt 10 CFR 50.59 determination. The key point is failure to restore the degraded or nonconforming condition promptly, despite the opportunity to do so. The staff position for corrective action that does not require an outage is similar, that is, if not corrected by the next opportunity of reasonable duration and timing, the staff would conclude that a de facto change had occurred and that a prompt 10 CFR 50.59 evaluation is required. Otherwise, no 10 CFR 50.59 evaluation is required regarding the discovery of a degraded or nonconforming condition that is being appropriately resolved consistent with 10 CFR Part 50 Appendix B, Criterion XVI.

FUTURE CHANGES (CONT'D)

- The second question focuses on the course of action to follow when an existing condition, which was required to be evaluated under 10 CFR 50.59, involves a USQ. The inspection program guidance forwarded by GL 91-18 says that when the licensee changes its licensing basis (to accept a condition as-is) and a USQ is involved, staff approval (in the form of a license amendment) is required prior to operating the plant with the degraded or nonconforming condition.
- The staff position is that a plant currently operating with a condition involving a USQ would not normally be required to shutdown, provided that the licensee has determined that all necessary equipment is operable and that the licensee expeditiously (i.e., within days) submits its application for a license amendment. However, the staff would not allow plant startup unless the condition is corrected or staff approval is received.

FUTURE CHANGES (CONT'D)

- SECY-97-035 indicates that the staff is considering rulemaking to clarify several provisions in 10 CFR 50.59, such as redefining "unreviewed safety question" and "margin of safety" to allow changes that are clearly acceptable even though they may involve some increase in probability or consequences of an accident or decrease in margin of safety. SECY-97-035 also discusses expanding the scope of 10 CFR 50.59 to capture information in the licensing basis that is not in the safety analysis report (SAR) (e.g., in other regulatory correspondence with the NRC staff). The staff has not yet concluded that rulemaking is warranted, and it is conducting an integrated evaluation of these and other issues before making this decision.

Experience Gained in QA / QC at Comanche Peak SES

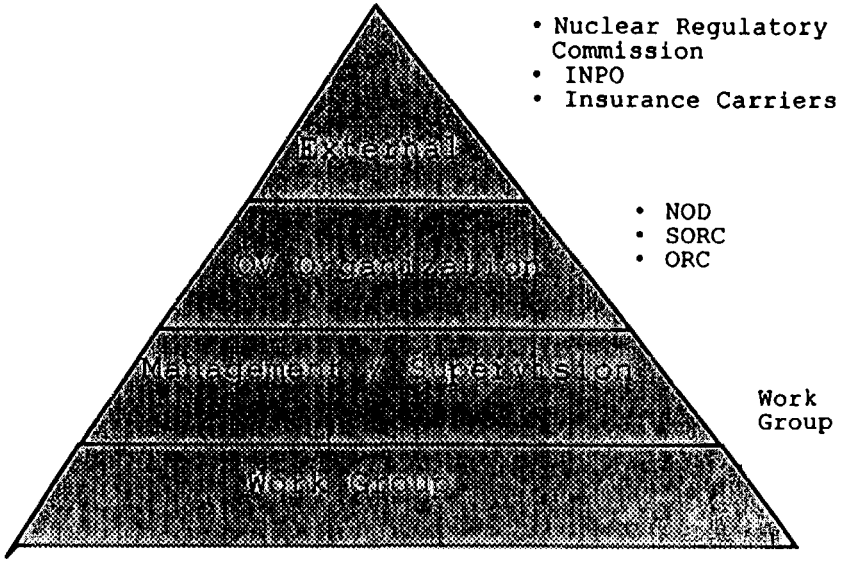
by Doug Davis

Nuclear Overview Manager

Comanche Peak Steam Electric Station

Texas Utilities

LEVELS OF DEFENSE IN DEPTH

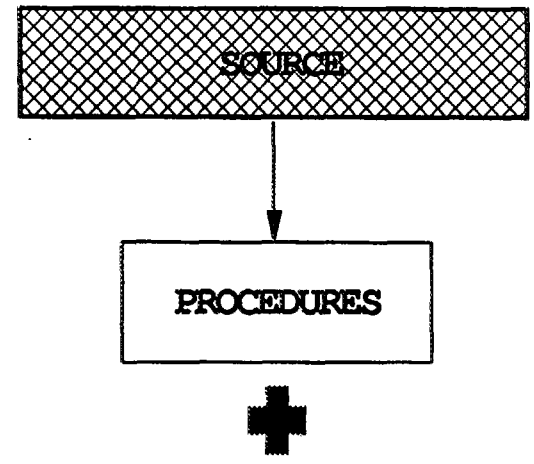


291

SOURCE OF REQUIREMENTS

- ✔ Nuclear Regulatory Commission
- ✔ Specifications
- ✔ Design Basis
- ✔ Institute of Nuclear Power Operations (INPO)
- ✔ Management Expectations
- ✔ Industry Standards
- ✔ Procedures
- ✔ Licensing Commitments

TO IMPLEMENT THE REQUIREMENTS



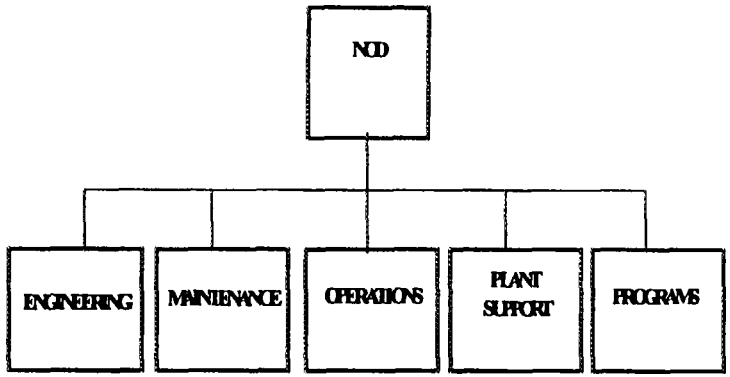
CHALLENGES FOR ORGANIZATION

- ✔ IMPLEMENT PROCEDURE/ PROGRAM
- ✔ SATISFY REQUIREMENTS
- ✔ CONTINUE TO LOOK FOR WAYS TO IMPROVE
- ✔ STRIVE FOR EXCELLENCE

ROLES OF INDEPENDENT OVERSIGHT

- ✔ Monitor for compliance with requirements
- ✔ Examine effectiveness of the operation
- ✔ Early identification of adverse conditions
- ✔ Identify weaknesses and areas for improvements
- ✔ Identify strengths and noteworthy practices

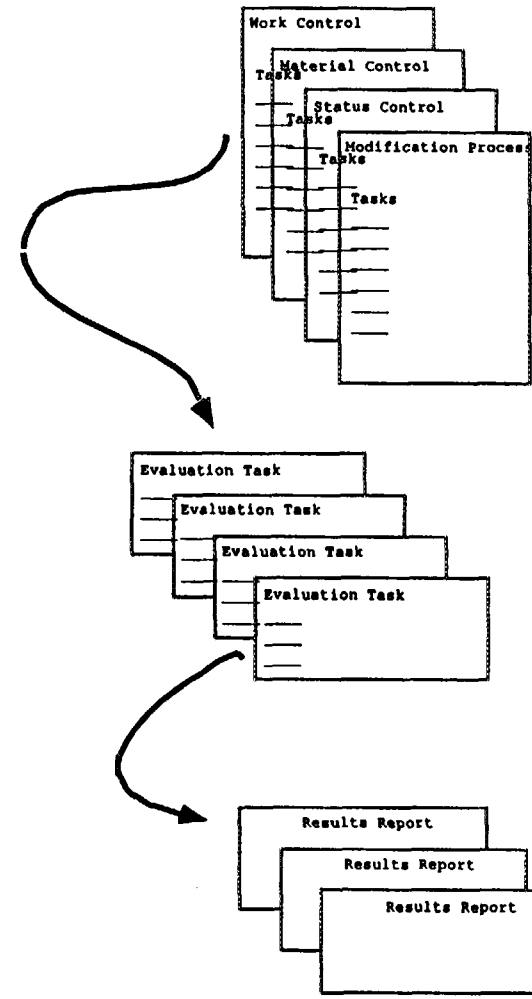
FUNCTIONAL ORGANIZATION



FUNCTIONS

- ✓ Evaluations
- ✓ Industry Operating Experience Report/ Independent Safety Engineering Group (IOER/ISEG)
- ✓ Plant Incident Reports/ Root Cause Analysis
- ✓ Inspection Program
- ✓ Non-Destructive Examination Program
- ✓ Self Assessment
- ✓ Trending
- ✓ Procurement Overview
- ✓ Quality Program Maintenance
- ✓ Human Performance Evaluation System
- ✓ NOD Planning/Scheduling

NOD EVALUATION PROCESS



EVALUATION PLANS

COMPREHENSIVE OVERVIEW PLAN FOR EACH PLANT PROGRAM OR PROCESS.

SOURCE:

- ✔ Management Expectations
- ✔ Regulatory Requirements
- ✔ Industry Standards
- ✔ Industry Experience
- ✔ Lessons Learned
- ✔ INPO Performance

FUNCTIONAL ORGANIZATION

ENGINEERING

- ✓ Surveillance Testing
- ✓ Document Control
- ✓ Plant Modifications
- ✓ Preventive Maintenance
- ✓ Reactor Engineering Program
- ✓ Design Control
- ✓ Configuration Management
- ✓ Environmental

MAINTENANCE

- ✓ Work Control Program
- ✓ Plant Material Condition
- ✓ Maintenance History
- ✓ Material Control
- ✓ Outage Planning/ Scheduling

FUNCTIONAL ORGANIZATION

OPERATIONS

- ✓ Conduct of Operations
- ✓ Status Control Program
- ✓ Emergency Operations Procedure
- ✓ Technical Specification Program
- ✓ Outage Interface
- ✓ Chemistry

PLANT SUPPORT

- ✓ Emergency Response
- ✓ Radiological Effluent Program
- ✓ Fire Protection Program
- ✓ Radiation Control Program
- ✓ Security Program
- ✓ Site Access Control
- ✓ Training/Qualification Program
- ✓ Procurement Control
- ✓ Material Control Program

PROGRAMS

- ✓ Corrective Action Program

EVALUATION IMPLEMENTATION

- ✔ Schedule evaluations baesd on evaluation plan
- ✔ Coordinate schedule with plant events
- ✔ Evaluation planning
- ✔ Determine tools to use:
  - ▸ Surveillance
  - ▸ Trending
  - ▸ Inspection
  - ▸ Audit
  - ▸ Interviews
  - ▸ Root Cause Tools
  - ▸ Observation
- ✔ Perform evaluation

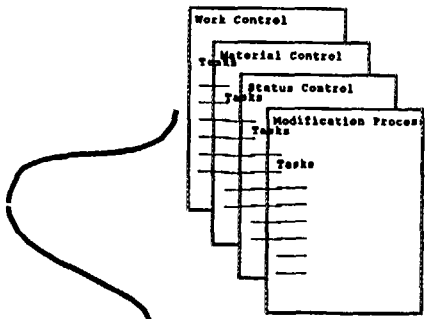
REPORTING RESULTS

- ✔ Report on several levels
  - ▸ Overall Program
  - ▸ Particular Tasks Evaluated
- ✔ Emphasis on clear and direct report on areas that need improvement
- ✔ Report
  - ▸ In writing
  - ▸ Electronically
  - ▸ Face-to-face
- ✔ Report conclusions
  - ▸ Program deficiencies
  - ▸ Program areas for improvement
  - ▸ Observation

QUALITY VERIFICATION PROCESS

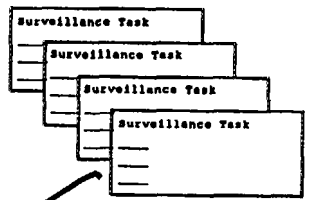
- ✔ In-process - Inspection Hold Points
- ✔ Observation Program
- ✔ Surveillance Program

NOD SURVEILLANCE PROCESS



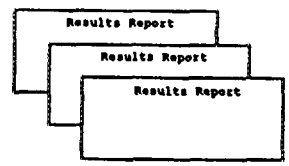
SOURCE

- WORK ORDERS
- SCHEDULES
- PLANNING MEETINGS
- TRAINING PLANS
- STAFF MEETINGS



SURVEILLANCE PLAN

- MATERIALS
- PROCEDURES
- JOB BRIEFING
- SAFETY
- HOUSE KEEPING
- WORK PACKAGE



SURVEILLANCE REPORT

- NEXT DAY
- RECOMMEND ACTIONS
- TRENDING

20

ROLE OF MANAGEMENT

IN THE DEVELOPMENT OF

SAFETY CULTURE

AT

THE OPERATING ORGANIZATION

W. ZHONG
IAEA

Visaginas, 6 - 9 May 1997

OBJECTIVE

To offer practical suggestions to assist in the development or improvement of a progressive safety culture.

*****

Examples are provided of specific practices that have been proven to be of particular value in assisting the development of a sound safety culture.

STAGES OF DEVELOPMENT OF SAFETY CULTURE

STAGE I SAFETY SOLELY BASED ON RULES AND REGULATION

STAGE II GOOD SAFETY PERFORMANCE BECOMES AN ORGANIZATIONAL GOAL

STAGE III SAFETY PERFORMANCE CAN ALWAYS BE IMPROVED

Some characteristics of three stages

I - Regulation Driven	II - Management Driven	III - Continuous Improvement Driven
Focus on the past - Reactive	Focus on the present - Short term	Focus on the future - Long term
Little cross-functional communication	Management encourages cross-departmental and cross-functional communication	Employees recognize the need for collaboration among departments
Mistakes are viewed as failures	Mistakes are viewed as correctable via more controls	Mistakes are viewed as process variation
Conflicts are not resolved	Conflicts are disturbing and discouraged in the name of teamwork	The existance of conflict is recognized and dealt with by trying to find mutually beneficial solutions
Safety is viewed as a required nuisance	Safety, cost and productivity seem like trade-offs	Safety and production are seen as inter-dependent

Link practices to the development stages of safety culture

Stage I - Regulation Driven	Stage II - Management Driven	Stage III - Continuous Improvement Driven
Senior managers commit the organization to improving its safety performance and agree a safety vision	Senior managers make managers aware that employee behavior, attitudes and values are important factors in achieving good safety performance and help employees contribute to improving safety performance	Senior managers remain alert to the possibility of learning from other organizations and establish systems for doing this. They recognize the effects of processes on safety results
Managers introduce regular review and audit of safety in order to identify areas for improvement	Managers introduce self-assessment of safety performance and ensure that there is a comprehensive corrective action plan	Senior managers make comparisons with external organizations chosen as benchmarks
Managers seek employee suggestions on how to improve safety	Managers seek active involvement of employees in improving safety	Encourage employees to assist in the further improvement of existing process

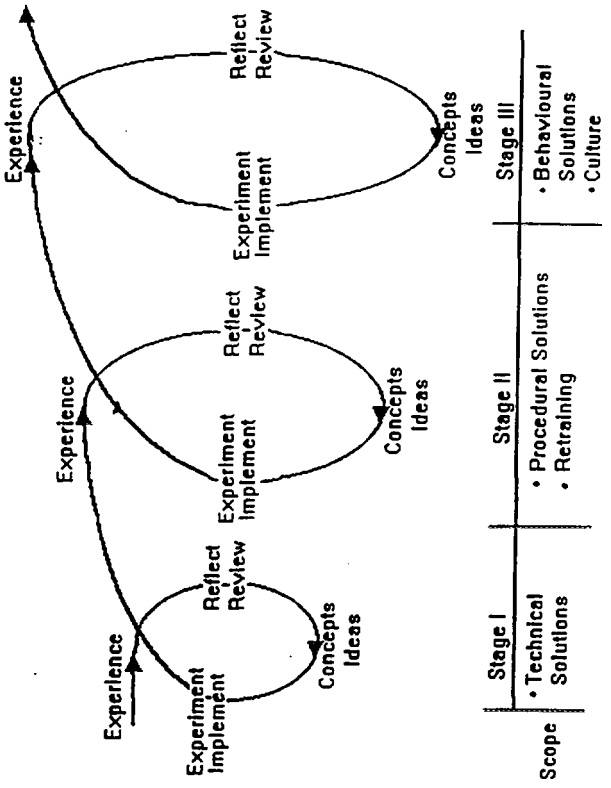


Figure 1: A Simple Model of Organisational Learning (after Kolb)

LINKING PRACTICES TO THE DEVELOPMENT STAGES OF SAFETY CULTURE (STAGE I)

- Senior managers commit the organization to improving its safety performance and agree a safety vision
- Senior managers review or formulate safety policy and communicate this to the workforce
- Managers review safety training and start to develop employee participation by inviting employees to identify training needs
- Managers establish safety performance measures, analyze statistics to establish trends and share information with employees
- Senior managers make other managers aware of IAEA publications
- Managers introduce regular review and audit of safety in order to identify areas for improvement
- Senior managers liaise with regulatory bodies to make them aware of initiatives being taken
- Managers seek employee suggestions on how to improve safety

LINKING PRACTICES TO THE DEVELOPMENT STAGES OF SAFETY CULTURE (STAGE II)

- Senior managers make managers aware that employee behavior, attitudes and values are important factors in achieving good safety performance. Everyone receives help so that the collective beliefs and behaviors of all have a positive impact on safety performance.
- Managers introduce positive measures when providing employees with information on safety performance trends.
- Managers make employees aware of other organizations who have successfully improved their safety performance to demonstrate that achievement is possible. This introduces employees to external ideas which may be worth adapting locally.
- Managers seek active involvement of employees in improving safety.
- Managers review contractor safety performance.
- Senior managers make managers aware of human factors and introduce root cause analysis.
- Senior managers introduce positive safety performance measures.

LINKING PRACTICES TO THE DEVELOPMENT STAGES OF SAFETY CULTURE (STAGE III)

- Senior managers remain alert to the possibility of learning from other organizations and establish systems for doing this. They recognize the effects of processes on safety results.
- Managers review safety targets and objectives. They remain alert to potential safety improvements.
- Managers co-operate with suppliers and contractors to improve their safety performance.
- Senior managers introduce organizational cultural indicators that have a bearing on safety performance.
- Senior managers make comparisons with external organizations chosen as benchmarks.
- Senior managers communicate with the public on safety issues.

- Regulators look at management processes rather than exclusively inspect compliance and/or performance.

GENERAL PRACTICES TO DEVELOP ORGANIZATIONAL EFFECTIVENESS

+ VISION, MISSION, GOALS & VALUES

+ FACILITATION/COACHING

+ OPENNESS

+ TEAMWORK

+ CONTINUOUS EVOLUTION OF IMPROVED SAFETY PERFORMANCE

• VISION
- Future aspirations of the organization
- Created by the top management
- To communicate the Vision to the workforce
- To align the efforts and energies of employees

• MISSION
- Way to achieve the Vision
- May change with the achievement of each stage

•GOALS
- Actions taken to achieve the Mission
- Specific Goal for each action

•VALUES
- Values are standards and principles commonly shared and set by the top management
- Values govern attitudes and behaviors people treat each other and desire to be treated

• Development and Implementation of Vision, Mission, Goals and Values:

Managers + Employees

• FACILITATION/COACHING

- Coaching of employees by managers to improve safety performance

- Facilitator: individuals who have special skills in encouraging change in human attitude and behavior

- Facilitator must model and exemplify the behaviours and attitudes of any new culture developed

- Facilitator's key function is to initiate approaches and practices which build relationships and trust among co-workers

- No single facilitator develops skills in ALL areas. A small cadre of people can be very helpful. The manager may assume the role of facilitator

• OPENNESS

- Open both to the public and the regulator as well as internally gains in both public confidence and in the successful management of safety

- Openness is also a basic requirement for the sharing of experiences, which in turn, provide a basis for an organization's ability to learn and improve over time

• TEAMWORK

- A team is a group of people who are committed to work together to achieve some common objectives

- The combination of individuals in teams results in a more effective solution to a problem, particularly, when it is of a complex nature and its solution requires the input of different disciplines

- To train employees in techniques that allow a structured approach to problem solving

- Make sure that there is no dilution of accountability and that accountability is clearly defined at the individual level

• CONTINUOUS EVOLUTION OF IMPROVED SAFETY PERFORMANCE

- Continuous evolution is most effectively sustained by focusing on improvements generated by employees

- To provide employees at all levels with the skills, support and commitment required to maximize their contribution to organizational performance

SPECIFIC PRACTICES TO DEVELOP SAFETY CULTURE

1. PRACTICES FOR SENIOR MANAGEMENT
2. PREDICTIVE MEASURE TO ANALYZE RISK
3. ERRORS AS A LEARNING OPPORTUNITY
4. IN-DEPTH ANALYSIS OF EVENTS
5. ABILITY TO LEARN
6. EMPLOYEE CONTRIBUTION TO IMPROVING SAFETY PERFORMANCE
7. THE NECESSARY INVOLVEMENT OF CONTRACTORS

SPECIFIC PRACTICES TO DEVELOP SAFETY CULTURE (Cont.)

8. COMMUNICATIONS OF SAFETY ISSUES TO THE PUBLIC
9. SELF-EVALUATION PROCESS
10. INTEGRATED SAFETY EVALUATION
11. SAFETY PERFORMANCE INDICATORS
12. REGULATORY APPROACH & IMPLICATIONS FOR SAFETY CULTURE
13. INFLUENCE OF THE REGULATORY BODY
14. INTERACTION WITH REGULATORS

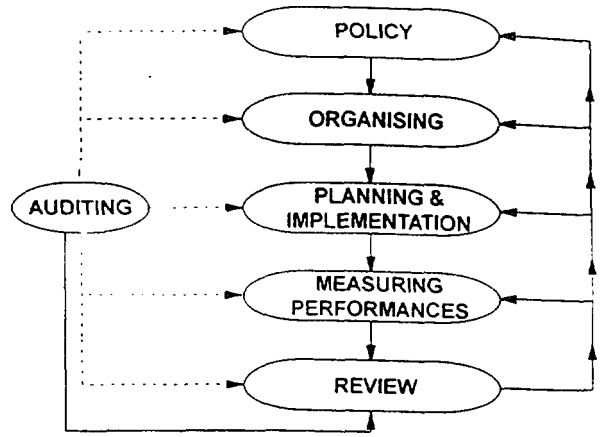
• PRACTICES FOR SENIOR MANAGEMENT

- The involvement and commitment of senior management in pursuing high standards of safety is essential

- Visible and genuine demonstration by senior managers of this commitment via personal behaviour and leadership example

- Ensure that their organization has a safety management system that provides a structured systematic means of achieving and maintaining high standards of safety performance

KEY ELEMENTS OF A SAFETY MANAGEMENT SYS



Examples of topics considered at stages of the process

Organising:
- Structure of organisation
- Responsibilities
- Managerial control
- Communication
- Co-operation
- Competence
- Independent advice

Planning & implementation
- Standards
- Safety Assessment
- Work Planning
- Operational Controls
- Emergency Planning

Measuring Performance
- Self Monitoring
- Independent Monitoring

• PREDICTIVE MEASURE TO ANALYZE RISK

- Use "predictive risk analysis" during the preparatory phase of an activity especially for sensitive operational activities

- Risk analysis uses typical experience feedback examples to help identify potential risks of errors at the different stages of the activity

- Risk analysis is performed by a multi-disciplinary team focusing on quality requirements for the main safety-related issues

- Risk analysis is a good tool to spread safety culture by contributing to better understanding and adherence to safety requirements

• ERRORS AS A LEARNING OPPORTUNITY

- Any event related to safety must be first considered as a valuable opportunity to improve operation through experience feedback and lessons learned

- To encourage the development of employee attitudes that give them confidence, without fear of blame, to report fully errors, particularly human errors

- Experience has shown that the number of events reported can actually increase, at first, due to the higher safety awareness and then in the longer term decrease following better mastery of the problems identified

- This should not affect organizational disciplinary measures if willful or criminal neglect has occurred

• IN-DEPTH ANALYSIS OF EVENTS

- Events should cover "near-misses"

- A thorough analysis to identify the direct and indirect causes to establish the root causes of the event

- A thorough analysis of the actual and potential consequences with highlighting of remaining layers of defence

- Honesty, objectivity and comprehensive reporting of events must be stressed

- The participation of the personnel involved in the event is essential

- Management should clearly state that safety culture is not a "zero error" culture, but rather a learning process which relies on openness and experience feedback to get improvement

• ABILITY TO LEARN

- The enhancement of nuclear plant safety relies on
  * Reactive prevention: actions taken in response to failures and
  * Proactive prevention: the ability to identify the nature and causes of developing problems and to apply effective interventions to meet them

- The ability to learn is characterized by the willingness of organizations to seek international exchanges of information

- The ability to learn is central to the plant's ability to improve

- Ownership at all levels of the organization is to be encouraged since staff are more likely to respond to changes that they have participated in

• EMPLOYEE CONTRIBUTION TO IMPROVING SAFETY PERFORMANCE

- Every employee has a primary responsibility for contributing to their personal safety and to that of their fellow employees. This is best facilitated by encouraging employee involvement in safety

- Safety improvement teams:
  Groups of individuals meet to find a solution to some safety related problem

- Safety committee and safety meetings:
  Regular safety meetings at the departmental or sub-group level or in committees to review safety performance in its area of responsibility and discusses actions for improvement

- Safety conferences:
  Serve as a forum for representatives from all levels of the organization to meet and discuss safety performance

• THE NECESSARY INVOLVEMENT OF CONTRACTORS

- All contractors can contribute to improved safety. Thus, contractors can and should participate in the enhancement of plant quality and safety

- To ensure that the primary responsibility of the utility for safety is not diluted and that quality in the activities of contractors is fostered

- Contractors should receive the same attention and training in safety culture as utility staff

- The involvement of contractors in work preparation, risk analysis and experience feedback is beneficial, both for the quality of work and skill development

• COMMUNICATION OF SAFETY ISSUES TO THE PUBLIC

- The communication of safety performance information to external groups can assist in developing and maintaining confidence of the public in the safety of nuclear power

- To hold routine meetings with representatives of local community and local government to share information about activities and safety performance

- To publish newsletters with regular frequency and information on safety-related matters is included

- To organize visitor tours of the site taking the opportunity to provide factual information to the visitors

- To construct exhibition centers to show models of nuclear processes to visitors

• SELF-EVALUATION PROCESSES

- Self-evaluation processes is a "feedback loop" allowing organizations to assess their safety performance by internal reference to key performance indicators and by external comparison with the performance of other organizations to maintain and develop the ability to manage safety

- Each manager or supervisor should be encouraged to develop and implement a self-evaluation programme in their area of responsibility

- Self-checking training may be provided to workforce to encourage employees to assume an individual responsibility for their personal safety and those of their colleagues

- Independent evaluations and audits should be conducted by competent people independent of the area or activities being audited

- Change the role of audits from the exclusive identification of non-compliances to include the identification of improvement opportunities

• INTEGRATED SAFETY EVALUATIONS

- Safety issues need to be dealt with using a multi-disciplinary approach with the participation of different specialists and professional groups

- Work is not done on a one-by-one basis, but is organized in a way that will allow for an integrated approach to be taken

- Consideration to be given to:
  technical,
  human factors and
  organizational aspects
  in a co-ordinated and integrated manner

• SAFETY PERFORMANCE INDICATORS

- Indicators of a more positive nature to complement the traditional passive indicators such as the number of accidents, faults and safety lapses

- The value of positive safety indicators is that they serve as a mechanism for giving recognition to employees who are endeavouring to improve safety by thought, action or commitment

- Recognition for achievement is a powerful motivating force to encourage continued improvement

- Examples of positive safety indicators:
  * % of safety improvement proposals implemented during previous month/quarter
  * Number of safety inspections conducted by managers during previous week/month
  * % of employee suggestions that relate to safety improvement

• REGULATORY APPROACH AND IMPLICATIONS FOR SAFETY CULTURE

- Prescriptive approach regulation: Explicit standards and requirements that are applied uniformly to all utilities and plants and that result in a standard approach being taken

- Performance based approach regulation: Focuses on the results obtained through the utilities' activities to demonstrate compliance with requirements

- Processed based approach regulation: Focuses on the organizational systems that the utility or plant has developed to assure the ongoing safe operation of the plant

- An open and frank dialogue between the utility and regulatory body focusing more on achieving fundamental safety objectives than on merely compliance with detailed rules and regulations

• INFLUENCE OF THE REGULATORY BODY

- Within the constraints of national legislation, allowing some flexibility for organizations to manage for safety and develop aims and goals that exceed legal requirements;
- Targeting inspection effort to areas of risk. For those plants which have effective safety management systems, sufficient inspections of control processes and selective inspections of outcomes on the plant may be adequate;
- Making allowances for no blame culture incidents;
- Making the reasoning behind regulatory controls visible;
- Establishing predictability and stability in the regulatory process;
- Trying to agree on appropriate technical ground rules for safety assessment methodologies;
- Having regular dialogue with organizations and encouraging openness in dealings;
- Training inspectors to deal with the public on nuclear safety issues in a way that is understood;
- Training of inspectors in safety management and human factors matters (including safety culture);
- Inspectors interacting and being visible to workers at plant level.

• INTERACTION WITH REGULATORS

- In addition to the formal interface concerning statutory duties of the regulators, it is beneficial to hold a routine meeting with regulators to inform them of general plans and activities

- These meetings can give the regulator a broader perspective that provides additional confidence in the total safety framework and organization that supports good safety performance

- Questions relating to safety culture can often be discussed at such a meeting

- The meeting can also present a convenient opportunity for the representatives from different regulatory bodies to interface with each other and the organization

ASSESSING PROGRESS IN THE DEVELOPMENT OF SAFETY CULTURE

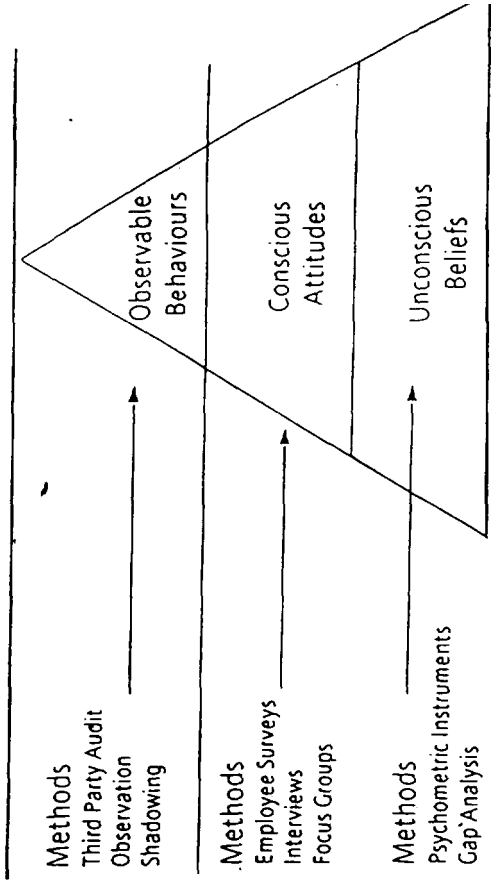
+ BEHAVIORAL MEASURES

+ ATTITUDINAL MEASURES

+ PERCEPTION OR BELIEF MEASURES

+ OVERALL ASSESSMENT OF SAFETY CULTURE

METHODS FOR MEASURING KEY COMPONENTS OF SAFETY CULTURE (AFTER SCHEIN)



• OVERALL ASSESSMENT OF SAFETY CULTURE

- The information accumulated from the

  * behavioral observations,
  * attitudinal and belief surveys

  can give a valuable indication of whether safety culture is developing successfully

- The information can also be used to confirm the effectiveness of specific management actions in relation to safety

• OVERALL ASSESSMENT OF SAFETY CULTURE (Cont.)

- Some other organizational indicators of a progressive safety culture are:
  * Widespread employee commitment to good safety performance, especially top management;
  * Good safety performance considered to be a goal in itself and not merely to satisfy regulatory requirements;
  * Investigation of the fundamental causes of events or near misses to learn lessons;
  * Display of safety indicators to communicate performance to employees;
  * Managerial awareness of safety culture issues;
  * No blame attached to employees who voluntarily report mistakes;
  * Commitment to continuous evaluation and improvement of safety performance;
  * Co-ordinated and regular audit programme;
  * Positive efforts made to learn from safety performance of external organizations;
  * Shift from measuring outcomes to measuring aspects of processes that affect safety.

CONCLUDING RECOMMENDATIONS

- There is no consistent and visible prescriptive formula for developing a strong safety culture
- A prerequisite is the genuine and consistent commitment of the top management of an organization to improving safety
- To start and do something tangible and visible to improve safety
- To involve employees from the beginning
- To take account of the existing national and organizational culture to ensure an effective implementation of the selected practices
- A mechanism to ensure that international experience of practices to develop strong safety culture is shared on a regular frequency
- The role of the regulatory body is very important

Where Root Cause Doesn't Work

by Doug Davis

Nuclear Overview Manager

Comanche Peak Steam Electric Station

Texas Utilities

At The Base Of The Learning Curve

ROOT CAUSE ANALYSIS

Root Cause Analysis techniques used to solve plant performance issues

Best at fixing equipment and some procedural issues

Less effective for issues involving personnel and management performance

Targeted Root Cause Programs

Development of root cause analysis programs targeted to personnel errors

- ☑ Less rigorous than formal root cause analysis.
- ☑ Good at solving errors induced by procedures, environment, communications, human factors
- ☹ Not good at solving errors induced by management actions and the internal motivation of employee

Factors Impeding Analysis

- ☹ Driven to find the "Root Cause"
- ☹ Conclusions focus on the last barrier
- ☹ Focus on cause and effect
- ☹ Acceptability of Conclusions

Performance Enhancement Program

Clear Expectations for workers and supervisor performance

Method to determine if expectations are being met

Rapid feedback as to whether or not error reduction efforts are working

Accountability at all levels for results

Elements of the Program

Process for Identification and Classification of Errors

Communication

Management and Worker Awareness

Trending of Results

Problem Identification and Classification

Events are reported on a common form

Maintain a low threshold for reporting

Recognize difference between Significant versus Non-Significant

Rapid trending and feedback system

Communication

Clear communication of expectations

Frank and open discussion of errors

Reinforce and reevaluate expectations when errors occur

Sharing experiences to help others avoid the same mistakes

Management/Worker Awareness

Daily discussion of errors

Monthly discussion of group trends

Quarterly report on trends, with increased analysis of issues

Share experience with other work groups

Program Strengths

Drives change when change is needed.

Gives quick feedback on progress.

Multilevel analysis is possible.

Can be correlated with process trends.

Tells when change (including corrective actions for errors) are inappropriate.

Program Issues

It is not a precise tool.

Doesn't tell why things are changing or what is changing.

Can be difficult for supervisors who want to change but don't know what to do.

Can provide an incentive to not report problems.

As the program is successful, the amount of data shrinks

Results of Program

Drastic reduction in Significant Errors that affect plant production

Continuous reduction in Non-Significant Errors

High level of awareness of workers , alert to Error likely situations

Results of Program

Personal accountability for actions has increased

High sense of urgency to correct low threshold problems before they become significant

Enhanced programs, procedures and processes

Now What ?

Where do we go from here for the next advance?

Performance Enhancement can tell when there is a problem, but it doesn't tell what the problem is or how to fix it.

We Know That .....

For many significant personnel errors,
there were one or more behaviors
that allowed the event to occur.

And So .....

If you eliminate these behaviors, the event is no longer possible.

Solution: Supplement Existing Program

Focus on Behaviors to Tell What to fix,

and

Use Existing Program to Confirm that It's working!

FEEDBACK OF SAFETY - RELATED OPERATIONAL EXPERIENCE: LESSONS LEARNED

ComEd

A Unicom Company

Dr. D. Elias

May 6 - 9, 1997

Ignalina Nuclear Power Plant, Lithuania

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LESSONS LEARNED PROGRAM

- 1990 Initial Development from Dresden and Zion DET
- AD HOC Group reviewed events, exchanged information on notable problems and events
- 1991 formalized "Lessons Learned" Program
- Program Focus
  - Rapid transmission of information among stations
  - Reviews available by group, technical representative, policy committee
  - Tailored lessons for each station
  - Umbrella non-routine lessons learned efforts (outage planning, plant events, INPO, generic issues)
  - Accountability through planned follow-ups:
    - Timeliness - NQP/ONSG/Performance Assessment
    - Effectiveness - ONSG/Performance Assessment
    - Prudency - Performance Assessment

LESSONS LEARNED OBJECTIVES

- Prevent events/deficiencies that have happened/been identified at nuclear stations from recurring at ComEd Nuclear Stations.

- Good practices identified at stations also communicated to other stations to allow them to improve operations.

LESSONS LEARNED PERSONNEL CHARACTERISTICS

- Effective communication
- Recognized
- Respected
- Responsive
- Independent of line and production function
- Valued
- Action oriented
- Results oriented
- Achieving the right results
- Knowledgeable
- Reflective
- Persistent, insistent and thick skinned
- Capable of expert assessment
- Observant
- Forceful
- Decisive
- Intrusive
- Anticipatory
- Reckoned with
- Received proactively
- Sufficiently equipped
- Being informed
- Being recognized as fulfilling a safety and regulatory function
- Ability to communicate generic and industry issues
- Multitasking capability
- Sensitive to customers needs
- Confronting
- Visible
- Present
- Current
- Adequate staffed
- Analytical
- Persuasive
- High Quality Performance
- Supportive
- Ability to comprehensivel understand, assess and analyze a condition

SOURCES OF INDUSTRY OPERATING EXPERIENCE

- INPO Significant Operating Experience Report
- INPO Significant Event Report (SER)
- INPO Operating & Maint. Reminder (O&MR)
- Other INPO Issuances
- Operating Experience Reports (OE)
- In-House Events (Lessons Learned Group)
- Vendor Information
- NRC Issuance (Nuclear Licensing Dept.)
- Human Performance Enhancement System

THREE TYPES OF DOCUMENTS FOR TRANSMITTING LESSONS LEARNED ISSUES

1. LESSONS LEARNED INITIAL NOTIFICATIONS - BLUE
   - Brief, informational event descriptions
   - Wide station distribution
   - Intended to heighten awareness of event
   - Rapid dissemination
2. LESSONS LEARNED INFORMATION - GREEN
   - Issued by any department within Nuclear Operations Division
   - Umbrella Existing Efforts
3. SIGNIFICANT LESSONS LEARNED DOCUMENT - RED
   - Contains information and recommendations regarding major events
   - Recommendations reviewed by Lessons Learned Review Committee prior to issuance
   - Applicability of each recommendation to each station is considered

July 15, 1991
LLIN 91-50

SUBJECT: Inadvertent Reactor Feed Pump Trip with subsequent Low Reactor Water Level Scram Quad Cities Unit 2

INITIAL CONDITIONS

- U-2 in normal shutdown procedure for planned maintenance outage

EVENT DESCRIPTION

- On 7/12/91 at 1900, commenced Reactor (Rx) shutdown per QGP 2-1; "A" Feedwater Regulating Valve (FRV) O.O.S. and isolated
- On 7/13/91 at 0333, manually tripped main turbine per procedure
- 0339 Manual scram initiated
- 0340:04 RX Water Level (RWL) decreases to +8" (scram setpoint). Turbine bypass valves auto closed normally.
- 0340:17 RWL recovers (increases) to +8"
- 0341 Verified all "rods in" by OD-7
- 0343 Received high RWL alarm (+44")
- 0344 "A" Reactor Feed Pump (RFP) trips at +48" RWL
- 0345 Reset Rx Scram
- 0348 One turbine bypass valve manually opened 50% for inventory control
- 0351 RFP high RWL trip resets (+44"); bypass valve is closed; SCRE recognizes RWL at +18" and decreasing and notifies crew of impending low level scram
- 0355 Received Rx Scram on low RWL at +8": feedwater level control switched to manual; FRV's closed
- 0356 "A" RFP started
- 0358 RWL restored to +8"
- 0403 "A" RFP trips at +48" RWL
- 0412 "B" RFP started at +27" RWL; crew realizes "B" FRV leaks through; "B" FRV isolated

ADDITIONAL INFORMATION

- Valve stem to operator coupling was found striking the top of the packing gland on "B" FRV, preventing full closure of the valve. One inch of material (probably carbon spacer) was left in the stuffing box during the last repack of the valve (live load packed). The post maintenance testing did not include a verification of valve stroke to check for interference.

- Extreme caution should be exercised when opening or closing a turbine bypass valve with no RFPs running.

- An investigation team has been assembled to determine root causes and corrective actions; A LER will detail specific results of the investigation.

RECOMMENDED DISTRIBUTION INCLUDES

- Station Managers, Operations, Maintenance, Regulatory Assurance, Training (Simulator)

Jon Marshall for P.M.
Lessons Learned Group

4/14/93

To: R. Bax
T. Joyce
K. Kofron
C. Schroeder
G. Schwartz
G. Spedl

LESSONS LEARNED INFORMATION 93-G01
Control Rod Mispositioning Events
Quad Cities Units 1&2

Site Quality Verification and the station Reactor Engineer investigated three recent control rod mispositioning events. The results of the investigations are attached for your information. No response is necessary.

T. R. Tramm
for

D. Elias

xc: S. Becker, J. Cantlin, W. Huntington, G. Pliml, T. Schuster, D. Taylor, Site VPs (6), SQV Supervisors (6), Station Technical Superintendents (6), R. Bishop, D. Farrar, D. Elias, R. Querio, T. Tramm, M. Wallace, W. Naughton, L. DelGeorge, T. Rieck, E. Martin, C. Reed, M. Turbak, R. Ward, M. Willoughby, B. Palagi

SIGNIFICANT LESSONS LEARNED INFORMATION FOR
STATION/DEPARTMENT MANAGER'S ATTENTION

(Significant Lessons Learned Document 91-2)

March 14, 1991

To: R. Bax, G. Diederich, E. Benigenburg, T. Joyce, K. Kofron, R. Pleniewicz, J. Leider, C. Sargent, R. Flessner

Subject: Quad-Cities Unit 1 Inadvertent Loss of Reactor Vessel Inventory During RHR Valve Testing Activities

The attached Lessons Learned information, relative to the subject event, has been reviewed by the Lessons Learned Review Committee (LLRC) and deemed significant enough to warrant the Station/Department Manager's attention.

A one page synopsis of the event is followed by a list of Lessons Learned that were evaluated at the LLRC meeting on February 27, 1991.

The status of Lessons Learned items will be tracked via the NTS system. No additional written response is required.

3/27/91

Lessons Learned Group
Safety Assessment Department

Attachments:
A - 2-7-91 P.F. Manning letter regarding equipment OOS clearance
B - 1-30-91 Galle/Wallace letters regarding valve stroking
C - Braidwood Station HLA

cc: C. Reed, D. Galle, M. Wallace, L. DelGeorge, R. Querio, K. Graesser, N. Kalivianakis, Sta. Tech. Supts (6), M. Turbak, J. Bowers, M. Willoughby, ONSG Administrators (6), D. Farrar, K. Brennan, F. Rescek, D. Brown, P. Manning

LESSON LEARNED FEEDBACK: A CASE STUDY

ZION STATION

Systems Monitored Independently

Centrifugal Charging (High Head)	Essential Service Water
Safety Injection (Medium Head)	Auxiliary Feedwater
Residual Heat Removal (Low Head)	Diesel Generators
Component Cooling Water	Electrical Distribution

Technical Specifications

Both absolute safety and relative safety are analyzed

The safety plane is the point where all equipment that is required is operable

Safety plane baseline is 1000 points

ZION STATION (CONT'D)

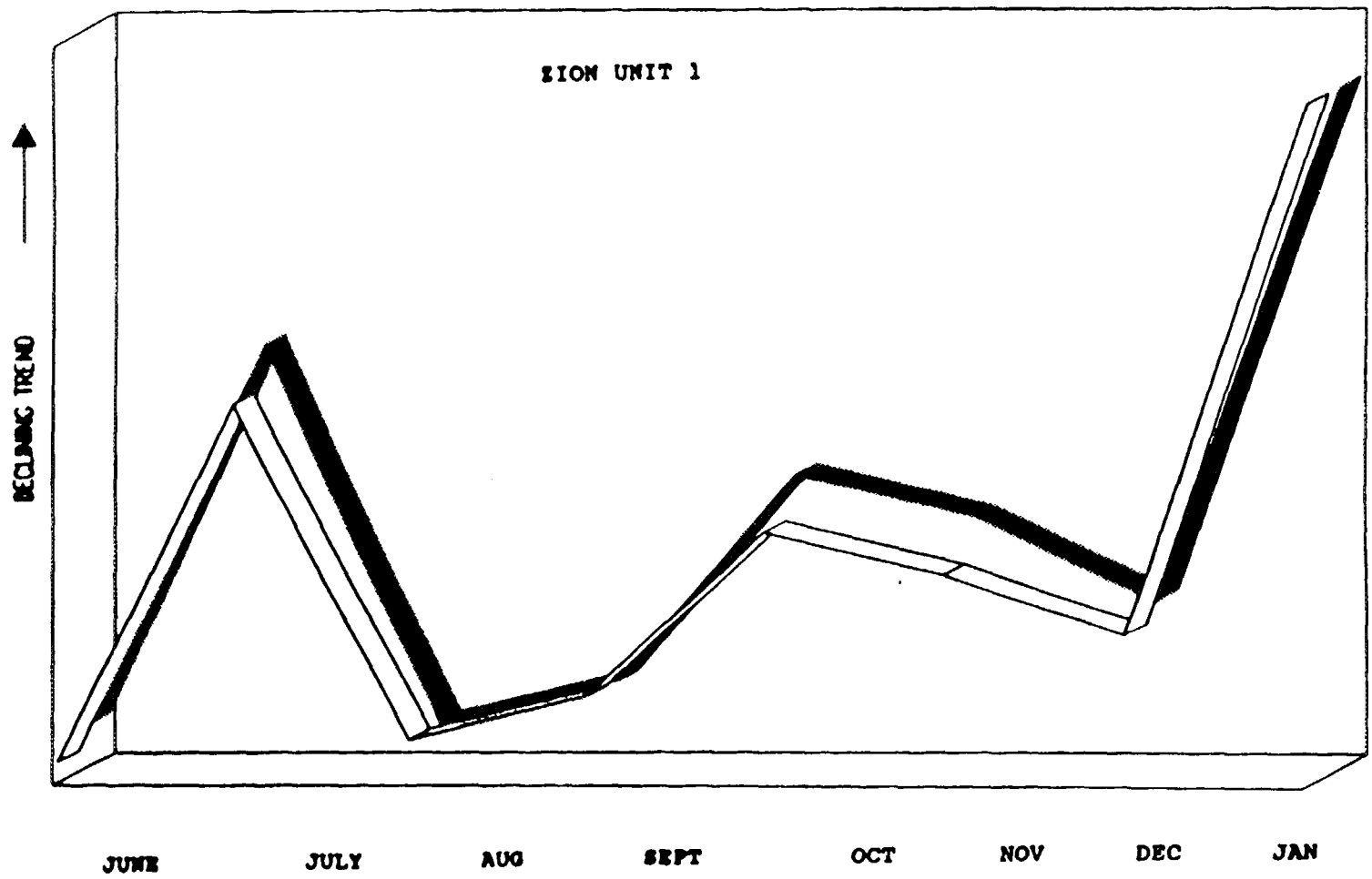
Negative penalty points added to absolute safety for:

- Entry into Technical Specification LCO due to equipment unavailability = -200 points
- Plant shutdown due to Technical Specifications = -400 points
- Degraded Equipment = -100 points

Positive penalty points added to absolute safety for:

- Entry into a Technical Specification LCO for preventative maintenance = +100 points
- Plant shutdown prior to an LCO being exceeded = +100 points
- Contingency plans in place = +100 points

INTEGRAL SAFETY SYSTEM PERFORMANCE TREND



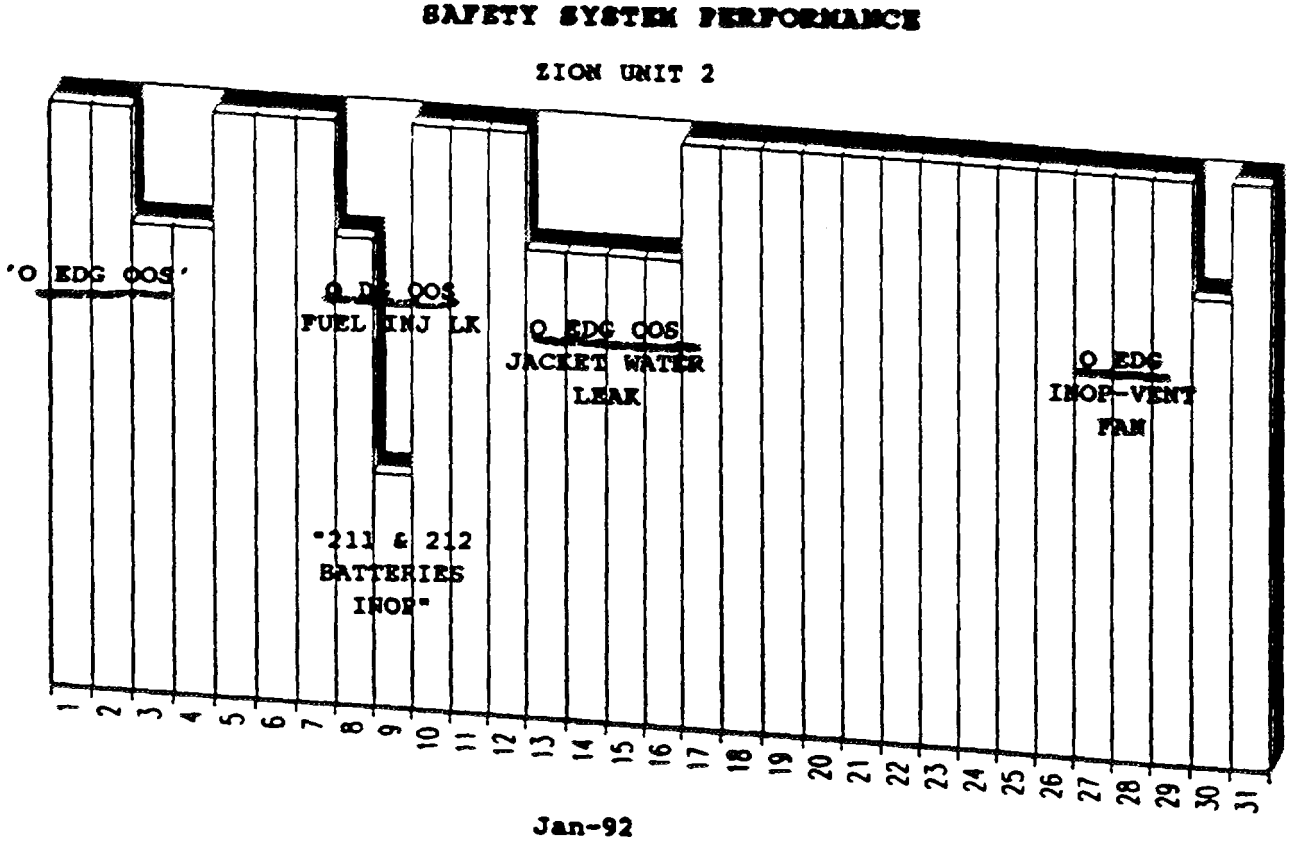
NOTE JAN TREND

23f

ZION ONSITE NUCLEAR SAFETY

JANUARY 1992

MONTHLY REPORT



UNIT 2:

1/3-4/92-"0" DG OOS FOR L.O. FLEX HOSE FAILURE

1/8-9/92-"0" DG OOS FOR FUEL INJECTOR LINE LEAK

1/9/92-BATTERIES 111 & 112 INOP DUE TO HVAC INOP

1/13-16/92-"0" DG OOS FOR JACKET WATER WRINKLE BELLY LEAK/REPLACEMENT

1/30/92-"0" DG INOP DUE TO VENT FAN INOP

Enhancing Operational Safety

Licensed Control Room Supervision

- Must Remain in a Supervisory Role
  - Operations Supervisory Personnel and Training Instructors Routinely Observe Control Room and Simulator Activities

Licensed Control Room Supervision

- Carefully Manage Control Room Environment to Minimize Distractions
  - Annunciators Lit More than 14 Days
  - Controllers in Manual for More than 21 Days
  - Limit Number of People in Control Room
- Refrain From Manipulating Plant Equipment

Personnel Access to Control Room

- Enter Only if Assigned to Perform Specific Duties Within the Control Room
- Don't go Forward of the Unit Supervisors Platform nor Enter the Dark Carpet Zone Without Obtaining Specific Permission of the Control Room Operators

Reactivity Changes

- Control Rods are Only Withdrawn in a Deliberate, Carefully Controlled Manner While Constantly Monitoring Nuclear Instrumentation and Redundant Indications of Reactor Power Level and Neutron Flux
- Reactor Operators Announce Intentions to Change Reactivity and Receive Acknowledgment Prior to Initiating Action

Reactivity Changes

- A Yellow Plaque has Been Placed Next to the Rod Control Switch to Focus the Attention of the Reactor Operator Prior to Moving the Control Rods
- CAUTION: Never Pull Control Rods Except in a Deliberate Carefully Controlled Manner, While Closely Monitoring the Reactor's Response

Reactivity Changes

- Simulator Reactivity Changes are Made in the Same Manner as Control Room Reactivity Changes

Simulator Training

- Shift Supervisor Develops a Training Plan Which Includes Standards for the Crew to Emphasize During Simulator Exercises
- Simulator Exercise Pre-Briefings Include a Review of the Standards and Performance Expectations

Simulator Training

- Crew and Individual Performance During Simulator Exercises is Monitored by the Shift Supervisor and Feedback is Provided to the Team and Individuals at the Conclusion of Each Training Session
- Good Practices are Identified and Coaching Provided to Enhance the Team's Performance

Simulator Training

- At the Conclusion of the Training Week, the Shift Supervisor Evaluates the Team Performance and Identifies Areas to Focus on During the Next Training Week

Examples of Standards

- Believe and Respond to Instrument Indications Unless They are Proven to be Incorrect
- If Unexpected Indications are Identified During an Activity, the Activity is Stopped Until the Indications are Thoroughly Understood and it is Known that the Activity can Safely Proceed

Examples of Standards

- A Conservative Approach is Used for All Decisions and Planned Evolutions
- The Shift Supervisor is Responsible to Direct Conservative Action if Activities or Continued Power Generation Jeopardizes the Safe Operation of the Plant

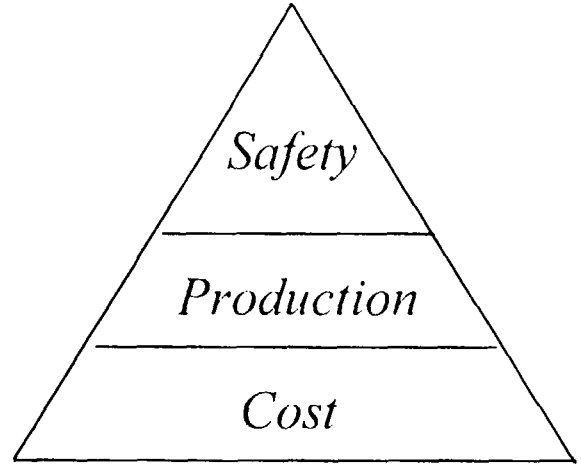
EXPERIENCE GAINED IN ENHANCING OPERATIONAL SAFETY AT COMED'S NUCLEAR POWER PLANTS

Dr. D. Elias

May 6 - 9, 1997

Ignalina Nuclear Power Plant, Lithuania

LEADERSHIP FOCUS



- Nuclear Safety Policy
- Centralization/Decentralization
- Typical Nuclear Operating Organization
- Safety Review Boards
- Human Performance Enhancement
- Elements of Effective Nuclear Oversight

NO Policy NOP-OA.38
Revision 0
Issuance Date: August 30, 1996

NUCLEAR SAFETY POLICY

1.0 Purpose

The purpose of this Policy is to define the Nuclear Operations Division's "nuclear safety policy" that is applicable to all Nuclear Operations personnel.

2.0 Policy

2.1 In order to ensure the health and safety of the public as well as station personnel, nuclear safety shall have clear priority over schedule, production, and cost. Continued emphasis on reactor safety and reactivity management will be the heart of nuclear power plant operational safety. Conservative decision-making shall guide all aspects of plant operations.

2.2 Responsibility for enforcing this Policy shall reside with senior Corporate and site management; responsibility and authority for the safe operation of the plant shall reside with the station shift engineer/manager; and responsibility for complying with this safety policy shall reside with each individual.

2.3 The nuclear plants shall be operated safely at all times. The major elements of safe operation, which shall be addressed through local management controls, include:

2.3.1 The nuclear plants shall maintain compliance with their license, technical specifications, and other regulatory requirements.

2.3.2 Clear management expectations shall be established for procedure adherence. Plant activities shall be performed in accordance with requirements contained in approved procedures governing the activities.

2.3.3 Equipment shall be operated, tested, and maintained:

A. To comply with the design and licensing basis of the plant,

B. To maximize the availability of systems important to safety, e.g. defense-in-depth, and

C. To assure that safety functions are neither compromised nor challenged unless in a controlled manner.

2.3.4 The configuration of the plant shall be deliberately chosen and controlled to support nuclear safety. The plant configuration shall not be altered in any way without proper authority, recording the change, or knowing exactly what the effect will be on the process and the readiness of the plant to respond to adverse events.

2.3.5 Nuclear fuel and radioactive materials shall be under absolute control at all times. Controls shall be in place to prevent unplanned or excessive personnel radiation exposures and unplanned release of radioactivity.

2.3.6 All conditions having actual or potential nuclear safety significance shall be promptly reported and investigated for their risk impact and their causation. Corrective actions shall be completed in a timely manner consistent with their nuclear safety significance.

3.0 References

3.1 Corcoran, William R., "The Principles of Nuclear Power Plant Operational Safety," Windsor, CT, 1996.

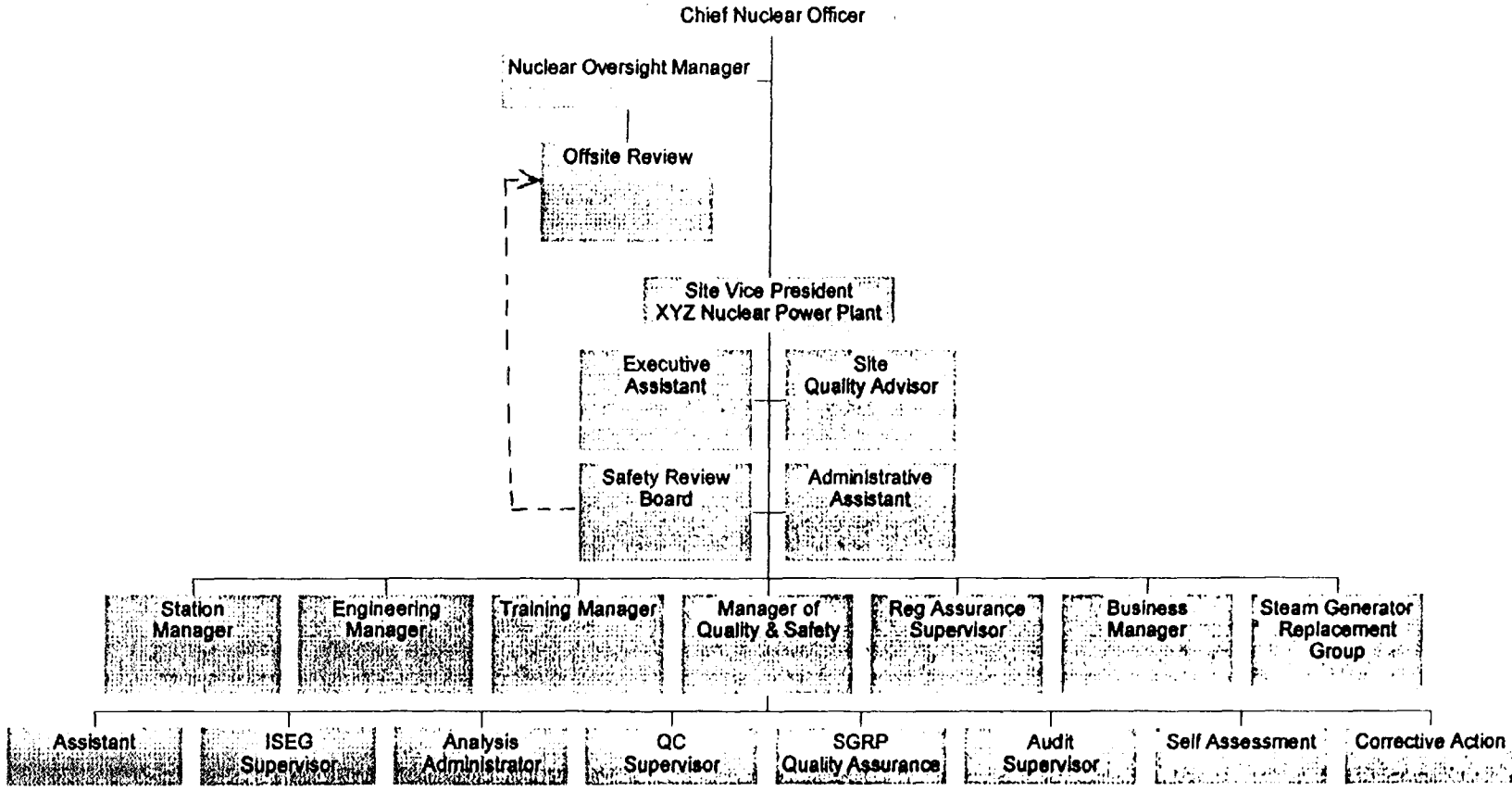
3.2 "Safety Culture," Safety Series-No. 75-INSAG-4, International Atomic Energy Agency: Vienna, Austria, 1991.

R.C. Ward Date	T.J. Maiman Date
Nuclear Oversight Department	Senior Vice President
Author	Nuclear Operations

CENTRALIZATION/DECENTRALIZATION

- Responsiveness
- Economies of Scale
- Sameness /replication
- Lessons Learned
- Safety Review Boards
- Access to Chief Nuclear Officer

ComEd Nuclear Operating Organization (Typical)



SAFETY REVIEW BOARDS

- Improved statement of SRB purpose
- Minimum quarterly meeting frequency
- Corporate executive as an SRB member
- Addition of Offsite Review Committee
- Quorum requirements
- Standing agenda and meeting format
- Process for escalation
- SRB responsibilities defined
- Document distribution and standardized listing of material to be distributed to the membership

BASIC ASSUMPTIONS
HUMAN PERFORMANCE ENHANCEMENT PROGRAM

- People
  - Want to do a good job
  - Causes are discoverable
  - Can improve circumstances by changing things
  - Consequential events occur for the same reasons as non-consequential events

AREAS OF POSITIVE SUPPORT FOR A VIABLE HPES PROGRAM

- Create environment for people to come forward without fear of restitution
- Management should receive reports with open minds and discuss/accept results
- Recognize that more than one cause may exist
- Do not look at the cost of implementation as a primary factor
- De-emphasize using the term "Personnel Error" - this is a symptom not a cause

AREAS OF POSITIVE SUPPORT FOR A VIABLE HPES PROGRAM (CONT'D)

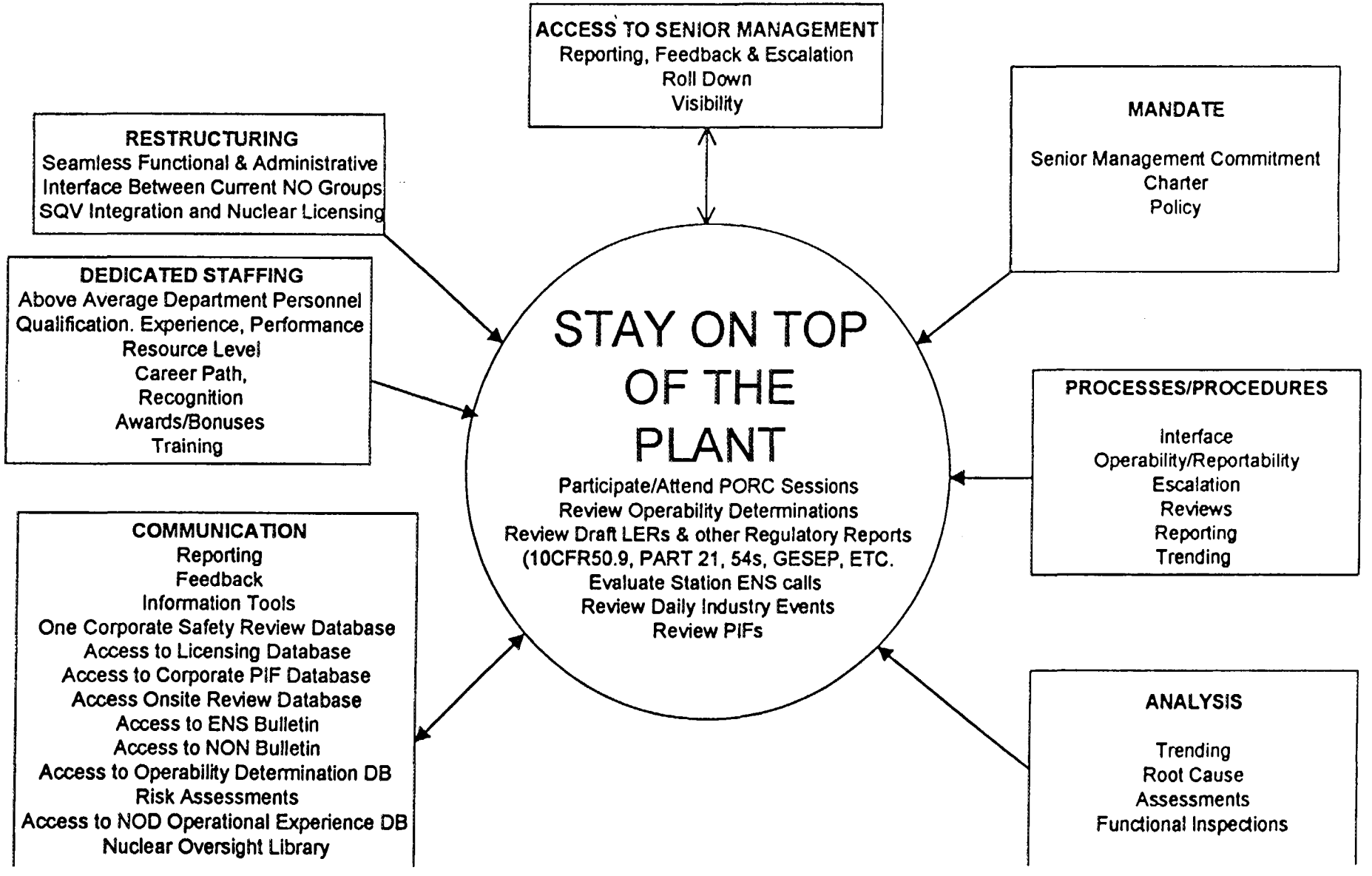
- Demand absolute root cause, ask WHY vs. WHO
- Completely separate discipline and HPES
- Train managers and staff to understand HPES
- Management should communicate their expectations of HPES program
- Don't "bog down" the HPES Coordinator to the point where being pro-active suffers
- Make the HPES Coordinator a full time position

COMMONWEALTH EDISON
HPES PROGRAM

Areas Which Could Weaken a Viable HPES Program

- Implement disciplinary action, then HPES
- Assign non-credible HPES Coordinators
- Use HPES in a purely reactive mode
- Don't accept responsibility. Denial by involved persons

ELEMENTS OF AN EFFECTIVE NUCLEAR OVERSIGHT



Игналинская АЭС 6-9 мая 1997г.

г.Висагинас, Литва

Внебюджетный проект МАГАТЭ по безопасности реакторов типа РБМК

Семинар руководящих работников
старшего уровня
по содействию развитию Культуры безопасности
на АЭС с реакторами типа РБМК

К вопросу о состоянии Культуры безопасности на АЭС Украины (справочный материал)

Понятие Культуры безопасности имеет наполнение из многих составляющих, каждое из которых вносит свой вклад в уровень Культуры безопасности. Основополагающей в этой области является приверженность к безопасности на государственном уровне. Для контроля за безопасностью, выработки критериев безопасности служат органы Государственного регулирования ядерной и радиационной беопасности.

После распада в декабре 1991 года Советского Союза в Украине возникла необходимость создания собственного органа по регулированию ядерной и радиационной безопасности. К концу 1991 года был создан Государственный комитет Украины по надзору за ядерной и радиационной безопасностью (Госатомнадзор Украины), который совмещал функции регулирующего и инспектирующего органа. После ряда реорганизаций в марте 1995 года Госатомнадзор Украины был объединен с Министерством охраны окружающей природной среды под названием "Администрация ядерного регулирования" (АЯР). Руководитель АЯР является первым заместителем Министра.

В составе министерства охраны окружающей природной среды и ядерной безопасности Украины также созданы: Государственная инспекция по надзору за ядерной и радиационной безопасностью (Госатоминспекция), Государственный центр регулирования качества поставок и услуг для атомной энергетики (Госцентр качества) и для научно-технической поддержки АЯР в качестве экспертной организации - Государственный научно-технический центр по ядерной и радиационной безопасности (НТЦ). Все указанные организации находятся в оперативном подчинении руководителя АЯР, однако, нужно отметить, что решение Главного государственного инспектора (начальника Госатоминспекции), в соответствии с Законом, может быть отменено только в судебном порядке.

В 1995 году в Украине были приняты Законы "Об использовании ядерной энергии и радиационной безопасности" и "Об обращении с радиоактивными отходами". Оба Закона соответствуют международной практике и представляют собой достаточно надежную законодательную основу для деятельности в области ядерной энергетики.

Принятые Законы отвечают положениям № 75 - INSAG - 4 об установлении требований к безопасности АЭС на законодательном уровне и, тем самым, обеспечивают национальную основу для Культуры безопасности.

Руководитель АЯР опубликовал в прессе Заявление о политке государства в области безопасности. В этом Заявлении безопасность объявлена высшим приоритетом во всех видах деятельности, связанных с использованием ядерной энергии.

Все перечисленные органы государственного регулирования ядерной и радиационной безопасности имеют утвержденные "Положения..." об их деятельности, в которых заявлено о приверженности безопасности. Эти "Положения ..." также являются важными элементами Культуры безопасности.

В развитие упомянутых Законов разработан ряд нормативных и руководящих документов, перерабатываются некоторые ранее действовавшие нормативные документы бывшего СССР, иначе говоря, обеспечивается соответствие нормативной и законодательной основ.

В соответствии с Законом вся деятельность в области ядерной энергетики, прямо или косвенно влияющая на безопасность, основывается на разрешительном принципе. Лицензированию подлежат виды деятельности, указанные в Законе, например, проектирование, эксплуатация, подготовка персонала и другие, в том числе и выполнение определенных обязанностей оперативным персоналом.

Для получения Лицензии Заявитель должен продемонстрировать свою способность выполнить нормативные требования по ядерной и радиационной безопасности , в том числе, наличие подготовленного, приверженного безопасности персонала, продемонстрировать соответствующую Программу Обеспечения качества. Эти требования распространяются на все виды деятельности, связанные с безопасностью.

В 1996 году Государственным комитетом по использованию ядерной энергии Украины (Госкоматом) совместно со специалистами АЭС начата разработка пакета документов по обеспечению Качества на всех этапах жизненного цикла АЭС. Эта работа, являющаяся частью процесса лицензирования , чрезвычайно важна для повышения Культуры безопасности.

Ключевым элементом Культуры безопасности является наличие подготовленного и аттестованного персонала. В Украине имеется ряд высших и средних специальных учебных заведений, которые готовят персонал для атомной энергетики. Это Одесский политехнический университет, Киевский политехнический университет. Кроме того,Госкоматомом совместно с АЭС создан институт по подготовке специалистов для АЭС на базе Севастопольского военно-морского училища.

Для подготовки и поддержания готовности оперативного персонала на надлежащем уровне созданы учебно-тренировочные центры на Запорожской АЭС, Южно-Украинской АЭС, Ровенской АЭС, учебно-тренировочный пункт на Хмельницкой АЭС. К концу 1997 года должно быть завершено создание аналитического тренажера на Чернобыльской АЭС. Это - совместная разработка ЧАЭС, НИКИЭТ (Россия) и PNL(США).

В соответствии с Законом проводится лицензирование оперативного персонала АЭС. Для этого разработаны и согласованы в установленном порядке требования к персоналу, подлежащему лицензированию. Например, на Чернобыльской АЭС должны пройти процедуру лицензирования работники, занимающие следующие должности:

- Ведущий инженер управления реактором;
- начальник смены реакторного цеха;
- начальник смены блока.

В настоящее время приблизительно 35% работников, занимающих эти должности, уже имеют Лицензии на право осуществления этой деятельности. К концу этого года планируется полностью закончить процесс лицензировния перечисленного персонала.

Большое внимание уделяется совершенствованию эксплуатационных процедур. Периодически пересматриваются Технологические Регламенты, эксплуатационные инструкции.

Ведется работа по разработке новых инструкций. Так, на ЧАЭС в сентябре 1997 года завершается I-й этап написания симптомно-ориентировочных инструкций

по 5-и сценариям аварий. Эта работа выполняется также в сотрудничестве с НИКИЭТ и PNL.

Указанные действия направлены на улучшение подготовки персонала и , следовательно, на повышение Культуры безопасности.

В 1994 году Госкоматом провел на Южно-Украинской, Запорожской, Ровенской и Хмельницкой АЭС ряд проверок выполнения рекомендациий МАГАТЭ по повышению Культуры безопасности. По результатам этих проверок были определены наиболее слабые стороны деятельности администрации АЭС. Руководством Госкоматома и всех АЭС были приняты Заявления о политике, в которых был отмечен приоритет безопасности над всеми производственными показателями. Произведен пересмотр структуры управления АЭС для четкого разделения ответственности за безопасность руководящими работниками. Внесены коррективы в должностные инструкции оперативного персонала.

Очень полезными для повышения Культуры безопасности представляются мероприятия, проводимые МАГАТЭ. Так, в 1992 году на Хмельницкой АЭС был проведен семинар по Культуре безопасности для работников АЭС Украины, в марте 1997 года на Ровенской АЭС был проведен семинар по самооценке персонала. Кроме того, участники от Украины были приглашены на предыдущий семинар в октябре прошлого года в Швеции и представители ЧАЭС, Госкоматома и АЯР присутствуют на настоящем семинаре. Надеемся, что опыт, полученный нами на Игналинской АЭС, поможет в повышении уровня Культуры безопасности на АЭС Украины.

WORKSHOP FOR SENIOR MANAGERS:
"ENHANCEMENT OF SAFETY CULTURE IN THE OPERATION OF NPPs"

Ignalina NPP, Lithuania, 6 to 9 maj 1997

TEAM WORK SESSIONS
HOW TO ENHANCE SAFETY CULTURE

What is special with RBMK npps?

How shall Safety Culture at RBMK npps be enhanced?

Which are the two most important measures to enhance Safety Culture at
Ignalina npp
Leningrad npp
Smolensk npp
Chernobyl npp

2 of

PROMENT LTD
Thomas Eckered
14 July 1997

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Summary of the
TEAM WORK SESSIONS
HOW TO ENHANCE SAFETY CULTURE

A Motto was set for the Team Work Sessions, namely **"Safety culture is a living matter. You have to work continuously on improving it. If you don't - it will deteriorate".** The Team Work Sessions were meant to engage each participant in active work on Safety Culture and thus preparing them for their own continuous efforts back at their own organisations.

The Forsmark Workshop very much concentrated on the **Organisational Framework** aspects of Safety Culture. That was correct because the Workshop was the first of its kind and intended to be a starting point for future similar activities. Therefore, what was presented and discussed at Forsmark were matters related to

- Policies
- Strategies
- Procedures
- Instructions, and
- Plans.

One can call these aspects the "hard" organisational and procedural parts of Safety Culture, the first main pillar of Safety Culture. At the Visaginas Workshop there was more concentration on the "soft", human aspects of Safety Culture, as

- Attitudes
- Moral
- Common Goals, and
- Behaviour.

Those aspects are related to the **Attitudes of Individuals**, the second main pillar of Safety Culture.

Also when an organisation - the government, the regulator or the operator - has managed to sort out the organisational framework of Safety Culture in a satisfactory way, the attitudes have to be the right ones. There are many **obstacles** in that respect, like

- Ignorance
- Laziness
- Greed
- Criminal behaviour
- Lack of confidence in others
- Egoism
- Effects of unsatisfactory tasks or work conditions
- and many more ....

Three teams were formed and asked to consider questions about RBMK reactors in general and specifically about how to enhance Safety Culture at them.

The first question was **What is special with RBMK reactors?** A summary of the answers follows below. In some cases the Teams indicated if the feature described was positive (+) or negative (-).

1. The Technical specification ("multi-reactor", pumps, procedures)
2. The number of staff
3. The staff management structure
4. Fuel re-loading during operation
5. Number of shifts (seven) - one always in training
6. The fuel handling system
7. Lot of equipment (-)
8. Many suppliers (-)
9. Quality problems (-)
10. Numerous staff, who must be qualified (-)
11. Lack of containment (-)
12. Work radiation hazards (-)
13. Negative public opinion (-)
14. Fast acting scram system at INPP (+)
15. Pressure suppression system (+)
16. Quality of in-service inspections improved (+)
17. New RBMK fuel (+)
18. New safety valves (+)
19. QA advances (+)
20. On-site and off-site audits (+)

The second question was **How shall Safety Culture at RBMKs be enhanced?** A summary of the answers follows below.

1. training of the staff
2. Communication (in-plant and international)
3. Experience feed-back and exchange
4. Continuous monitoring of hardware modifications

5. Setting of goals
6. Use of IAEA and other guides
7. Peer reviews (OSARTs and others)
8. Safety enhancement programmes (like SIP-1 and SIP-2)
9. Training
10. Development of procedures
11. Management commitment
12. Information to the staff
13. Government and regulatory body attitudes
14. Involvement of every employee
15. Team work
16. Self Assessment
17. Management openness
18. Reporting of weak points
19. Language training (English)
20. Use of safety indicators
21. Staff motivation
22. Share Safety Culture with the vendors.