



Safety Culture Evolution in Spain

What is Safety Culture?

WIN Global 2006 meeting

Consolación Montalvo

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Spanish Nuclear Power Plants

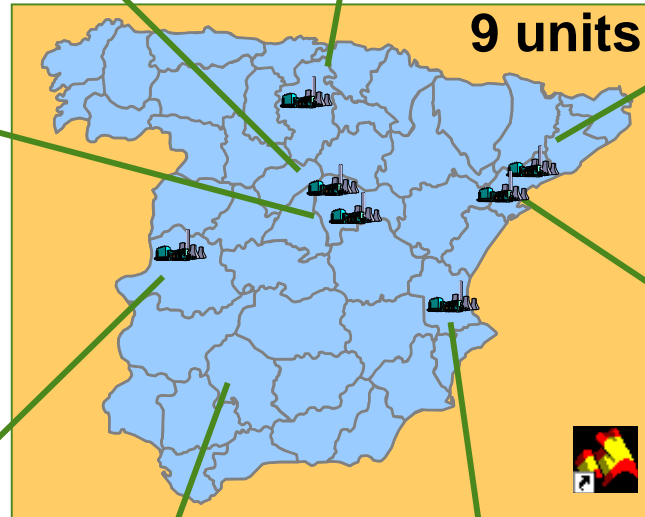


Trillo
KWU PWR 3 loops
 1 unit
 1,065 MWe
 1988



Sta. Mª de Garoña
 GE BWR/4 Mark I
 1 unit
 465 MWe
 1971

José Cabrera
W PWR 1 loops
 1 unit
 160 MWe
 1968



Ascó I & II
W PWR 3 loops
 2 units
 1,025 MWe x 2
 1983, 1985

Almaraz I & II
W PWR 3 loops
 2 units
 980 MWe x 2
 1981, 1983



Vandellós II
W PWR 3 loops
 1 unit
 1,080 MWe
 1987

El Cabril
 LILW Disposal
 Facility



Cofrentes
 GE BWR/6 Mark III
 1 unit
 1,080 MWe
 1984

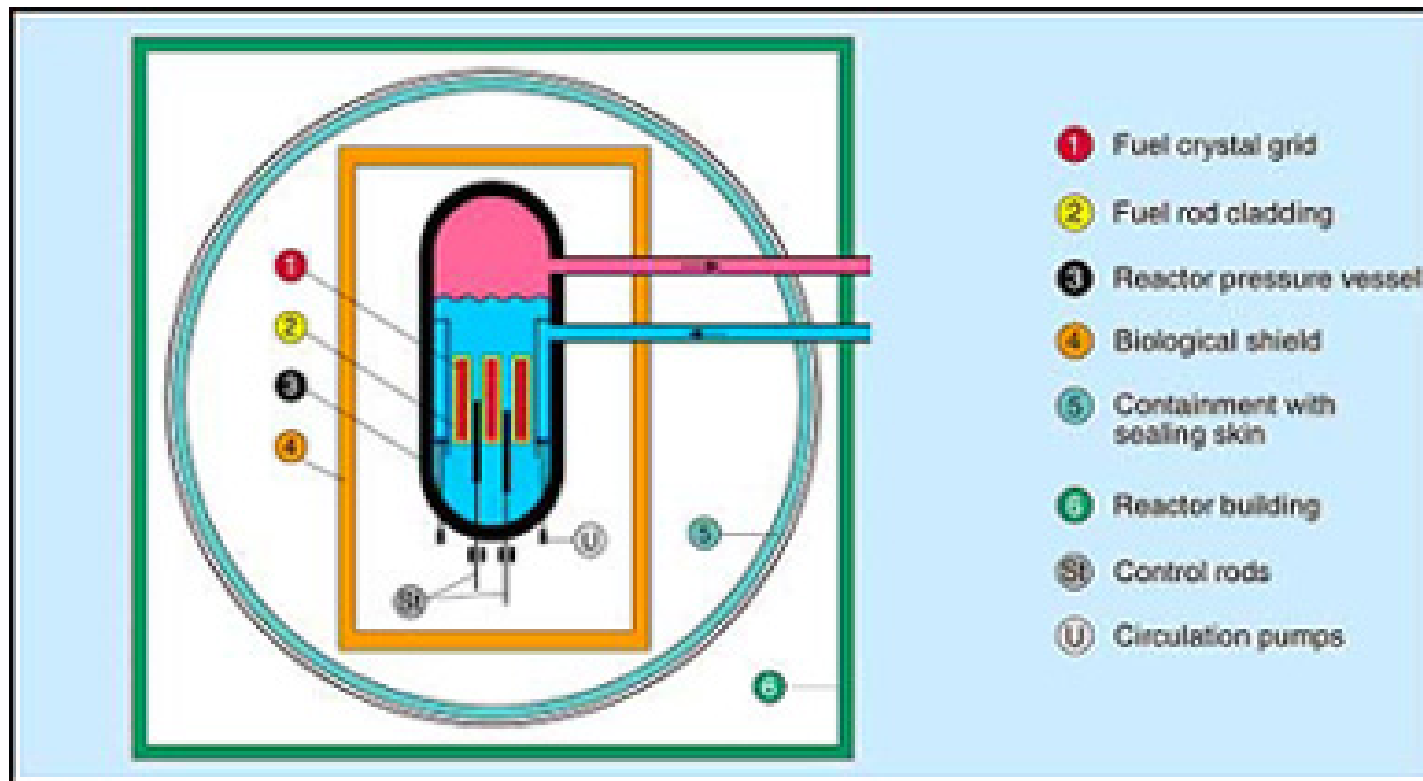
Nuclear Safety

Definition

The achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.

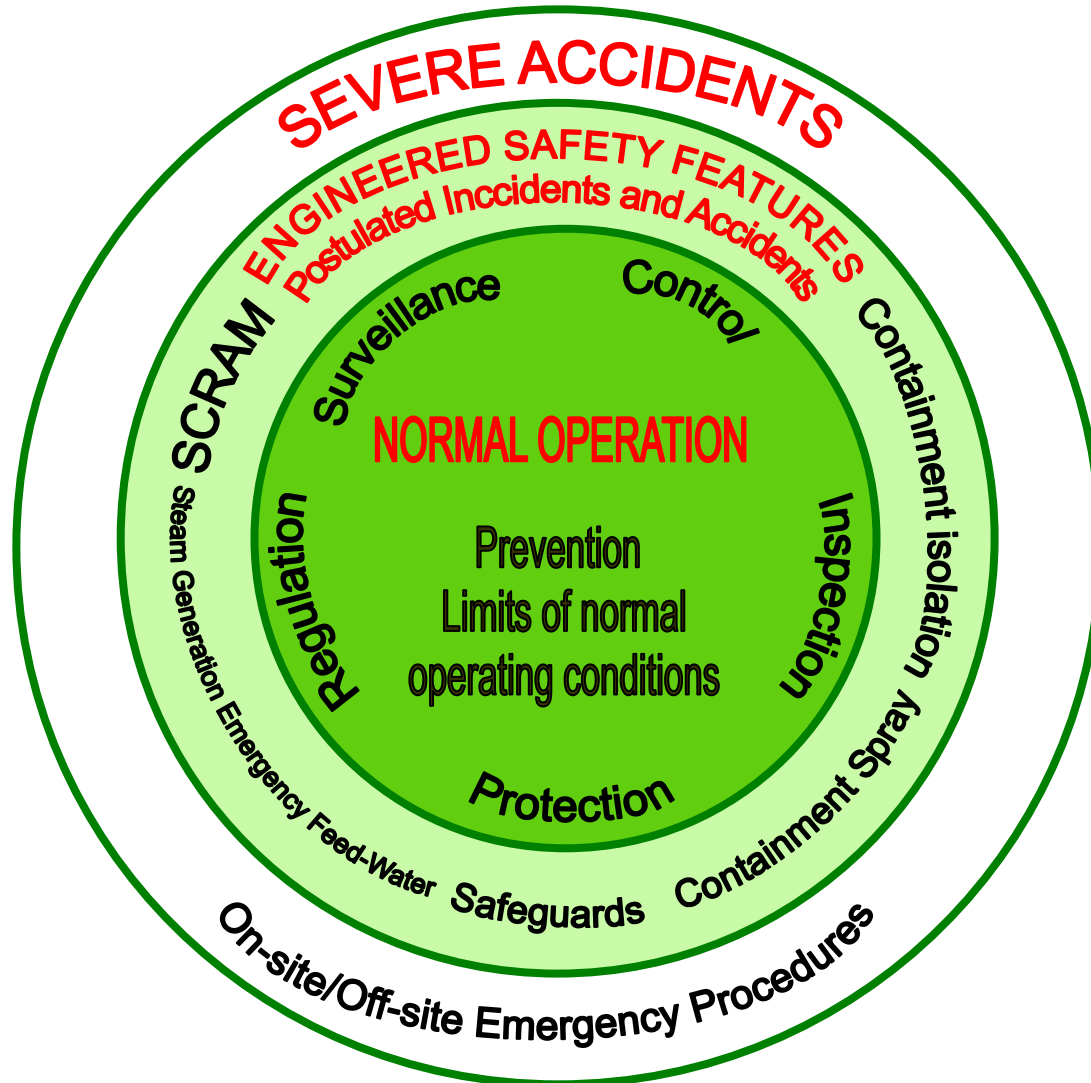
Basic Principles of nuclear safety

- PROVISION OF LEAKTIGHT **BARRIERS** BETWEEN THE RADIO-ACTIVE SOURCE AND PUBLIC



Basic Principles of nuclear safety

- **DEFENCE-IN-DEPTH** CONCEPT, APPLIED TO DESIGN AND OPERATION:
PREVENTION AND SURVEILLANCE, PROTECTION AND SAFEGUARD



Safety Culture

Background

- AFTER **TMI** BOTH REGULATORY BODIES AND UTILITIES ACKNOWLEDGED THAT
 - HUMAN FACTORS
 - MANAGEMENT INVOLVEMENT
 - ORGANIZATIONAL BEHAVIOR
 - REGULATORY ENVIRONMENT
 - INSTITUTIONAL STRUCTURESWERE ASPECTS TO BE CAREFULLY STUDIED
- US NUCLEAR INDUSTRY CONSTITUTED **INPO** FOR “**EXCELLENCE IN NUCLEAR OPERATIONS**”
 - PERFORMANCE INDICATORS (SELF-ASSESSMENT OF THE QUALITY OF PLANTS OPERATIONS)
- AFTER **TCHERNOBYL**, THE **IAEA** PROVIDED GUIDANCE TO ASSESS THE SAFETY CULTURE IN INDIVIDUALS AND ORGANIZATIONS ENGAGED IN NUCLEAR POWER ACTIVITIES:
 - MANAGEMENT OF SAFETY
 - INVOLVEMENT OF STAFFKEY FACTORS FOR A GOOD **SAFETY CULTURE**
- THE ACTUAL NEW GLOBAL SAFETY CONCEPT IS BASED IN “IAEA-INSAG-03”

Safety Culture



Evolution of Nuclear Safety concept



Safety Culture

Definition

- *IAEA-INSAG-04* DEFINITION:

“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 COMPOUND OF INTANGIBLE ATTITUDES AND ATTRIBUTES THROUGHOUT THE ORGANIZATION THAT PROMOTES THE SAFE OPERATION OF THE PLANT

THE LEVEL OF SAFETY CULTURE IN A NUCLEAR ORGANIZATION CAN BE DESCRIBED AS THE BEHAVIOR OF INDIVIDUALS AND GROUPS FOR HANDLING AND MANAGING NUCLEAR SAFETY

Safety Culture

Principles and Values



- LOOKING TOWARDS EXCELLENCE IN NUCLEAR SAFETY MATTERS
- ACHIEVING OPTIMUM RELIABILITY
- PLACING ADEQUATE HUMAN AND ECONOMIC RESOURCES
- ESTABLISHING QUALITY IN ORGANIZATION STRUCTURE AND PLANT OPERATION
- INCORPORATING TECHNOLOGY INNOVATION

Safety Culture

Safety and Competitiveness

- REGULATORY BODIES AND THE NUCLEAR INDUSTRY ARE WORKING TOGETHER FOR EXCELLENCE IN PLANTS PERFORMANCE
- HIGH PLANTS PERFORMANCE WILL MAINTAIN AN OPTIMUM ECONOMICAL COMPETITIVENESS THROUGH A GOOD LEVEL OF SAFETY AND A HIGH RELIABILITY IN PLANTS OPERATIONS
 - GOOD LEVEL OF SAFETY:
 - TECHNICALLY GOOD AND SAFE DESIGNS
 - GOOD HUMAN PERFORMANCE AND SAFE OPERATION
 - HIGH RELIABILITY:
 - FOUNDED ON A HIGH AVAILABILITY AND A GOOD EQUIPMENT PERFORMANCE
 - DEFINITION AND CONTROL OF GOOD PERFORMANCE INDICATORS
 - OPTIMIZATION OF SHUTDOWN OUTAGES

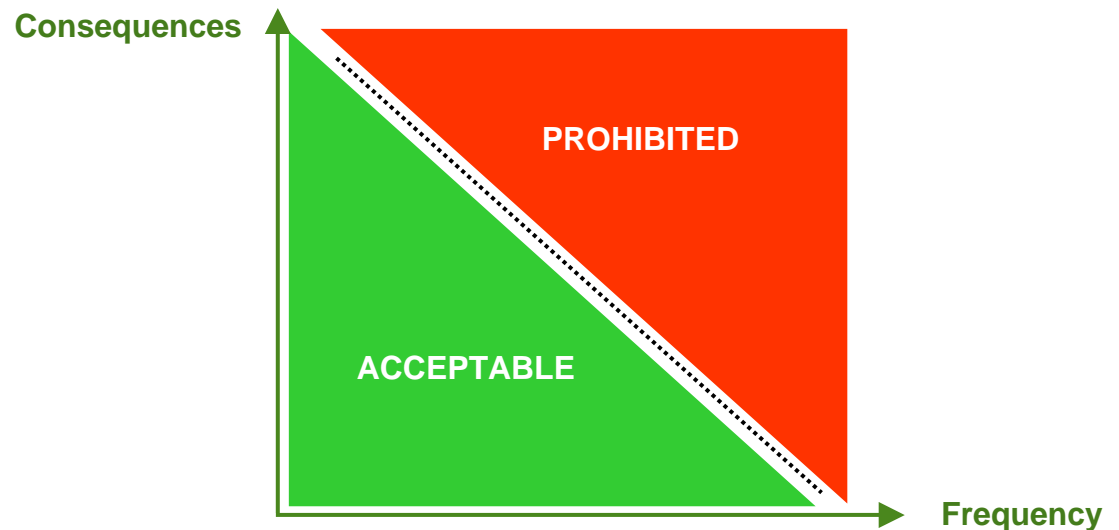
BOTH A HIGH RELIABILITY AND A GOOD LEVEL OF SAFETY INVOLVE TECHNICAL AND CULTURAL ASPECTS WHICH MUST BE ADDRESSED IN COMBINATION WITH AN OPTIMUM OPERATION AND MAINTENANCE COST TO LOOK FOR HIGHER LEVELS OF QUALITY, EFFICIENCY, AND INNOVATION

Risk Informed Regulation

Probabilistic Safety Assessment (PSA)

PSA IS AN ANALYSIS TOOL THAT IS USED DURING BOTH THE DESIGN AND THE OPERATING STAGES OF A NUCLEAR PLANT, TO IDENTIFY AND TO ANALYSE EVERY POSSIBLE SITUATION AND SEQUENCE OF EVENTS THAT MIGHT RESULT IN A SEVERE CORE DAMAGE

CONCEPT OF 'RISK' →



Risk Informed Regulation

CNPP main PSA Applications

Maintenance optimization

- Reliability Centered Maintenance
- On-line Preventive Maintenance
- Maintenance Rule
- Risk Monitor

Operational support

- Severe accident management
- Tech Specs AOT extension

Inspection and Testing optimization

- RI-IST
- RI-ISI

Unavailability Risk Management

Other initiatives in progress

- Risk Informed Regulation - Option 2
- Tech Specs. NEI Initiatives

- Reactor Oversight Process (ROP):
Inspections & Perform. indicators

regulatory
authority

