

2010 AEC-NRC Bilateral Technical Meeting

Readiness Inspection Plan and Implementation for Lungmen Plant

Atomic Energy Council, R.O.C

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Contents

- Development of Inspection Plan
 - Construction Inspection Framework
 - NRC inspection program and procedures
 - IAEA guidance
- Lungmen Readiness Inspection Plan
- Implementation Status and Future Planning
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Construction Inspection Framework

- Construction Program Inspection
 - Design Change Process Inspection
 - Construction testing Inspection
 - Pre-Op Testing Inspection
 - **Operation Readiness Inspection**

- Operation Program Inspection
 - Lo-Power testing Inspection
 - Operation Readiness Insp.
 - Power ascension Insp.
 - ROP transition Insp.

Construction Tests

Pre-Operational Tests

**Initial Fuel
Loading**

Startup Tests

Inspection Manual Chapter Coverage

IMC 2503/2504

IMC 2512 - LWR
Construction Phase
Inspection Program

IMC 2514 - LWR
Startup Testing Phase
Inspection Program

IMC 2513 - LWR Pre-Op Testing
& Operational Readiness
Inspection Program

IMC 2515 - LWR
Operations Phase
Inspection Program →

Construction Tests

Pre-Operational Tests

Initial Fuel
Loading

Startup Tests

Documents for Developing Operational Inspection

- Preparedness Inspection (IMC-2513 Appendix B)
- Non-ITAAC Inspection Program (IMC-2504)- for operational readiness
- Inspection Procedure 93806
- Watts Bar unit 2 Reactivation (IMC 2517)
- IAEA Guidance (NS-G-2.9)

IMC-2513 Appendix B

Preparedness Inspection

- Appendix B of IMC 2513 describes the inspection program to mainly verify that management controls and procedures, including quality assurance programs, necessary for operation of the facility have been documented and implemented.
- The Scope of Operational Preparedness Inspection:
 - Operations
 - Surveillance
 - Fire Protection
 - Radiological Control
 - Quality Assurance
 - Maintenance
 - Water Chemistry
 - Security and Safeguard
 - Fuel Receipt and Storage
 - Others

IMC 2504 – Non-ITAAC Inspections

Operational Readiness

- Appendix B: Inspections Before Fuel Load
 - Part A: Operational program inspections
 - Part B: PI&R, Follow-up, ORAT (**Operational Readiness Assessment Team**) inspections
 - Part C: Licensee program inspections

IP 93806 Operational Readiness Assessment Team (ORAT) inspection^{1/2}

- IMC 2504: ORAT should be conducted in phases based on licensee implementation of operational and testing programs
 1. prior to commencement of pre-operational and start-up testing
 2. required prior to fuel loading
 3. required during low-power testing
- Results from this inspection will provide a major input and basis for determination of startup readiness

IP 93806 Operational Readiness Assessment Team (ORAT) inspection ^{2/2}

- Plant Inspection
 - Focus on safety-significant activities
 - License management transitional controls (construction to operation)
 - Use of industry operating experience
 - Licensee's self-assessment capability (PI&R)
 - Operator training, plant staff qualification
 - Quality assurance
 - BOP operation
 - Radiological control
 - Maintenance program
 - TS implementation
 - :
- **Inspection procedures** as listed in the NRC Inspection Manual Chapter 2513, Appendix B

Watts Bar 2 reactivation (IMC 2517)

- Operational Readiness Activities: Activities completed during the operational preparedness phase to support the transition from construction to operation
 - Operation
 - Fire Protection
 - Surveillance
 - Plant Water Chemistry
 - Radiation Safety
 - Security
 - Emergency Preparedness

Standard Construction Inspection Report Outline

Cover Letter
Cover Page
Executive Summary
Table of Contents (optional)

Report Details:

Summary of Plant Status

I. Quality Assurance Program

II. Management Oversight and Controls

C Construction Activities

M Maintenance Activities

E Engineering Activities

SY System Turnovers

P Pre-Operational Activities

SU Startup Testing Activities

T Training and Qualification of Plant Personnel

III Operational Readiness Activities

O Operations

F Fire Protection

ST Surveillance Testing

CH Chemistry

R Radiation Safety

S Security

EP Emergency Preparedness

IV. Other Activities

IAEA guidance – Commissioning for Nuclear Power Plants

- **Regulatory Body** to review and assess
 - The **as-built design** of the plant, **results** of pre-op tests
 - The adequacy of **procedures** and instructions, especially main administrative procedures, **normal** operating procedures and **EOPs**
 - The arrangements for **periodic testing, maintenance, inspection** and **surveillance**
 - **Quality assurance program** for commissioning, operation and maintenance activities
 - The **radiation protection** program
 - **Emergency preparedness**
 - The adequacy of the arrangements for **physical protection** important to safety
 - :

Lungmen Readiness Inspection Plan

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- Four inspection plans for Lungmen initial test program (ITP)
 - Post-Construction Test Inspection Plan
 - Preoperational Test Inspection Plan
 - **Operational Readiness Inspection Plan**
 - Start-Up Test Inspection Plan
- AEC has developed the readiness inspection plan last December and started implementing portions of the plan based on Lungmen construction process

Lungmen Readiness Inspection Plan

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■ Scope of Inspection

- Facility Management — Engineering
- Operations — Maintenance
- Surveillance — Water Chemistry
- Fire Protection — Security and Safeguard
- Radiation Safety — Fuel Receipt and Storage
- Quality Assurance — Emergency Preparedness

Lungmen Readiness Inspection Plan

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- Inspection items for Operation
 - Operation staffing and training
 - Operational Procedure Review
 - Emergency Operational Procedure Review
 - Operator response to control room annunciators, alarms, and recorders
 - Evaluate operator knowledge of Technical Specifications (TS)
- Inspection Procedures adopted (and translated)
 - NRC IP 36301 Operational Staffing
 - NRC IP 42450 Operational Procedure Review
 - NRC IP 42452 Emergency Op. Procedure Review

Lungmen Readiness Inspection Plan

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- Inspection items for Fire Protection
 - FP organization, staffing, and capability
 - Drill and training of fire brigade
 - FP design and features
 - FP equipment installation and operability
 - FP procedure integrity and implementation
- Inspection Procedures adopted (and translated)
 - NRC IP 64704 Fire Protection Program

Lungmen Readiness Inspection Plan

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- Inspection scopes involve various areas and responsible branches of AEC
- Department of Nuclear Regulation will coordinate for implementing the inspection plan
- Three types of inspection
 - Quarterly construction inspection
 - Inspect certain items within the plan
 - Operational readiness team inspection

Implementation Status and Future Planning 1/3

- Two small scale inspections have been performed
 - PSI/PST, 4th quarterly inspection in 2009
 - Fire protection inspection in January, 2010
- First operational readiness inspection will be performed in the second half of 2010
- GL 89-10 MOV program inspection in May
- There will be more inspections as needed
- Last ORAT inspection will be performed around 1 month before initial fuel loading

2009 Q4 inspection (PSI/PST)

Dec. 2009

Jan. 2010

Special inspection of fire protection

May 2010

Special inspection of MOV program

2010 Q2 inspection

Jun. 2010

1st Readiness Team
Inspection

2010 Q3 inspection

Sep. 2010

NRC pre-visit

2010 Q4 inspection

Dec. 2010

Last Readiness Team
Inspection

NRC join

Initial Fuel Loading ?

Implementation Status and Future Planning 3/3

- Inspection summary for PSI/PST (Dec. 2009)
 - Early stage of PSI/PST program
 - As-built not consistent with drawing
 - Large number of PST deficiencies reflect ineffective licensee construction examination
- Inspection summary of fire protection (Jan. 2010)
 - FP program not being implemented yet
 - Lack of clear roadmap for switching temporary construction FP facility to formal FP system

Concluding Remarks

- The Lungmen readiness inspection plan has been established, profoundly based on NRC inspection programs and procedures
- AEC has implemented small portion of areas within the inspection scopes, and will continue as Lungmen construction and test evolve
- NRC's experiences in the readiness inspection are highly appreciated and welcomed to join the team inspections for Lungmen plant

The End