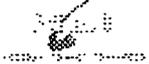


NEI/NRC Industry Workshop on ISA	
Sofitel Hotel, Washington, DC September 23-24, 2003	
	

Overview
<ul style="list-style-type: none"> • Overview of Experiences and Perspectives Related to the New Part 70 (Interpretation of the SRP) • NRC/Licensee Communications Challenges • Review Process for Balance of Plant vs. License Amendment • Baseline Design Criteria • Choice of IROFS


Overview
<ul style="list-style-type: none"> • Natural phenomena • NRC Regulation of Chemical Accident Sequences • Application of the Standard Review Plan • Nuclear Criticality Safety Evaluations


Overview of Experiences and Perspectives Related to the New Part 70

- Part 70 is principally for "possession licensees" (Enrichment plants are consider "production licensee")
- A possession license is different then a production licensee
- A possession licensee does not change the nature of the nuclear or radiation aspects of the material.
- A production licensee does change the nature of the nuclear aspect by increasing the enrichment.



Overview of Experiences and Perspectives Related to the New Part 70

- Possession Licensee is reviewed for material handling programs
- Production Licensee is reviewed for processing of that changes its nuclear characteristics
- Both licensees under Part 70 use similar formats
 - A description of the programmatic conditions that are submitted for review and approval, which become license conditions and can not change without NRC approval
 - An integrated safety analysis of the facility which is maintained at the site and subject to review by NRC at the site
 - A summary of the integrated safety which is submitted for review and approval by the NRC



Overview of Experiences and Perspectives Related to the New Part 70

- Programmatic Conditions
 - For each area of safety programmatic conditions are established which by design assure the safe handing of the nuclear material
 - These conditions can only be changed with NRC approval
 - Licensee can not process, handle or do any work with the nuclear material if it is outside the scope of the programmatic conditions



Overview of Experiences and Perspectives Related to the New Part 70

- **Integrated Safety Analysis**
 - Provides the review of the handling of the nuclear materials to assure that; it is within the programmatic requirements, the emphasis of the safety program(s) is appropriate for the risk, and the measures for carrying out the safety program(s) are appropriately monitored
- **Integrated Safety Analysis Summary**
 - Provides a high level summary of the ISA focusing on the high risk areas along with a table of the key items relied on for safety and demonstrating that the performance requirements of Part 70 are satisfied



ISA IN THE LICENSING ENVIRONMENT

	Commitment in License	On Docket	On Site (Configuration Management)
1.0 General Site Information	✓		
2.0 Organization	✓		
3.0 (a) ISA (Program) > Commitment to Perform, Maintain and Implement Results > Scope (Processes and Hazards to be Reviewed) > Methods > Team Member Qualifications > Graded Approach > Assurance Criteria > Summary submittal and update frequency	✓		
3.0(b) ISA (Implementation) > Process Descriptions > Accident Sequences > Items relied on for safety > Assurance applied to Items			✓
3.0(c) ISA Summary > Site Description* > Facility Description* > Process Description > ISA Method* > ISA team* > Accident sequences (High risk Only) > Controls (Overview) * These items are available in other parts of the License i.e. 1 and 3(a)		✓	
4.0 Radiation Safety > Performance Requirements > Program Description > Implementation through ISA results	✓		
5.0 Criticality Safety > Performance Requirements > Program Description > Implementation through ISA results	✓		
6.0 Chemical Safety > Implementation through ISA results	✓		
7.0 Fire Safety > Implementation through ISA results	✓		
8.0 Emergency Management	✓		
9.0 Decommissioning (a) Funding Plan (70.25) (b) Decommissioning Plan (70.38) Performance Requirements Program Description Implementation	TBD	TBD	TBD
10. Management Control Systems	✓		



New Facility Licensing Under Part 70 - A Case Study In-Progress -



Mario Robles
Manager, Advanced Technology Licensing

ISA Workshop
Washington DC
September 2003

Four "Views"

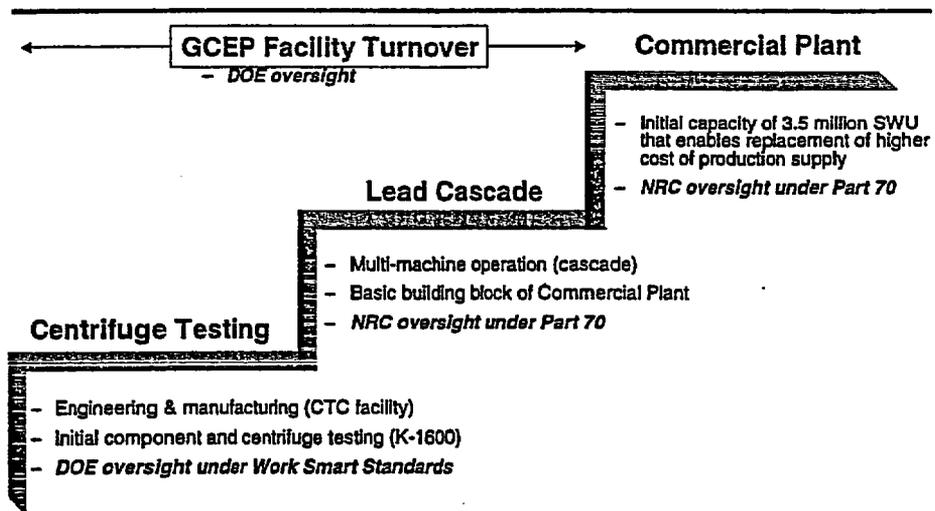
- Overview of Program Steps, Scope, Schedule
- Review of Licensing Highlights and Issues
- Preview of Coming Attractions and Expectations
- View "So Far" – Preliminary Findings



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Program Steps



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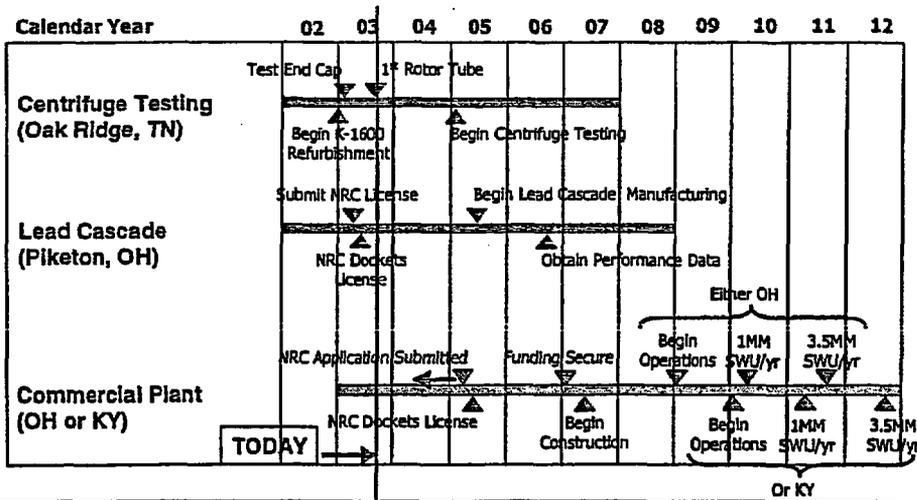


Lead Cascade Scope

- **Designed to provide information and minimize risks for Commercial Plant deployment**
 - Reliability, performance, and economics data
 - Technical, cost and regulatory risk
- **Licensing features**
 - Install and operate up to 240 machines in recycle mode
 - Possess up to 250 kg UF₆
 - Enrich UF₆ and withdraw samples up to 10 wt.% U-235
 - Lease GCEP areas from DOE
 - Leverage existing GDP personnel and programs
- **GCEP facility turnover activities are outside scope of License Application**



Milestone Schedule



Licensing Highlights

- **July 2002**
 - USEC submits consolidated Security Plan and QA Program Description in support of Part 70 license application
- **February 2003**
 - USEC submits license application for Part 70 for test and demonstration facility using gas centrifuge technology
 - Environmental Report
 - Decommissioning Funding Plan
 - Integrated Safety Analysis (SECRET-RD)
 - Fundamental Nuclear Materials Control Plan
- **March 2003**
 - NRC accepts license application for further review
 - NRC noted technical omission regarding seismic information
- **April – September 2003**
 - NRC publishes FRN re: Opportunity for a Hearing (expires without intervention)
 - NRC QA, Environmental, ISA, and other reviewers visit PORTS
 - NRC requests additional information (RAI)
 - USEC provides NRC with response to RAI



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Licensing Issues

1. **DBE Treatment of Natural Phenomena Hazards**
2. **Commercial Process Controls versus Safety Controls**
3. **Initial Conditions, IROFS, and Management Measures**
4. **Defense-in-depth” and additional non-IROFS controls**
5. **Human Factors Review and crediting operator action**
6. **License Conditions – Operational Readiness and Management Measures Verification Reviews**



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Coming Attractions & Expectations

- **December 2003**
 - USEC selects site for Commercial Plant

- **February 2004**
 - NRC issues license with conditions for Lead Cascade

- **August 2004**
 - USEC plans to submit a license application for Commercial Plant

- **2005**
 - NRC will perform Operational Readiness Review and Management Measures Verification Reviews
 - USEC expects to operate Lead Cascade



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Preliminary Findings

- **Safety Focus**
 - USEC has found that the new Part 70 requirements have been effective and efficient in focusing NRC interactions on safety significant aspects of facility design and operation

- **Benefit of On-Site Visits**
 - USEC has found that the NRC on-site visits has increased the staff's understanding of the proposed licensing action and has limited the number of RAI

- **Pre-operational Reviews**
 - USEC has found that the NRC has not required submittal of an inordinate amount of detailed information for in-office review and has instead opted to perform more detailed on-site implementation reviews prior to operation



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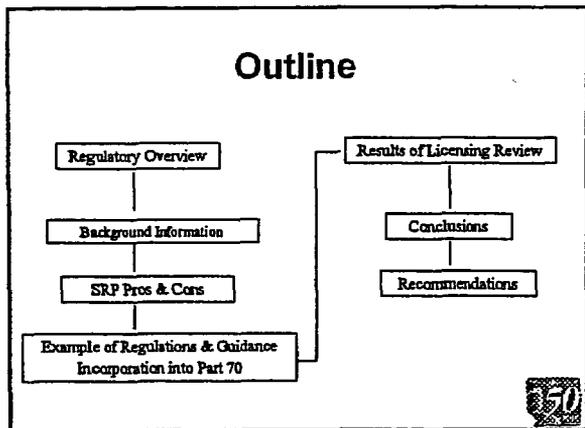


Application of the Standard Review Plan

Regulation vs. Guidance

J. Scott Kirk, CHP
Licensing Specialist
Nuclear Fuel Services, Inc.





Regulatory Overview

10 CFR Part 70, Subpart H Implementation

- 10 CFR Part 70, Subpart H – Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of SNM
 - Risk-Informed, Performance-Based Standards
 - Effective October 18, 2000
- Standard Review Plan (NUREG-1520)
 - Implementation Guidance for Rule
 - Issued March 2002



Background Information

NFS' Experience in the ISA Process

- Issuance of License Amendment for Fuel Manufacturing
 - August 1999, NRC issued license amendment commensurate with draft 10 CFR 70, Subpart H requirements
 - License conditions required development or enhancement of supporting programs/procedures
 - ISA, Configuration Management, Change Control, Training, Procedures, Functional Testing of IROFS, Audits and Assessments, Records Management
 - These programs/procedures have been subject to numerous NRC inspections



Background Information (Continued)

NFS' Experience in the ISA Process

Licensing Actions Under 10 CFR 70, Subpart H

- Received NRC Approval Authorizing Storage of LEU at Uranyl Nitrate Building (UNB) on July 7, 2003
 - NRC staff used SRP to complete licensing action
- NRC Currently Reviewing License Amendment Request to Downblend HEU into LEU
 - Captured many of the "lessons learned" from UNB
 - Issuance of license amendment planned for late October 2003



Standard Review Plan

NFS' Experience

Pros

- Content and Format Helpful in Drafting ISA Summary and Management Measures
- Acceptance criteria provides means to gauge acceptability of licensing submittals
- Should result in consistent reviews of licensing submittals

Cons

- Issues such as natural phenomena, CCE and independency of IROFS not well defined (TBD)
- ISA Summary for License Amendment vs. Balance of Plant submittals not clearly addressed (TBD)
- Resulted in prescriptive requirements in context of commitments required to support issuance of license amendment (e.g., management measures)



Management Measures *UNB License Amendment Request*

- NRC staff requested that management measures be contained in license to ensure enforceability
 - Description of management measures was initially contained solely in ISA Summary
 - Commitment to describe management measures in the license was noted in RAI
 - ISA Summary is not part of the license

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Licensing Structure and Change Control

- General Structure of Programmatic Commitments
 - SNM-124 Part I contains general regulatory and programmatic commitments (e.g. development of written programs/procedures)
 - SNM-124 Part II contains description of means to implement and comply with licensing and regulatory requirements
 - Procedures used extensively by operating staff to implement regulatory and licensing requirements
 - Content of implementing procedures reviewed during Readiness Reviews and during periodic inspections

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Licensing Structure and Change Control (continued)

- Current licensing structure allows changes to programs
 - Changes to procedures evaluated under "change control" provisions
 - Listing of significant changes and updates to Part II of SNM-124 submitted annually, per license condition
 - Frequent inspections ensure enforceability
- Current licensing structure more in-line with performance-based philosophy

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Management Measures Acceptance Criteria

- Chapter 11 of SRP contains “acceptance criteria”
 - Applicable to commitments contained in license amendment request, and
 - Content of policies and procedures
 - *e.g., Incident Investigation - The applicant has a formal policy or procedures in place for conducting an incident investigation, and the policy or procedures contain the following elements.*



Application of SRP Acceptance Criteria

- NFS anticipated “acceptance criteria” to be evaluated against:
 - The nature of commitments contained in Part I of SNM-124
 - Description of the management measures program contained in Part II of SNM-124
 - Content of Policy and Procedures
- Experience acquired during licensing review differed from expectations



Results of Licensing Review

- Acceptance Criteria Captured Solely in Commitments Contained in Part I of SNM-124
 - “acceptance criteria” for types of information expected in procedures listed in Part I of SNM-124 (e.g., Incident Investigation)
- Programmatic Descriptions were not included in Part II of SNM-124
- Procedures and Programs not Reviewed Against “Acceptance Criteria” to Determine Acceptability



Conclusions

- **Acceptance Criteria Did Not Translate Into Substantial Changes to Existing Management Measures Programs and Procedures Currently Used to Support Fuel Program**
 - i.e., existing management measures program described in existing plans and procedures was relatively adequate to meet the SRP "acceptance criteria"
- **UNB Licensing Review Resulted in Prescriptive Requirements for Implementing Management Measures Program**
 - Changes to Part I of SNM-124 require prior NRC approval, per license condition
 - Impedes effectiveness to change/evolve an existing programs by eliminating use of "change control" provisions
 - Inclusion of SRP "acceptance criteria" into Part I of SNM-124 carries same weight as regulation

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Recommendations

- **Develop Interim Staff Guidance to Capture "Lessons Learned" and Regulatory Basis of NRC Positions (e.g., natural phenomena)**
- **Interim Staff Guidance Should Clarify Reviews of "Acceptance Criteria" to be Inclusive of Information Contained in a Two-part License and the Contents of Supporting Plans and Procedures.**
 - Commitments to develop programs commensurate with regulations should be sufficient for Part I
 - Inspections and review of Annual Updates ensure programs/procedures are adequate
- **Planning for Vertical Slice Reviews Should Allocate Additional Time to Review Commitments Contained in Supporting Plans and Procedures**

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	<h2>Items Relied on for Safety (IROFS)</h2> <p>L. Randy Sanders, CHP Nuclear Fuel Services, Inc.</p>
	

IROFS

Definition

- Structures, systems, equipment, components and activities of personnel that are relied on to prevent potential accidents at a facility that could exceed the performance requirements of 10 CFR 70.61 or to mitigate their potential consequences.



IROFS

Definition cont...

Function:

Accordingly, an IROFS provides a safety function that serves to reduce the risk associated with a specific accident scenario.

The components of an IROFS function may include operator actions, equipment, control logic, and elements such as time or margin of safety.



IROFS

Definition cont...

- Utility subsystems required to maintain the reliability and availability of an IROFS are bounded within the IROFS function.
- Utilities not required to meet the performance criteria, such as in fail-safe controls or equipment, do not require inclusion into the IROFS boundary.



IROFS

Equipment, actions, or controls within the IROFS functional boundary equipment and subsystems must be:

Designed to prevent or mitigate specific, potentially hazardous events.

- Independent so that there is no dependence on components of other protective layers associated with an identified hazard. There must also be no linkage between the initiating event and the ability of the IROFS to perform as required.



IROFS

- Dependable so that they can be relied on to operate in the prescribed manner.
- Auditable in that they are designed to facilitate regular validation (including testing) and maintenance of the protective functions.



IROFS

- What constitutes monitoring an IROFS (Baseline Design Criteria 10 CFR70.64 (a)(10))
 - Functional Test Program
 - Diagnostic checks
 - I&C to monitor parameters
- What constitutes a challenge to an IROFS?
 - Operational PLC vs. Safety PLC
 - Operational control used as an IROFS



IROFS

What constitutes essential utility systems?
Fail in safe configuration



Review Process for Balance of Plant vs. License Amendment



Difference in Submittal Requirements Balance of Plant vs. License Amendment

- What documentation should be included with a License Amendment request submittal?
 - ISA Summary (required by 10CFR70.65)
 - All accident sequences or a sampling of accident sequences?
 - NCSEs?
 - FHA?
- Do these requirements differ from what is acceptable for the Balance of Plant ISA due in 2004?



ISA Summary vs. ISA

- ISA Summary – synopsis of the results of the ISA
- ISA – systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety
 - P&IDs
 - Criticality safety analyses
 - Dose calculations
 - Process safety information
 - ISA worksheets
 - Engineered IROPS boundary descriptions
 - Process hazard analysis



Review Procedure for Approved Processes

- Existing safety bases for approved processes are currently in place
- How will review of the safety bases be conducted to account for updating to meet new Part 70?



	<h2>Natural Phenomena</h2>
	J. Scott Kirk, CHP
	L. Randy Sanders, CHP Nuclear Fuel Services, Inc.



Regulatory Requirements

- Information That Is Required to Be Contained in the ISA Related to Events Caused by Natural Phenomena Per 10 CFR 70.62(c)(iv):
 - Potential accident sequences caused by credible external events, including natural phenomena
 - The consequences and likelihood of occurrence of each accident sequence identified and the methods used to determine the consequences and likelihoods



Regulatory Requirements

- Baseline Design Criteria (10 CFR 70.64) must be applied in the design of New Facilities or New Processes at Existing Facilities:
 - New processes defined as those that require a license amendment under 10 CFR 70.72.
 - Retrofits to existing facilities (e.g., those housing or adjacent to the new processes) are not required; however, all facilities must comply with the performance requirements.
 - The design must provide for adequate protection against natural phenomena with consideration of the most severe documented historical events for the sites



Standard Review Plan

- A description in the ISA Summary of site factors related to characterizing natural phenomena to assess their impact on facility safety and their likelihood of occurrence.
 - Tornadoes
 - Hurricanes
 - Floods (100-year flood)
 - Earthquake (accelerations with a 250-year and 500-year earthquake)



Uniform Building Codes

- NRC Approved License Amendment Request for Uranyl Nitrate Building
 - NRC agreed that constructing facility in accordance with the 1999 Standard Building Code was acceptable method to address events related to natural phenomena
 - NRC stated that use of UBC were appropriate for CAT I and CAT III uranium fuel cycle facilities
 - NRC stated that separate methods were required for CAT I plutonium processing facilities to minimize environmental impacts



Application of Baseline Design Criteria for New Facilities

L. Randy Sanders, CHP
Nuclear Fuel Services, Inc.



Baseline Design Threshold

- Risk Assessment of Natural Phenomena Events
 - Protect against what Natural Phenomena (seismic, flood etc) initiating event frequency?
 - Applying IROFS to prevent or mitigate the seismic initiating event
 - Misleading to assume application of two IROFS can make the accident sequence Highly Unlikely.



Natural Phenomena Events at Existing Facilities

- Architectural Information Lacking for Some Older Buildings Housing Process Operations
 - In some instances, retrofits may be only alternative to prevent/mitigate accidents related to natural phenomena from exceeding performance requirements
 - Reconciling Baseline Design Criteria in these instances problematic



Baseline Design Threshold

New Term: Baseline Design Natural Phenomena Event

A physically credible natural phenomena event that has the capability to exceed the performance criteria in 10 CFR70.61. Protection is afforded by designing and constructing a facility to applicable sections of the Standard Building Code or equivalent and by assuring operational adherence to this code through a configuration management change control program



**Baseline
Design
Threshold**

- Adherence to 10CFR70.62(c)(iv and v) and 10CFR70.64(a)(2) is demonstrated by eliminating potential intermediate or high consequences limited to a defined baseline design threshold.



**Baseline Design
Threshold**

Baseline Design Threshold

Seismic: Initial construction of structures and components shall be designed and constructed to seismic zone IIC criteria as specified in Section 1607 of the 1999 Standard Building Code or similar criteria in a similar building code that has a minimum threshold return probability of 1E-3/yr (500-year return period)



**Baseline Design
Threshold**

- High Winds: 1999 Standard Building Code or equivalent.
 - Designed and constructed to withstand sustained wind speeds up to 70 mph.
- Flood
 - If the facility is located below the 100-year flood plain elevation, facility IROFS are assigned to prevent or mitigate an intermediate or high consequence event from flooding to meet the performance criteria.



Baseline Design Threshold

- **Lightning**
 - Lightning protection is afforded by incorporating applicable sections of NFPA 780 in the facility design.



Baseline Design Threshold

- NFS' position that this was enough to satisfy the performance criteria and baseline design criteria.
- NRC required designation of IROFS identified by the NRC
- Entire structure designated as IROFS
 - Building
 - Floor, Pedestal, Tanks, Tank Supports
 - Apply Passive Engineered Control Management Measures



Natural Phenomena IROFS

IROFS Identifier	IROFS Description	Type of Control	IROFS Failure
UNB-X	The UNB is designed to meet the seismic load resistances as specified in the 1999 EBC.	Passive engineered control	Building incorrectly designed, installed, or modified so that it does not meet the code requirements
UNB-Y	Each storage tank in the UNB is equipped with a seismic restraint system that will prevent unacceptable tank movement in a design basis seismic event (as defined by the 1999 EBC).	Passive engineered control	Restraints incorrectly designed, installed, or modified so that it cannot meet the design basis accelerations.
UNB-Z	The UNB is designed to meet the wind load resistances as specified in the 1999 EBC.	Passive engineered control	Building incorrectly designed, installed, or modified so that it does not meet the code requirements



Discussion

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