

## MFFFPEm Resource

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Email from DWGWYN dated 2/6/2012

Dave

Attached is encrypted version of the presentations for tomorrow's meeting. I've added note to title slide that indicates presentations contains material that should be withheld. Also attached is public version of the presentation (open session only).

Dealis

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**Sent Date:** 2/6/2012 9:20:59 AM  
**Received Date:** 2/6/2012 9:21:39 AM  
**From:** Tiktinsky, David

**Created By:** David.Tiktinsky@nrc.gov

**Recipients:**  
"MFFFHearingFile Resource" <MFFFHearingFile.Resource@nrc.gov>  
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# IROFS Risk Ranking/Augmented QA



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# Agenda

## Part I – Open Session

- Objective
- Background
- Approach
- Risk ranking methodology
- Augmented Quality Assurance
- Licensing document clarifications

## Part II - Closed Session

- Risk ranking examples

**Part I**  
**Open Session**  
**Risk Ranking Process/Augmented QA**

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# Objective

- Describe approach that ensures that the most important IROFS are identified and priorities/controls are applied consistent with safety significance
- Describe the MOX Services approach to augmented QA for low risk IROFS (MPQAP Section 2.2.3.C)

## Background

- Item Relied on for Safety (IROFS)
  - Each engineered or administrative control or control system necessary to comply with paragraphs (b), (c), or (d) of this section shall be designated an item relied on for safety [10CFR70.61(e)]

# Background

- Quality Assurance
  - Application for ... plutonium processing and fuel fabrication facility shall contain... a description of the quality assurance program
    - Include discussion of how the criteria of 10CFR50 Appendix B will be met [10CFR70.22(f)]
  - Acceptable option is commitment to implement and maintain its QA program to comply with applicable “requirements” of ASME-NQA-1-1994... [NUREG-1718, 15.1.4.3]



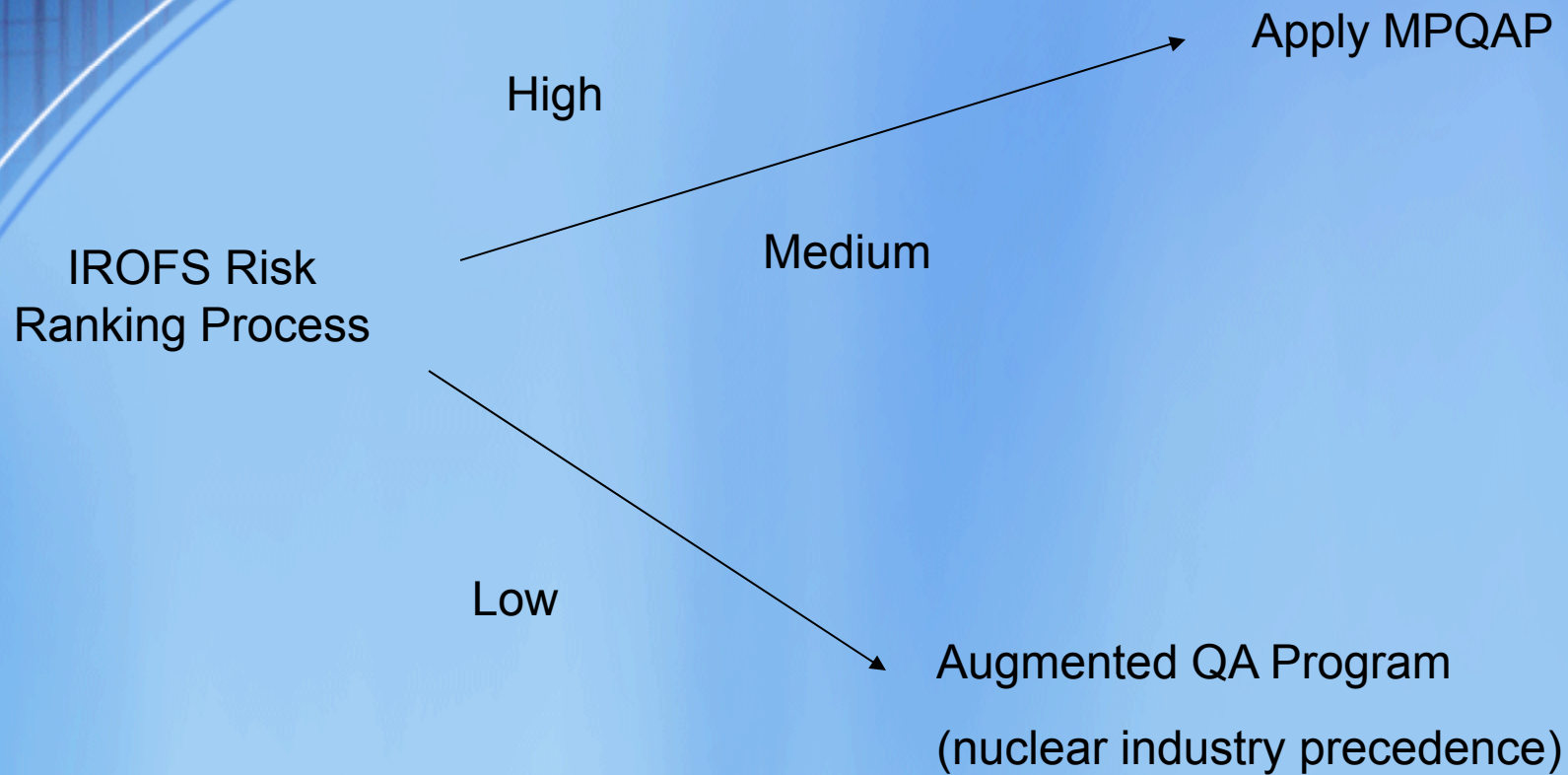
# Background

- Quality Assurance
  - MOX Services has committed to NQA-1 [LA 15.1]
  - MOX Project Quality Assurance Plan
    - Provides discussion of how criteria of 10CFR50 Appendix B are met
    - Section 2.2.3 C discusses augmented QA programs for IROFS
      - Described in engineering procedures
      - Quality Assurance concurrence
      - Use must be justified
      - May rely on nuclear industry precedence
      - Provide NRC list of IROFS where augmented program is used

## Background

- Advisory Committee on Reactor Safeguards
  - Without such [risk] rankings, licensees and regulatory bodies will find it challenging to apportion their resources for inspecting, monitoring, and maintaining IROFS in complex facilities. *[ACRS Letter on Comparison of ISA and PRA for Fuel Cycle Facilities, Feb 17, 2011]*

# Approach



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# Risk Ranking

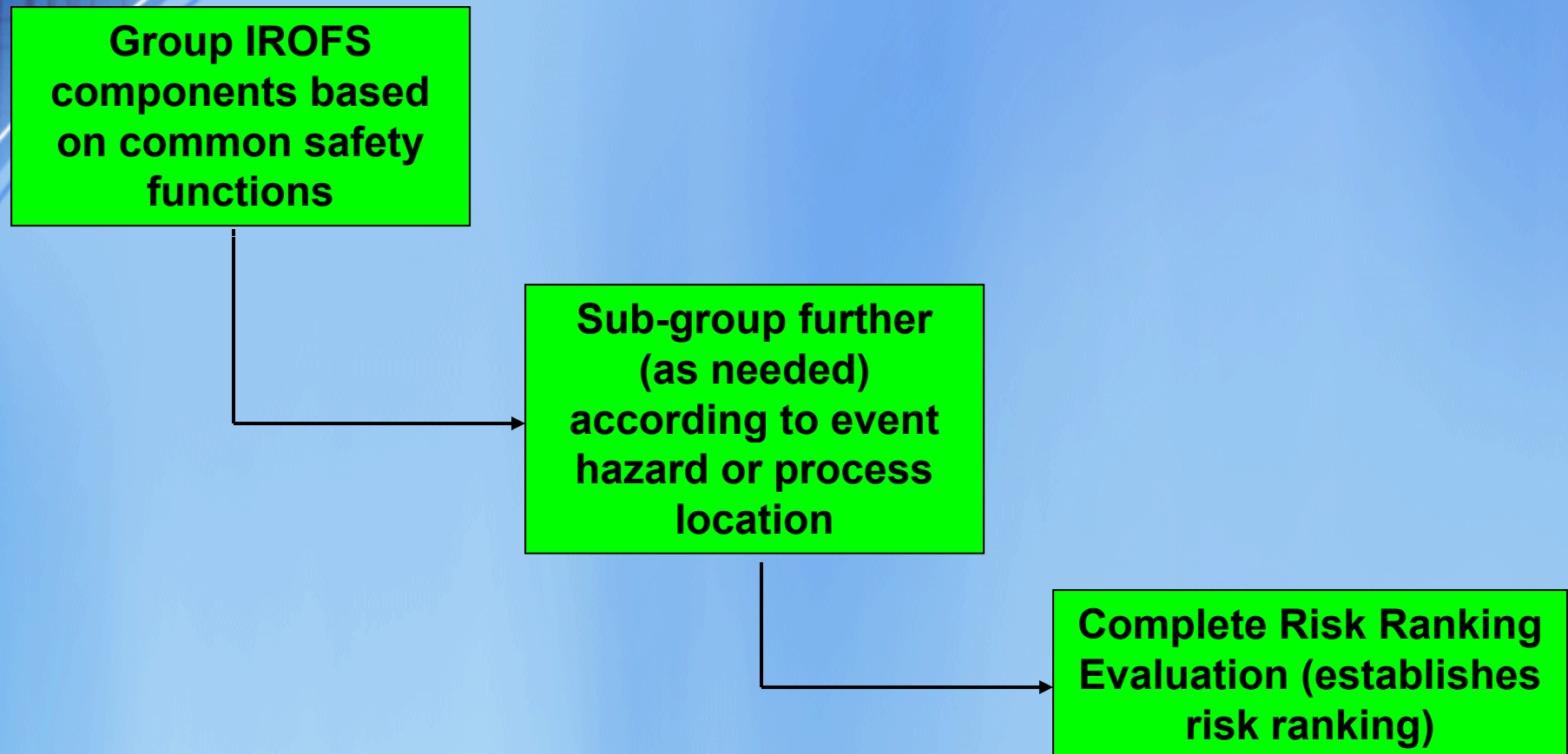
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# Risk Ranking Process

- Purpose
  - Define relative importance of IROFS to the overall safety criteria
  - Identify the IROFS that are a priority for MOX Services focus
  - Identify low risk IROFS where augmented QA program could be applied

# Risk Ranking Process



# Risk Ranking Process

- Uses event sequences described in Integrated Safety Analysis Summary (ISAS)
- Risk Ranking Criteria groups
  - **Frequency** of the event sequence including IROFS failure
  - **Consequences** of event and IROFS failure



# Risk Ranking Process

- **Frequency** criteria
  - Is failure detection provided for the IROFS?
    - Continuously verified with automatic system control
    - Continuously verified with alarm or warning
    - Continuously verified with no alarm or warning
    - Verifiable through periodic surveillance frequency
  - What is the likelihood of the initiating event?
    - Occurrence less than once in lifetime of facility
    - Occurrence approximately once in lifetime of facility
    - Occurrence approximately once per year
    - Occurrence approximately greater than once per year



# Risk Ranking Process

- Frequency criteria (cont'd)
  - What is the complexity of the IROFS design?
    - Simple, reliable
    - More complicated but supported by some reliability data
    - Complex with little or no reliability data
  - How much safety margin is there between the process upset and the safety limit?
    - Low sensitivity, large margin to safety limit
    - Medium sensitivity, some margin to safety limit
    - High sensitivity, small margin to safety limit

## Risk Ranking Process

- Consequence criteria
  - Does the IROFS control or monitor the process?
    - Monitoring function, failure does not cause event
    - Indirectly provides controlling function, failure does not cause event
    - Direct controlling function, failure may cause event
  - What is the severity of the event consequence?
    - Low dispersability, e.g., assemblies, liquids, low energy systems, low energy deflagrations
    - Medium dispersability, e.g., pellets, non-respirable powders
    - High dispersability, e.g., respirable powders, high energy systems, high energy detonations, criticality

## Risk Ranking Process

- Consequence criteria (cont'd)
  - Is the event slow acting? How much time is there from the safety limit to unacceptable consequences?
    - Slow acting event, long time margin for response with upset condition identification
    - Medium acting event, less time for response or with indirect identification
    - Fast acting event, little or no time for response
  - Are other systems, normal or IROFS, available to provide additional safety?
    - Normal systems and other IROFS are immediately available to provide backup upon IROFS failure
    - Some systems are available, but may not be immediately available
    - Only normal or redundant, non-diverse IROFS available



# Risk Ranking Process

## RISK CATEGORY

- The sum of the four criteria in each group is evaluated for overall risk ranking of the IROFS control group by way of a risk matrix

Risk Chart		Frequency		
		Low	Medium	High
Consequence	High	Medium	High	High
	Medium	Low	Medium	High
	Low	Low	Low	Medium

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# Risk Ranking Process

- Status
  - Process implemented through project procedure
  - Evaluations have been performed to demonstrate process
  - Results compare favorably with other risk evaluation processes (e.g., PRA)
  - Will be integrated into change process

# Augmented QA Program

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## Nuclear Industry Precedent

- Regulatory Guide 1.176, *An Approach for Plant Specific, Risk Informed Decisionmaking: Graded Quality Assurance*
- Quality Assurance Program Description for the American Centrifuge Plant, Docket No. 70-7004, August 2004 (including NRC SER)
- LES License Amendment Request December 23, 2010, as approved by NRC
- 10CFR50.69 *Risk-informed Categorization and Treatment of Structures Systems and Components for Nuclear Power Reactors*



## Nuclear Industry Precedent

- Regulatory Guide 1.189, *Fire Protection for Operating Nuclear Power Plants*
- Regulatory Guide 1.143, *Radioactive Waste Management Systems*
- Regulatory Guide 4.15, *Radiological Monitoring Programs*

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## Augmented QA Program

- Key Differences for Augmented QA Program
  - Procure commercial using national codes and standards
  - Increased use of over checks at receipt inspection (such as PMI)
  - 10CFR Part 21 invoked upon acceptance
  - Reduced sampling vs. normal sampling plans
  - Peer inspection by qualified personnel
  - Audit focus on high risk IROFS
  - QL-1LR established to uniquely identify low risk IROFS

Note: MOX Services will continue to use performance analysis and lessons learned to determine if changes to process approach are required.

## Augmented QA Program

Note: The following MPQAP sections should require no reduction from existing MPQAP requirements for QL-1LR.

- Section 1      *Organization*
- Section 5      *Instructions, Procedures, or Drawings*
- Section 6      *Document Control*
- Section 8      *Identification & Control of Material, Parts or Components*
- Section 9      *Control of Special Processes*
- Section 11     *Test Control*
- Section 12     *Control of Measuring & Test Equipment*
- Section 13     *Handling, Storage and Shipping*
- Section 14     *Inspection Test and Operating Status*
- Section 15     *Nonconformance Materials, Parts or Components*
- Section 16     *Corrective Action*
- Section 17     *Quality Assurance Records*

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## **MOX Procedure Changes**

- PP1-1, *Quality Assurance Grading*
- PP3-7, *Audits*
- PP3-12, *Supplier Evaluation*
- PP8-3, *Evaluation and Reporting of Defects and Noncompliance*
- PP9-1, *SSC Quality Levels & Marking Design Documents*
- PP9-9, *Engineering Specifications*



## Licensing Document Clarifications

- License Application
  - Chapter 5 – include description of risk ranking process
  - Chapter 15 – include discussion of use of risk ranking process to support use of augmented QA program for low risk IROFS
- MPQAP
  - Update 2.2.3 C to include use of risk ranking process to support the use of augmented QA program (details on augmented program in MOX Services Project Procedure PP9-1, SSC *Quality Levels & Marking Design Documents*)



# Summary

- Established process to prioritize IROFS using risk insights
  - Identifies high risk and low risk IROFS
  - MPQAP for high risk IROFS
  - Implement MPQAP 2.2.3 C for low risk IROFS
    - Engineering procedures
    - Nuclear industry precedence

# **Part II**

## **Closed Session**

### **Risk Ranking Process Examples**

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