

Building a Smarter Fuel Cycle Inspection Program

Division of Fuel Management

Agenda

- Disposition of feedback from Nuclear Energy Institute (NEI) and URENCO USA (UUSA)
- Decision-making methodology
- Proposed recommendation
- Questions

Note: *The information included in this presentation is being shared in draft form so that stakeholders can see how their comments and proposals have been incorporated in the recommended changes to the inspection program.*

Disposition of Stakeholder Feedback

- Had significant number of stakeholder interactions
 - Held 8 public meetings
 - Received comments from members of the public
 - Engaged in discussion with NEI and industry during the meetings
 - Received multiple letters from NEI and UUSA
- Addressed feedback throughout the process

Disposition of Stakeholder Feedback

- Program specific considerations
 - Overlaps and efficiencies in current Inspection Procedures (IPs)
 - Maintenance/Surveillance, Waste Management
 - Resident Inspector Program
 - Benchmarking with Rector Oversight Program
 - Hours and functional areas inspected
 - Risk insights and Maturity of Integrated Safety Analysis (ISA)
 - Licensee Performance Review
 - Flexibility – range of hours for IPs
 - Corrective Action Program
 - Public concerns with licensee self-oversight

Development of Proposed Recommendation

Development of Proposed Recommendation

- Generic program considerations
 - Review of historical changes to inspection program
 - Review of compliance history
 - Analysis of operating experience (OpE) and inspection data
 - Insights gathered from inspectors and other subject matter experts
 - Maturity of the licensees' safety programs
 - Diversity of the facilities by categories and diversity of facilities within the category

Development of Proposed Recommendation

- Identification of Inspection Technical Areas
 - Criticality Safety
 - Operations/Chemical Safety
 - Fire Safety
 - Environmental
 - Radiation Protection
 - Transportation
 - Emergency Preparedness
 - Material Control and Accounting (MC&A)

Development of Proposed Recommendation

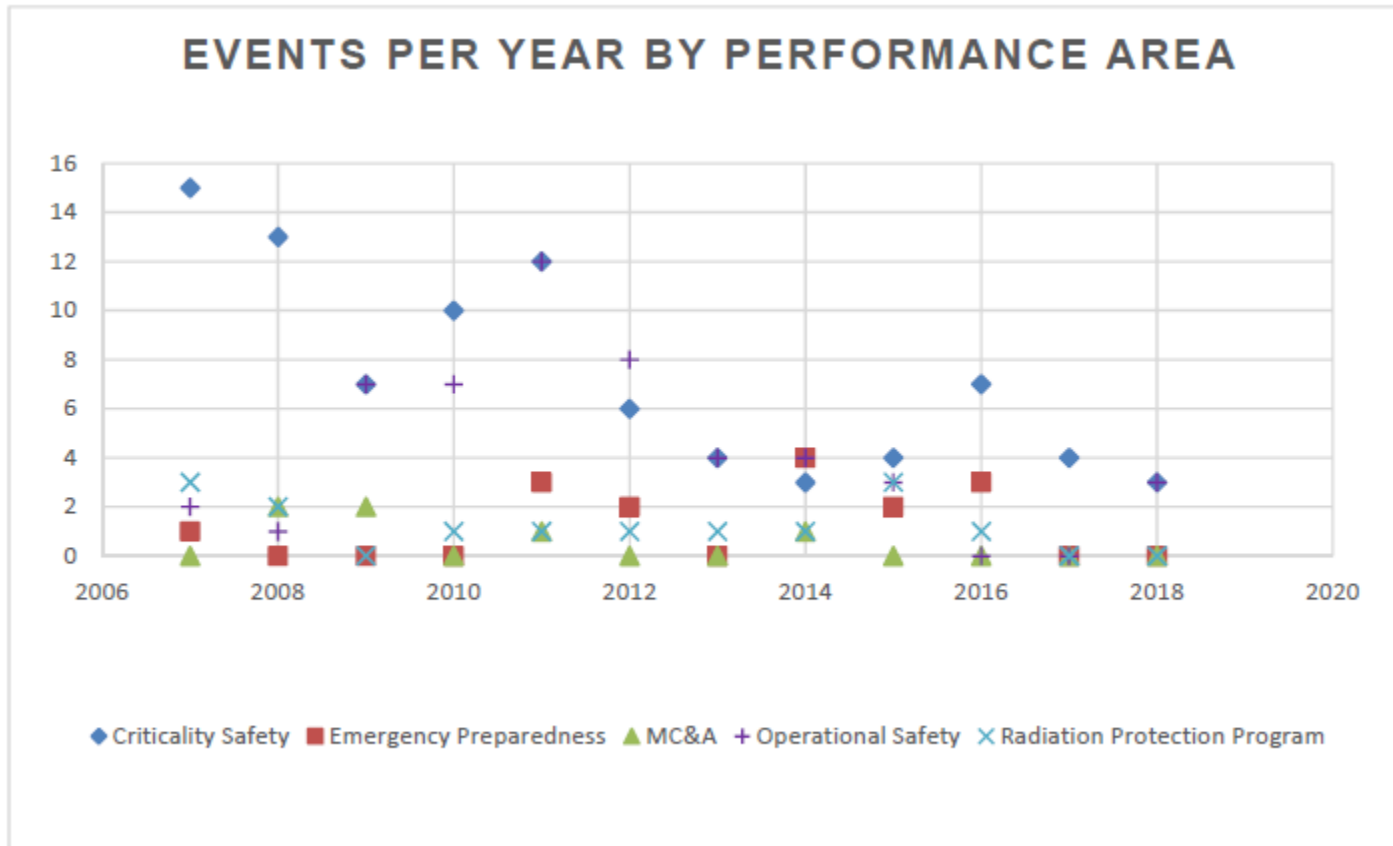
- Qualitative factors used for ranking importance of technical areas as Tier 1, Tier 2, Tier 3
 - Integrated Safety Analysis
 - Accident sequences and consequences for each area
 - Operating Experience
 - Regulatory Requirements
 - Public Interest
 - Engineering Judgement

Development of Proposed Recommendation

	Accident Sequences	Operating Experience	Regulatory Requirements
Criticality	<i>High</i>	<i>High</i>	<i>Medium</i>
Chemistry	<i>High</i>	<i>High</i>	<i>Low</i>
Fire	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>
Environmental	<i>Low</i>	<i>Low</i>	<i>Low</i>
Radiation Protection	<i>Medium</i>	<i>Low</i>	<i>Low</i>
Transportation	<i>Low</i>	<i>Low</i>	<i>Medium</i>
Emergency Preparedness	<i>Medium</i>	<i>Medium</i>	<i>Low</i>
Material Control & Accounting	<i>N/A</i>	<i>Medium</i>	<i>High</i>

- Note: Engineering Judgement and Public Interest were also factored

Development of Proposed Recommendation



Source: Fuel Cycle Annual Operating Experience Report 2018 (ADAMS No. ML19004A407)

Development of Proposed Recommendation

- Results of ranking

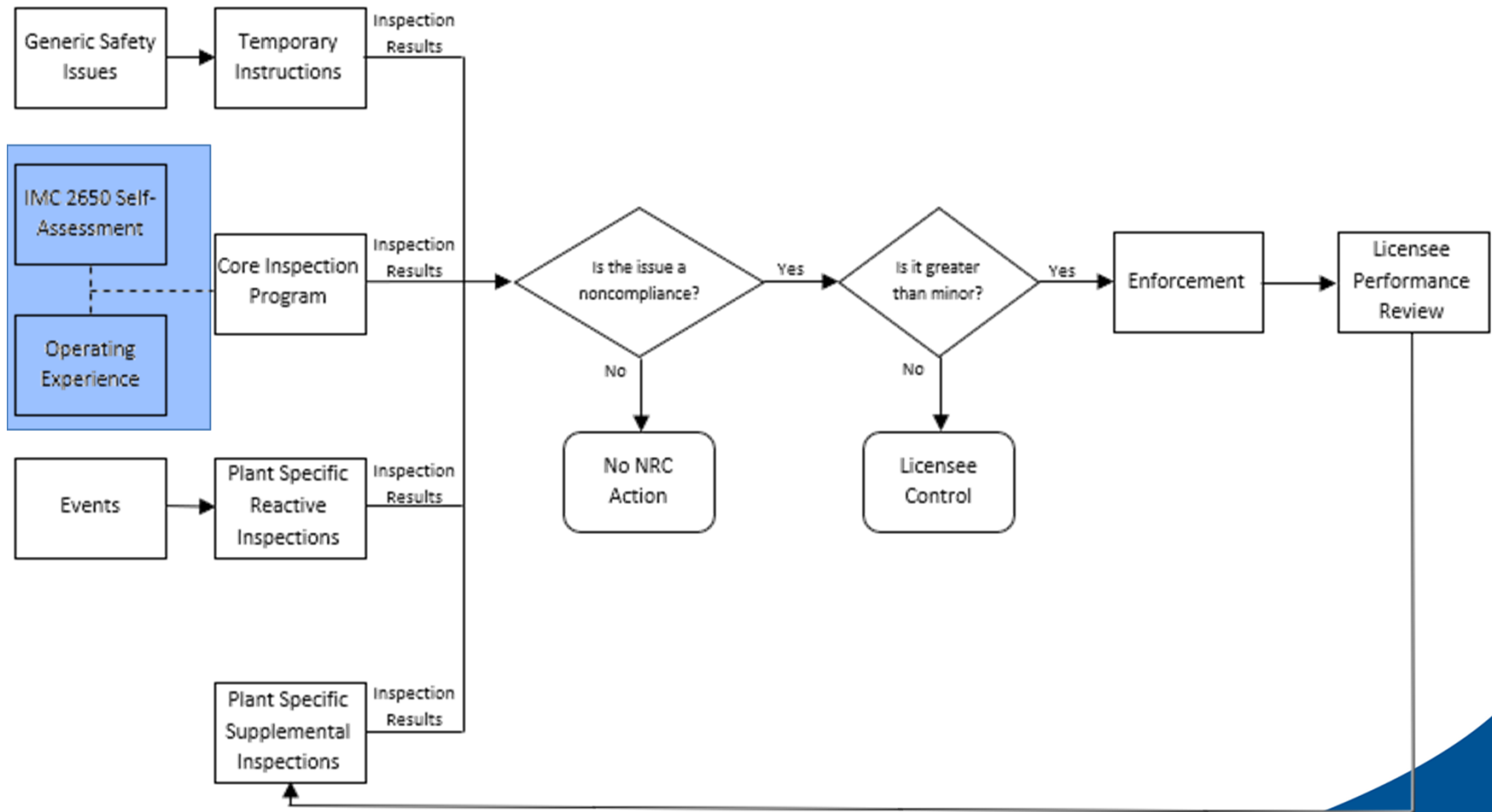
Technical Areas (Safety)	
Criticality Safety	Tier 1
Chemical Safety	
Fire Safety	Tier 2
Emergency Preparedness	
Radiation Protection	
Transportation	Tier 3
Environmental	

Technical Areas (Safeguards)	
MC&A	Tier 1/Tier 2

Development of Proposed Recommendation

- Tier 1
 - Maintain high level of inspection effort
 - Annual Frequency
 - Benefit from team inspections
- Tier 2
 - Maintain moderate level of inspection effort
 - Biennial Frequency
 - Benefit from team inspections
- Tier 3
 - Maintain moderate level of inspection effort
 - Triennial Frequency
 - Included flexibility or range of hours
- Corrective Action Program
 - Frequency changes for some Tier 2 and Tier 3 inspection areas

Framework of Proposed Recommendation



Working Group Proposed Recommendation

Function/ Program Areas	Procedure or Procedure Suite	Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility				Laser Enrichment Facility	
		Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Approved CAP Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
SAFETY OPERATIONS													
Plant Operations	88020 (OPR)	- Annual	-105	Annual (2 per year)	60 120	Annual (2 per year)	60-90	Annual (2 per year)	60-90	Annual (2 per year)	90	-	-
	88135* (Resident Inspection Program)	Annual	797 752	-	-	-	-	-	-	-	-	-	-
Criticality Safety	88015	Annual (3 2 per year)	492 120	Annual (2 per year)	64 60	-	-	Annual (2 per year)	64 60	Annual (2 per year)	60	-	-
Fire Protection	88055 (FPB)	- Biennial	- 320	Annual Biennial	32 60	Annual Biennial	32 60	Annual Biennial	32 60	Triennial	60	-	-
	88054 (FPT)	Triennial*	90	Triennial*	90	Triennial*	90	Triennial*	90	-	-	-	-

Working Group Proposed Recommendation

		Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility		Laser Enrichment Facility	
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
SAFEGUARDS											
MC&A	Procedures as in IMC 2683	Annual	152-196 120	Annual Biennial	54-72 60	-	-	Annual Biennial	62-84 60	-	-
	MC&A Observation	Triennial	30	Triennial	30	-	-	Triennial	30	-	-

Working Group Proposed Recommendation

		Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility				Laser Enrichment Facility	
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Approved CAP Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
RADIOLOGICAL CONTROLS													
Radiation Protection	88030 (RP)	Biennial with annual subsections	64 60	Biennial with annual subsections	64 60	Biennial with annual subsections	64 60	Biennial with annual subsections	64 60	Triennial	60	-	-
Environmental Protection	88045 (Effluent Control and Env.)	Annual Triennial	32 30-60	Annual Triennial	32 30-60	Annual Triennial	32 30-60	Annual Triennial	32 30-60	5 Years	30-60	-	-
Waste Management	88035 (WM)	Biennial	32	Biennial	32	Biennial	32	Biennial	32	-	-	-	-
Transportation	86740 (T)	Biennial Triennial	32 30-60	Biennial Triennial	32 30-60	Biennial Triennial	32 30-60	Biennial Triennial	32 30-60	5 Years	30-60	-	-
FACILITY SUPPORT													
Maintenance/Surveillance	88025 (MS)	-	-	Annual	30	Annual	30	Annual	30			-	-
Emergency Preparedness	88050 (EP)	Annual Biennial	32 30	Annual Biennial	32 30	Annual Biennial	32 30	Annual Biennial	32 30	Triennial	30	-	-
	88051 (Exercise Observation)	Biennial	48	Biennial	48	Biennial	48	Biennial	48	Biennial	48	-	-
Plant Modifications (Annual)	88070	Annual unless 88072 is performed	32 [±] 30*	Annual unless 88072 is performed	32 [±] 30*	Annual unless 88072 is performed	32 [±] 30*	Annual unless 88072 is performed	32 [±] 30*	Annual unless 88072 is performed	32 [±]	-	-
Plant Modifications (Triennial)	88072	Triennial	96 [±] 90*	Triennial	96 [±] 90*	Triennial	96 [±] 90*	Triennial	96 [±] 90*	Triennial	90*	-	-
Corrective Action Program	71152	-	-	-	-	-	-	-	-	Triennial	90	-	-

Appendix B – Current and Proposal

Function Areas Core Hours	Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion		Gas Centrifuge Facility			Laser Enrichment Facility	
	Current Program	Proposal	Current Program	Proposal	Current Program	Proposal	Current Program	Proposal	Proposal CAP	Current Program	Proposal
Plant Operations	797	857	60	120	60	90	60	90	90	0	0
Criticality Safety	192	120	64	60	0	0	64	60	60	0	0
Fire Protection	30	15	51	30	51	30	51	30	20	0	0
MC&A	196	120	72	30	0	0	64	30	30	0	0
MC&A Observation	10	10	10	10	10	10	10	10	10	0	0
Security	241	241	8	8	8	8	184	184	184	136	136
Radiation Protection	32	30	32	30	32	30	32	30	20	0	0
Environmental Protection	32	10	32	10	32	10	32	10	6	0	0
Waste Management	16	0	16	0	16	0	16	0	0	0	0
Transportation	16	10	16	10	16	10	16	10	6	0	0
Maintenance/Surveillance	0	0	30	0	30	0	30	0	0	0	0
Emergency Preparedness	56	39	56	39	56	39	56	39	34	0	0
Plant Modifications	53	50	53	50	53	50	53	50	30	0	0
Corrective Action Program	0	0	0	0	0	0	40	30	30	0	0
Total Annualized Hours =	1672	1502	500	397	364	277	708	573	520	136	136

Notes:

- Inspection hours shown on proposal assumes use of minimum hours as core program. The use of range of hours will be dependent on inspection scope
- MC&A Observation not currently illustrated in Appendix B. (Hours used: 30 hours, triennial)
- CAP hours not currently illustrated in Appendix B (Hours used: 120 hours triennial)

What happened with options 1-2?

- Based on extensive stakeholder engagements, the WG identified the need to evaluate additional approaches informed by previous options and stakeholder feedback
- Concerns about a new framework for inspections (predictability and implementation)
- Public concerns about reduction in inspection hours and reliance on licensee self-oversight

What's Next?

- Finalize WG report documenting recommendations (November 2019)
- Develop Plan for Phase 2 to incorporate recommendations into inspection program (October 2020)
 - Updates to Inspection Manual Chapter
 - Updates to IPs, Resident Inspector IPs Scope
 - Look for efficiencies on preparation and documentation of inspection activities
- Perform inspections using updated program (Calendar Year 2021)

Questions



Appendix B Markup – Proposal, NEI

		Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility	
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
SAFETY OPERATIONS									
Plant Operations	88020 (OPR)	- Annual	- 105 ¹	Annual (2 per year)	60 120 48-60	Annual (2 per year)	60 90 48-60	Annual (2 per year)	60 90 48-60
	88135+ (Resident Inspection Program)	Annual	797 752 797	-	-	-	-	-	-
Criticality Safety	88015	Annual (2 per year)	192 120 72-90	Annual (2 per year)	64 60 48-60	-	-	Annual (2 per year)	64 60 48-60
Fire Protection	88055 (FPB)	Biennial	30 0 ¹	Annual Biennial Biennial	32 60 48-60	Annual Biennial Biennial	32 60 48-60	Annual Biennial Biennial	32 60 48-60
	88054 (FPT)	Triennial*	90	Triennial*	90	Triennial*	90	Triennial*	90
	88054 (FPT)	Triennial*	90	Triennial*	90	Triennial*	90	Triennial*	90

NRC Recommendation in Blue
NEI Proposal #2 in Green

¹ Keep these IPs with the Resident Inspection Program, as is currently implemented today

Appendix B Markup – Proposal, NEI

		Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility	
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
SAFEGUARDS									
MC&A	Procedures as in IMC 2683	2 Annual Annual	152-196 120 72-90	Annual Biennial Biennial	54-72 60 48-60	-	-	Annual Biennial Biennial	62-84 60 48-60
	MC&A Observation	Triennial Triennial	30 24-30	Triennial Triennial	30 24-30	-	-	Triennial Triennial	30 24-30
RADIOLOGICAL CONTROLS									
Radiation Protection	88030 (RP)	Biennial with annual subsections	64 60 24-30	Biennial with annual subsections	64 60 24-30	Biennial with annual subsections	64 60 24-30	Biennial with annual subsections	64 60 24-30
Environmental Protection	88045 (Effluent Control and Env.)	Annual Triennial Biennial	32 30-60 24-30	Annual Triennial Biennial	32 30-60 24-30	Annual Triennial Biennial	32 30-60 24-30	Annual Triennial Biennial	32 30-60 24-30
Waste Management Waste Management	88035 (WM) 88035 (WM)	Biennial Biennial	32 32	Biennial Biennial	32 32	Biennial Biennial	32 32	Biennial Biennial	32 32

NRC Recommendation in Blue
NEI Proposal #2 in Green

Appendix B Markup – Proposal, NEI

		Category I Fuel Facility		Category III Fuel Fabrication Facility		Uranium Conversion Facility		Gas Centrifuge Facility	
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)	Inspection Frequency	Estimated Resources per IP (hrs)
Transportation	86740 (T)	Biennial Triennial Triennial	32 30-60 24-30	Biennial Triennial Triennial	32 30-60 24-30	Biennial Triennial Triennial	32 30-60 24-30	Biennial Triennial Triennial	32 30-60 24-30
FACILITY SUPPORT									
Maintenance/ Surveillance	88025 (MS)	-	-	Annual	30	Annual	30	Annual	30
Maintenance/ Surveillance	88025 (MS)	-	-	Annual	30	Annual	30	Annual	30
Emergency Preparedness	88050 (EP)	Annual Biennial Biennial	32 30 24-30	Annual Biennial Biennial	32 30 24-30	Annual Biennial Biennial	32 30 24-30	Annual Biennial Biennial	32 30 24-30
	88051 (Exercise Observation)	Biennial	48 38-48	Biennial	48 38-48	Biennial	48 38-48	Biennial	48 38-48
Plant Modifications (Annual)	88070	Annual unless 88072 is performed	32 30 24-30	Annual unless 88072 is performed	32 30 24-30	Annual unless 88072 is performed	32 30 24-30	Annual unless 88072 is performed	32 30 24-30
Plant Modifications (Triennial)	88072	Triennial	96 90 72-90	Triennial	96 90 72-90	Triennial	96 90 72-90	Triennial	96 90 72-90

NRC Recommendation in Blue
NEI Proposal #2 in Green

Appendix B Markup – Proposal, UUSA

		Gas Centrifuge Facility			
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Approved CAP Frequency	Estimated Resources per IP (hrs)
SAFETY OPERATIONS					
Plant Operations	88020 (OPR)	Annual (2 per year) Annual	60 90 90	Annual (2 per year)	90
	88135+ (Resident Inspection Program)	-	-	-	-
Criticality Safety	88015	Annual (2 per year) Annual	64 60 90	Annual (2 per year)	60
Fire Protection**	88055 (FPB)	Biennial Biennial	60 60	Triennial Triennial	60 45
	88054 (FPT)	Triennial*	90	-	-
MC&A	Procedures as in IMC 2683	Annual Biennial Biennial	62-84 60 60	60	60
	MC&A Observation	Triennial	30	60	60

NRC Recommendation in Blue
URENCO Proposal in Orange

Appendix B Markup – Proposal, UUSA

		Gas Centrifuge Facility			
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Approved CAP Frequency	Estimated Resources per IP (hrs)
RADIOLOGICAL CONTROLS					
Radiation Protection	88030 (RP)	Biennial with annual subsections Annual	64 60 30	Triennial Triennial	60 30
Environmental Protection	88045 (Effluent Control and Env.)	Annual Triennial	32 30-60	5 Years Triennial	30-60 30
Waste Management	88035 (WM)	Biennial	32		
Transportation	86740 (T)	Biennial Triennial Triennial	32 30-60 30	5 Years Triennial	30-60 15
FACILITY SUPPORT					
Maintenance/ Surveillance	88025 (MS)	Annual	30		
Emergency Preparedness	88050 (EP)	Annual Biennial Biennial	32 30 30	Triennial Triennial	30 30
	88051 (Exercise Observation)	Biennial	48	Biennial	48

NRC Recommendation in Blue
URENCO Proposal in Orange

Appendix B Markup – Proposal, UUSA

		Gas Centrifuge Facility			
Function/ Program Areas	Procedure or Procedure Suite	Inspection Frequency	Estimated Resources per IP (hrs)	Approved CAP Frequency	Estimated Resources per IP (hrs)
Plant Modifications (Annual)	88070	Annual unless 88072 is performed	32 30	Annual unless 88072 is performed -	32* 0
Plant Modifications (Triennial)	88072	Triennial	96 90	Triennial	90
Corrective Action Program	71152	-	-	Triennial Triennial	90 90

NRC Recommendation in Blue
URENCO Proposal in Orange