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# Complex-wide Review and DOE Order 435.1 *Radioactive Waste Management* Update

Howard Pope  
EFCOG Meeting  
August 31, 2010



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# ***Introduction***

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- History
- Original 1996 Complex-Wide Review
- How DOE Order 435.1, Radioactive Waste Management, was created
- Where we are now / where we are going
- 2010 Complex-Wide Review
  - Responses & Findings
- DOE O435.1 revision update



# History

- DOE O 5820.2A, *Radioactive Waste Management*, was issued September 1988
- Several attempts to revise DOE O 5820.2A
- DNFSB Recommendation 94-2
  - LLW forecasting and capacity planning inadequate
  - Characterization of LLW ineffective
  - LLW in storage indefinitely
  - Storage conditions for LLW inadequate
  - Some LLW generated with no path for disposition
  - Performance assessments unapproved and lacking adequate requirements
- DNFSB 94-2 required DOE to conduct a complex-wide review (CWR)



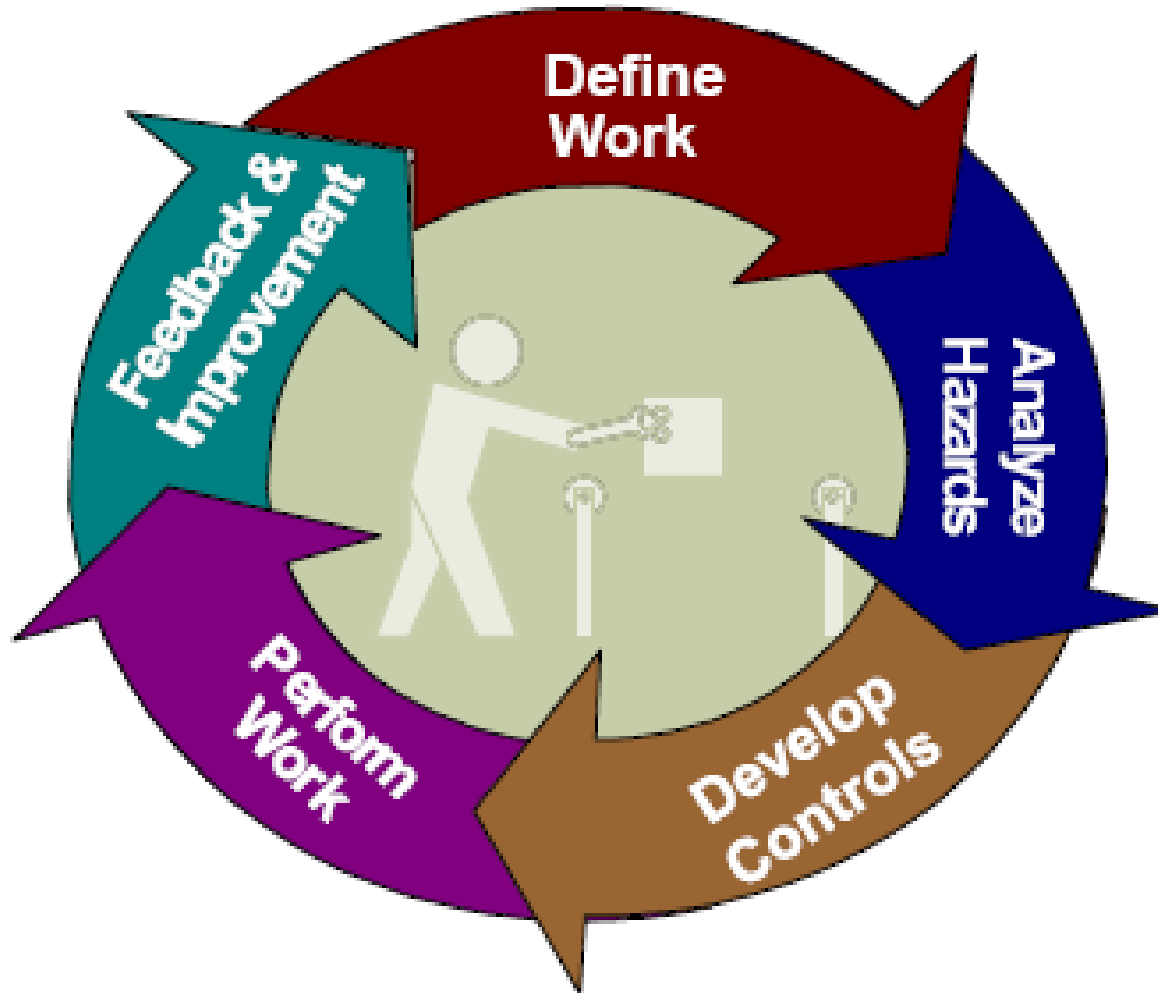
# History

- 1996 CWR focused on environmental, safety & health areas
- Completed May 1996 with the same basic findings of DNFSB - vulnerabilities
- CWR/DNFSB was the primary drivers in developing a new approach to radioactive waste management
- DOE decide to replaced DOE O 5820.2A with DOE O 435.1
  - Incorporate DNFSB recommendations
  - Develop a clear & sound technical basis for requirements/guidance
  - Incorporate considerations of risk through ISMS process
  - Less prescriptive & more performance based
  - Address stakeholder concerns
  - Other considerations (e.g. delegation of decision making to the field)



# How the Order Was Developed

## Integrated Safety Management System Process



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# *How 435.1 was Created*

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- Began Order writing process September 1996 (CWR May 1996)
- Four teams of Headquarters and Field staff
  - HLW, TRU, LLW/MLLW, & General Requirements
- Structured ISMS process
- July 9, 1999 issued Order, Manual, Guidance, Technical Basis, and training program

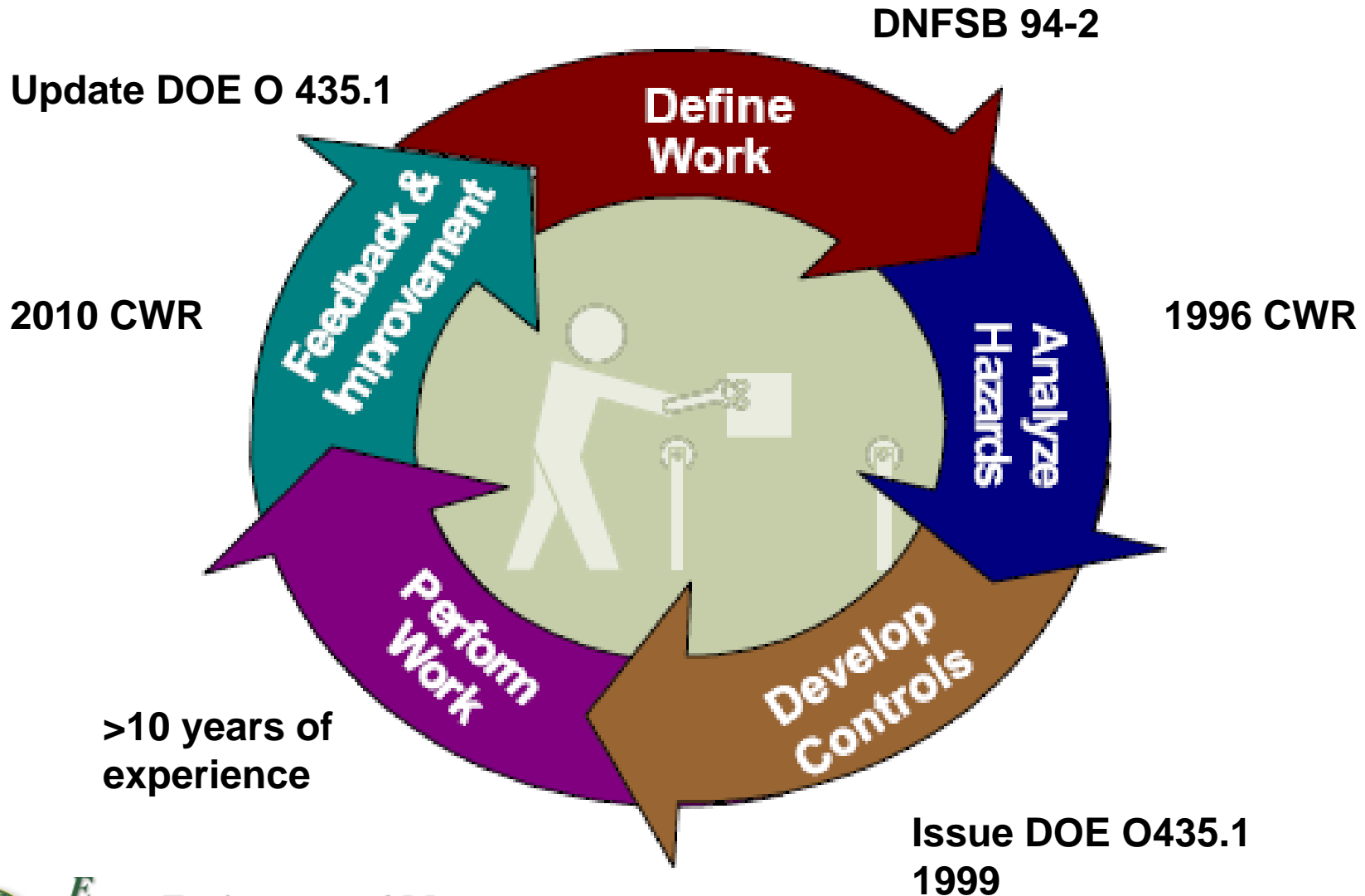


# ***How 435.1 was Created (continued)***

- Identification of waste management functions and activities based on standard systems engineering approaches
  - Generation, treatment, storage, disposal, closure
- Assess hazards to workers, public, and environment that were performing the functions
- Develop Controls -- assess existing requirements and develop requirements to address significant hazards
  - Identify needed requirement areas
  - Identify existing and external requirement sources; applicable Federal requirements; other Federal requirements (e.g., 10CFR61, 40CFR191); International standards (IAEA); and industry consensus standards
- Evaluate adequacy of requirements / any additional requirements
- Document /implement: Order, Manual, Guide & Tech. Stds



# Where We are Now



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# Where We Are Going

- 14 years since first CWR completed
- 11 years experience implementing DOE O 435.1
- Opportunity to re-assess and evaluate our progress
  - What issues still exist
  - What have been the successes
- Consistent with feedback and continuous improvement step of ISMS
- Good first step for evaluating update needs for 435.1



# *Objectives of 2010 CWR*

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- Describe the progress made within EM/NNSA for managing radioactive waste (HQ, HLW, TRU, LLW)
- Provide a self-assessment tool for sites
- Identify radioactive waste management best practices and areas of improvement
  - Site-wide
  - Complex-wide
- Support update of DOE O 435.1

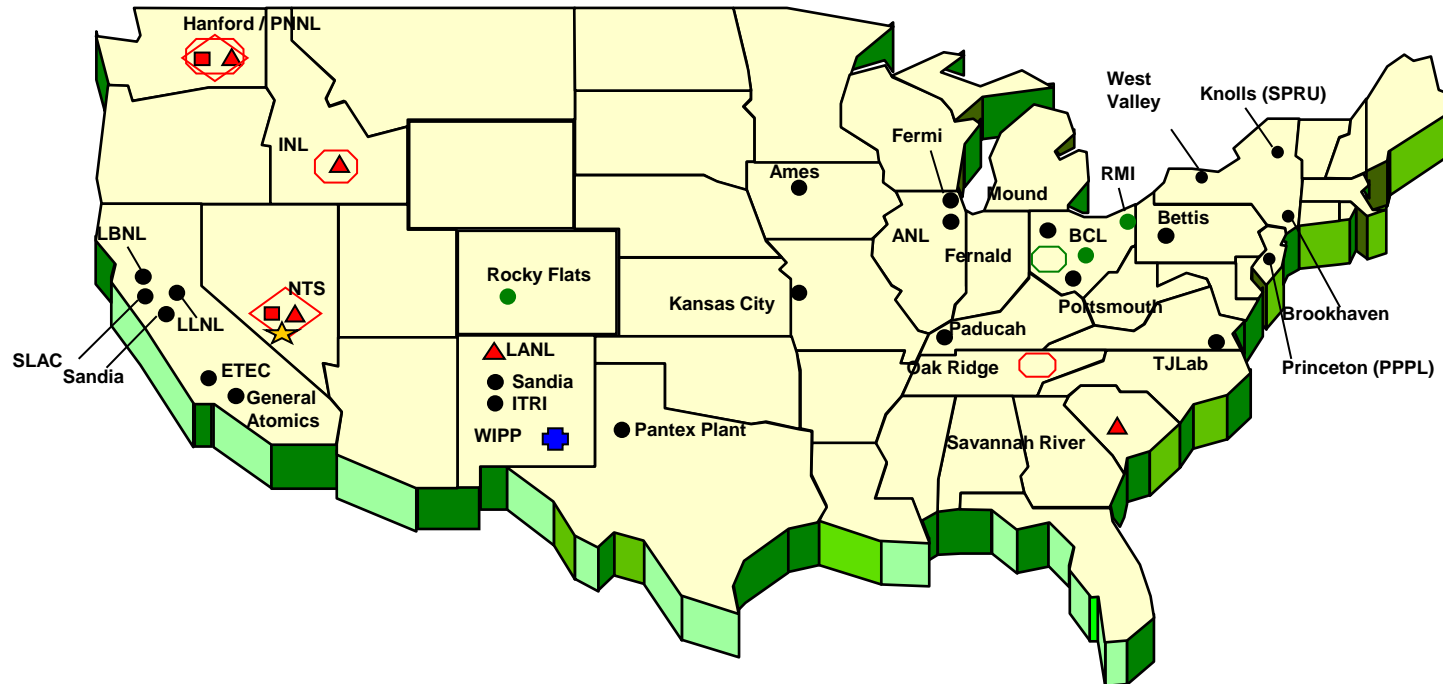


# Scope of CWR

- All DOE/NNSA sites and Program Offices that manage radioactive waste
  - Sites - LLW (29), TRU (12), HLW (4)
  - Program Offices – EM, NE, SC, HS, LM and NNSA
- Requirements of DOE M435.1-1
  - FEM & HQ responsibilities
  - generation
  - treatment
  - storage
  - disposal
  - waste incidental to reprocessing
  - closure



# DOE Radioactive Waste Management Complex

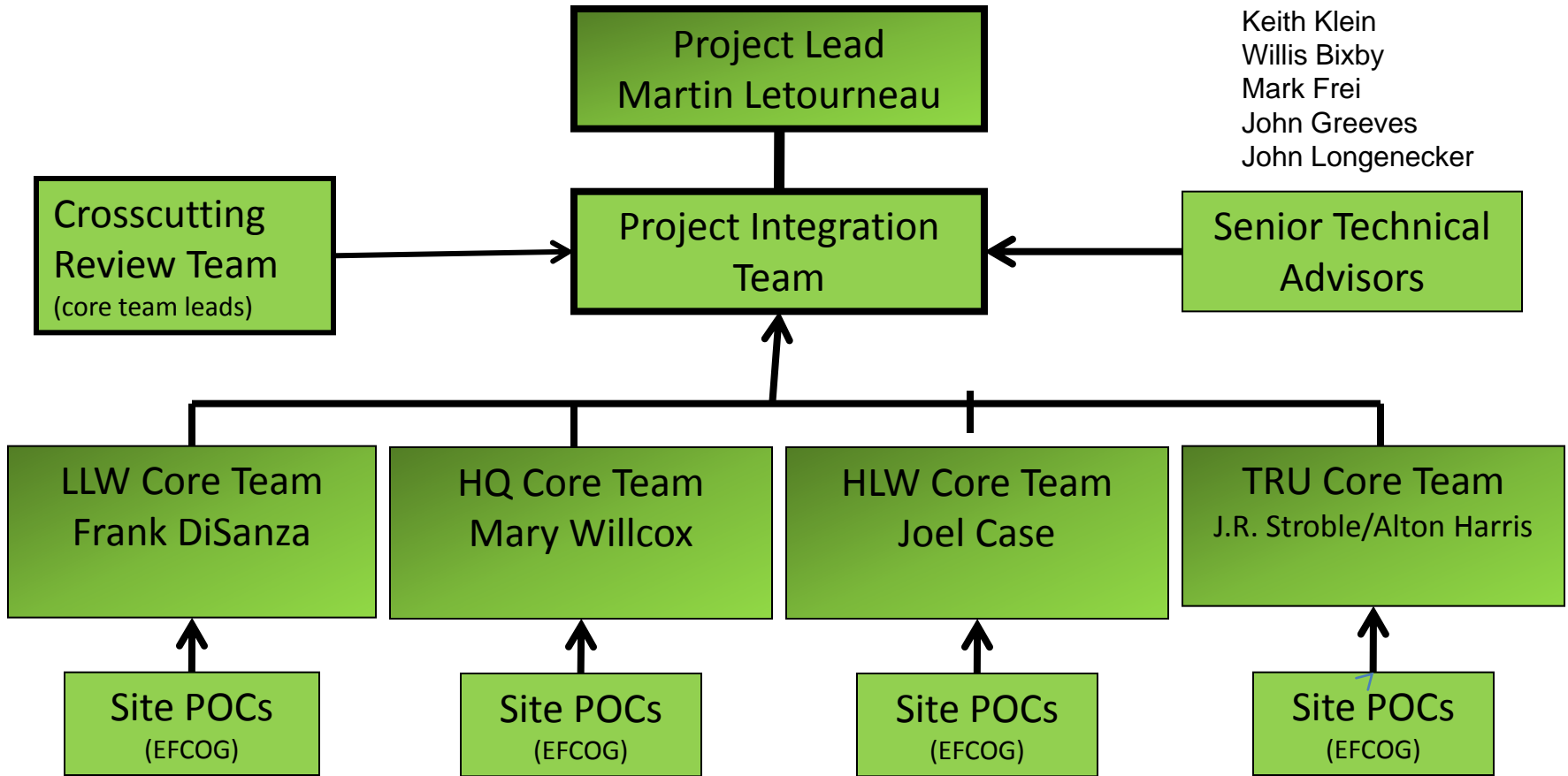


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# CWR Project Team



# ***Survey Tool and Lines Of Inquiry (LOI)***

- LOIs – LLW, HLW, TRU, HQ & FEM
- Central data base
  - Accessible by Core Teams and Site points-of-contact
- Coordination through Corporate Boards and EFCOG
- Pilot at one large site (SRS-LLW, HLW, TRU) / one small site (LBL-LLW, TRU)
  - Lessons learned meeting to refine LOIs
- LOIs completed by site POCs (DOE, contractors)
  - Results reviewed by Core Teams



# LOI Development Table

Site CWR Lines of Inquiry Category Breakdown Table				
Waste Process Category	Number of questions per LOI category			
	HLW	TRU	LLW	Oversight Management
General	17	20	16	
Generation	43	62	57	
Treatment	34	42	47	
Storage	54	41	52	
Disposal / WIR	14	67	91	
Closure	27			
Crosscutting Areas	31	29	29	
Field Element Manager (Site)				52

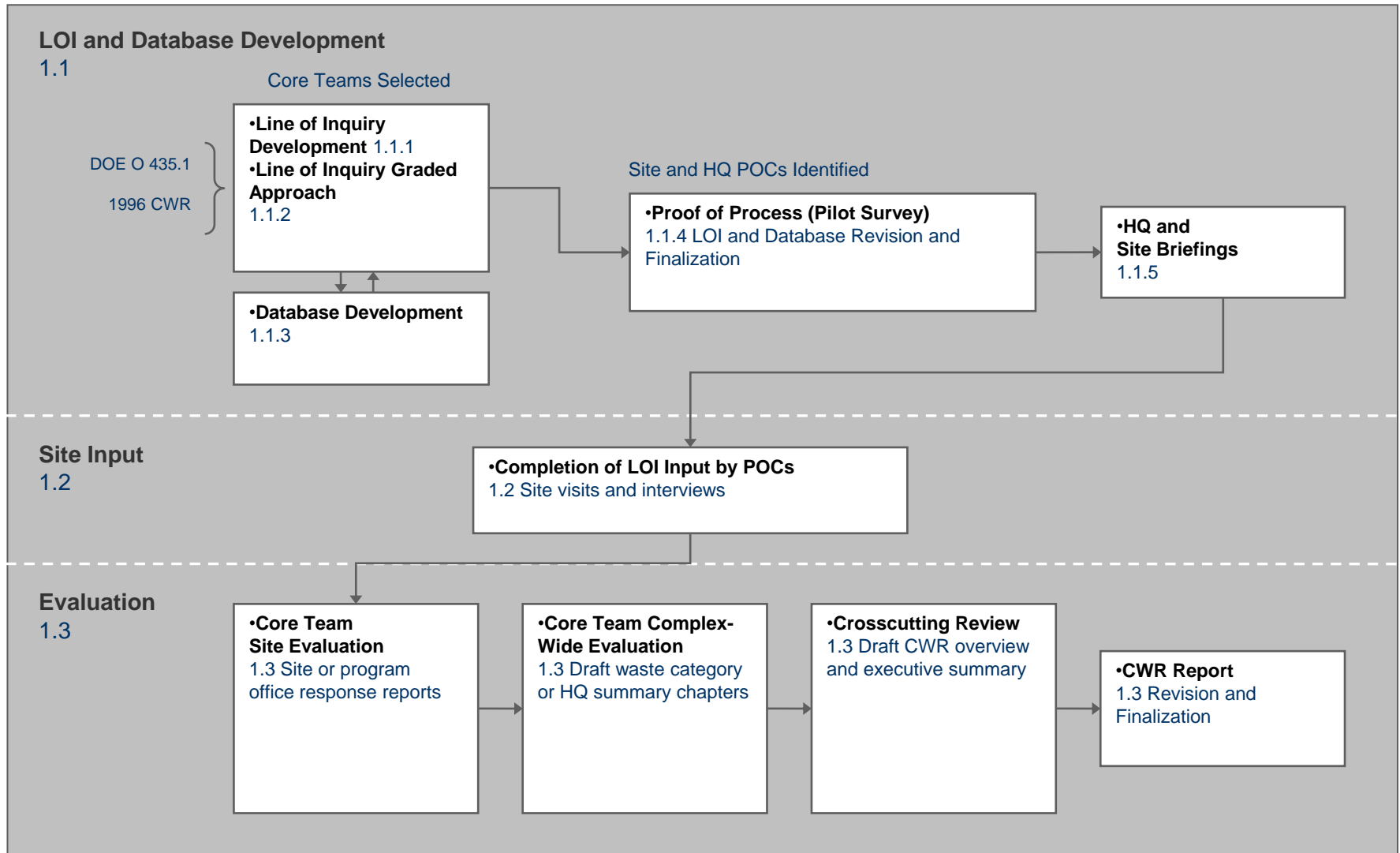


# LOI Development Table

Headquarters CWR Lines of Inquiry Breakdown Table	
Program Office	HQ Responsibility (Number of questions)
Environmental Management (EM)	35
Health, Safety & Security (HS)	15
Legacy Management (LM)	13
National Nuclear Security Administration (NNSA)	13
Nuclear Energy (NE)	13
Science (SC)	13



# LOI & Data Base Process Flow



# Sites and Offices Surveyed

Complex-wide Review - Site and Offices Surveyed	LLW	TRU	HLW	HQ
Ames Laboratory	x			
Argonne National Laboratory	x	x		
Brookhaven National Laboratory	x			
ETEC Boeing	x			
Fermi National Accelerator Laboratory	x			
Fernald Environmental Management Project	x			
Hanford Site	x	x	x	
Idaho National Laboratory	x	x	x	
Kansas City Plant	x			
Lawrence Berkeley National Laboratory	x	x		
Lawrence Livermore National Lab	x	x		
Los Alamos National Laboratory	x	x		
Mound Site	x			
Nevada Test Site	x	x		
Oak Ridge Reservation	x	x		
Pacific Northwest National Laboratory	x			
Gaseous Diffusion Plant	x			
Pantex Plant	x			
Gaseous Diffusion Plant	x			
PPPO (UDS)	x			
Rocky Flats Environmental Tech. Site	x			
Sandia National Laboratories	x	x		
Savannah River Site	x	x	x	
Separations Process Research Unit	x			
Stanford Linear	x			
Thomas Jefferson National Accelerator Facility	x			
Waste Isolation Pilot Plant	x	x		
West Valley Site	x	x	x	
Environmental Management (EM) Program Office				x
Health, Safety & Security (HS) Program Office				x
Legacy Management (LM) Program Office				x
National Nuclear Security Administration (NNSA)				x
Nuclear Energy (NE) Program Office				x
Science (SC) Program Office				x
<b>Totals</b>	<b>29</b>	<b>12</b>	<b>4</b>	<b>6</b>



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# *Survey Results and Core Team Evaluations*

- Over 14,000 individual responses received
  - 100 Percent Site and Program response
- Core Team Evaluation of results
  - **Successes** – Achievement of complex-wide mission, goals or milestones
  - **Best Practices** – Activities and approaches that demonstrated effective implementation of DOE O 435.1
  - **Lessons Learned** – Work practices or approaches shared to promote repeat application or avoid recurrence
  - **Areas of Improvement** – Specific areas of DOE O 435.1 that may not be fully implemented or suggested revisions, additions, or clarifications to DOE O435.1



# Overall Results – Total 68 BP & 139 AI

## Distribution of CWR Responses (62 BP/118 AI waste types)

<u>Category</u>	High Level Waste		TRU Waste		Low Level Waste	
	<u>BP</u>	<u>AI</u>	<u>BP</u>	<u>AI</u>	<u>BP</u>	<u>AI</u>
General		1	3	5	2	11
Generation	5	5	1	4	21	17
Treatment		2	1	3	4	2
Storage	2		1		4	3
WIR	1	9				
Closure	2	1				
Disposal			5	2	7	22
Crosscutting		7	1	6	2	16
FEM						2
<b>Total</b>	<b>10</b>	<b>25</b>	<b>12</b>	<b>20</b>	<b>40</b>	<b>73</b>



# HQ Responses & Findings

- Best Practices (6)
  - Management, planning and integration of the TRU program
  - Low-Level Waste Disposal Facility Federal Review Group (LFRG) process for review of PA/CA
- Areas of improvement (21)
  - Execution of oversight responsibilities by HQ Program Offices/Site Managers
  - Commercial treatment, storage, and disposal exemption process
  - Ensuring the performance assessment requirements are included in legacy management process for sites being closed
  - Ensuring integration of DOE O435.1 and CERCLA closure requirements.



# ***HLW Responses and Findings***

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- Best Practices (10)
  - WIR Citation process has allowed for safe disposition of equipment that had previously come in contact with HLW
- Areas of Improvement (25)
  - Clarifying the requirements for alternative waste forms (other than glass)
  - Integration of NDAA 3116 and DOE O435.1 requirements



# ***TRU Responses and Findings***

- Best Practices (12)
  - Deployment of the central characterization project (CCP) has increased the efficiency and accuracy of TRU waste characterization
  - Establishment and implementation of the TRU Corporate Board was used as the standard for establishing other waste-type Corporate Boards
- Areas of Improvement (20)
  - Improvements in integration in waste handling could be experienced if there were a single contractor for TRU management at each site.
  - Identification of annual disposal goals should be included in site waste management planning documents in order to improve consistency and reduce rework.
  - Improvements in the disposal process for classified TRU need to be made.



# LLW Responses and Findings

- Best practices (40)
  - Establishment of the LFRG and its manual and guidance has improved consistency with requirements of DOE O 435.1.
  - Adoption of a "one touch" philosophy which stipulates that at the point of generation, waste will be packaged, classified, and characterized in full compliance with its disposition pathway to minimize overall worker risk and to promote consistency.
  - Implementation of the Unreviewed Disposal Question Evaluation (UDQE) procedure at Savannah River Site is the standard for determining the impact to the PA and CA when proposed actions or new information is discovered.
  - LLW Corporate Board (LLWCB) effective in providing forum for sharing information across DOE sites
- Areas of improvement (73)
  - Clearly establishing DOE's authority to take ownership of radioactive material that is in the national interest
  - There is a need for consistent implementation of radioactive waste management requirements for those sites that have multiple contractors, Field Offices and Program Offices responsibilities.
  - Clarifying the appropriate use of concentration averaging
  - Integrating requirements from DOE O 435.1 and those of other regulations such as RCRA, CERCLA, 40 CFR 191, 10 CFR 61 and, NDAA 3116.



# Key Findings/Issues – Executive Summary

1. Significant progress has been made in radioactive waste management over the last 10 years
2. Establishing LFRG has improved consistency in PA/CA reviews
3. New requirements (e.g. NDAA 3116 for tank closures) should be included in the DOE O435.1 update
4. Identification of disposal paths for certain waste with no path for disposal (e.g. non-defense TRU)
5. Clarifying definitions for: fission products in sufficient concentrations; classified material and spent nuclear fuel reprocessing in DOE O435.1
6. Improving Program Office and Site Managers oversight responsibilities and consistent implementation of requirements involving multiply site contractors and/or program offices
7. Improved implementation of other DOE Orders (e.g. classified material) and outside regulatory agencies (e.g. RCRA, CERCLA) requirements that have overlapping requirements with DOE O435.1
8. Modify the current commercial disposal exemption process requirements for LLW

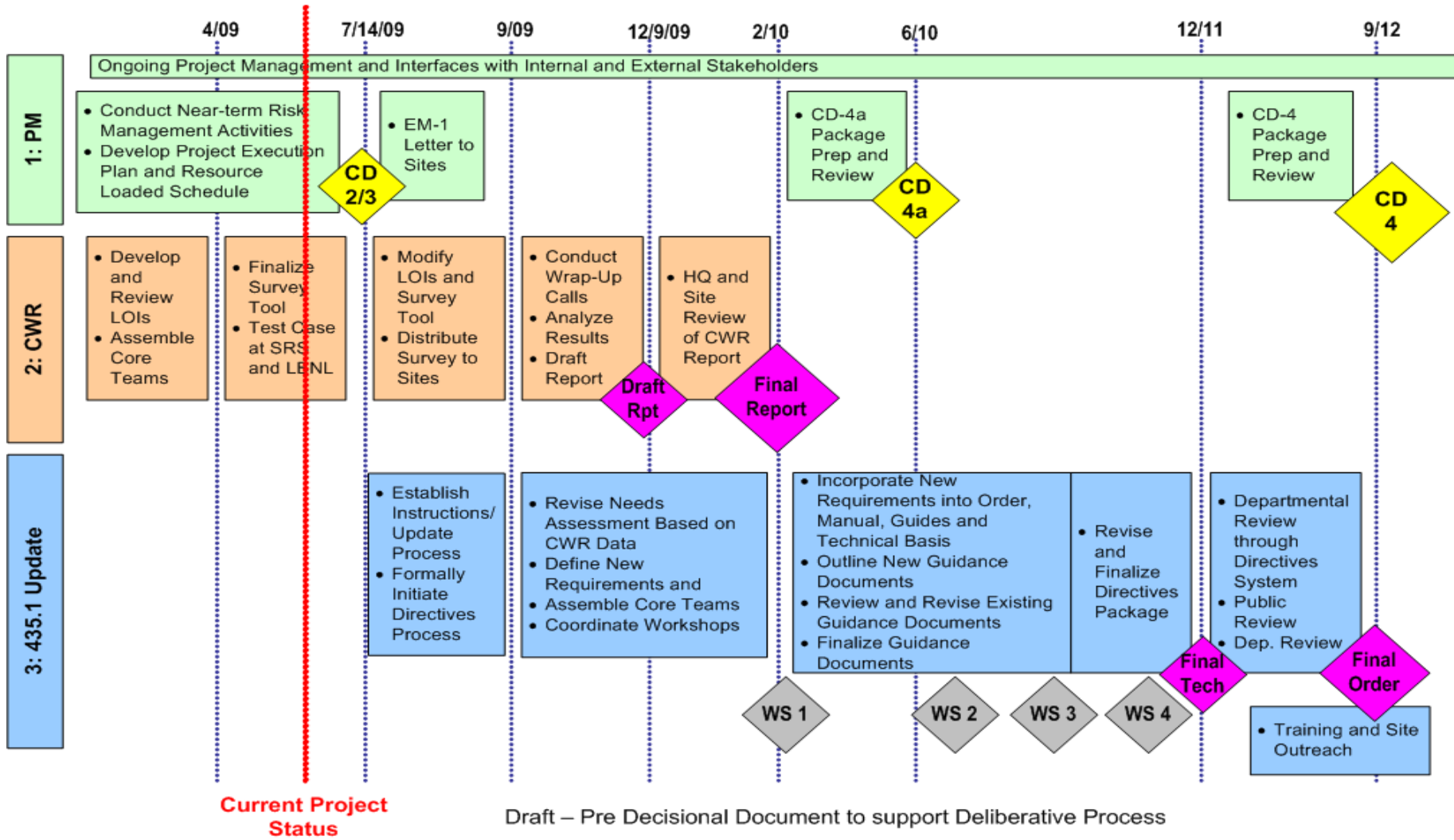
# ***CWR Status***

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- Presented results to Senior Technical Advisors – ***February 2010***
- Finish internal review draft report – ***March***
- Input to DOE O435.1 update teams – ***April***
- Input provided to the LLW Corporate Board - ***June***
- HQ final review – ***July***
- CWR approved – ***July***
- CWR available for distribution – ***August 2010***



# CWR and 435.1 Update Integrated Schedule



# ***DOE O435.1 Update Status***

- Developed methodologies for updating 435.1
  - Using same approach as 1999 order revision
- Established chapter-specific Core Teams
  - **General Requirements – Linda Suttora**
  - **LLW – Frank DiSanza**
  - **HLW – Joel Case**
  - **TRU – J.R. Stroble/Alton Harris**
- Developed algorithm for processing input information
  - Established website for establishing baseline information and changes to Order, Manual, Guide & Technical Basis



# Status of DOE O435.1 Update

- Four core team workshops
  - Workshop #1- April 2010 – Portland
    - Established core teams
    - Developed plans and schedules
    - Team assignments
    - Expectations
  - Workshop #2 – **October 25<sup>th</sup>** – Salt Lake City
    - Status
    - Crosscutting issues
    - Technical Standards (rogue guides)
    - Team consistency
  - Workshops #3 & 4 - TBD



# Status of DOE O435.1 Update

- Team membership established – **EFCOG** highly supportive
  - Each team established plan for review/revision of requirements/guide
    - Goal is to have Manual revisions complete in August/September with Guide and Technical basis complete in October/November time frame
    - Workload divided by chapter and letter requirement
    - Communication through GoToMeeting, conference calls, individual team meetings to resolve issues and write requirements
- Weekly core team conference calls
  - Crosscutting issues – requirements common to all waste types will be included in General Requirements, Chapter I
  - Status



# GENERAL CORE TEAM ASSIGNMENTS

<i>Name</i>	<i>Affiliation</i>	<i>Phone</i>	<i>Email</i>
Linda Suttora	Environmental Management	(301) 903-8482	Linda.Suttora@em.doe.gov
Joe Boda	Nuclear Energy	(301) 903-7123	Joseph.Boda@energy.doe.gov
Joe Desormeau	Legacy Management	(970) 248-6034	Joe.Desormeau@lm.doe.gov
Tom Longo	National Nuclear Security Administration	(301) 903-8120	Thomas.Longo@nnsa.doe.gov
John Tseng	Savannah River Site	(803) 557-6584	john.tseng@srs.gov
Dennis Knapp	Savannah River Site	(803) 952-4670	dennis.knapp@srs.gov
Danny Smith		(703) 549-9128	danny_smith_rpe@msn.com
Emily Macdonald	Sapere Consulting	(509) 524-2344	emacdonald@sapereconsulting.com
Ed Regnier	Health, Safety, & Security	(202) 586-5027	Edward.Regnier@hq.doe.gov
David Michlewicz	Science	(301) 903-8432	David.Michlewicz@science.doe.gov
Eric Pierce	Pacific Northwest National Lab	(509) 308-2703	eric.pierce@pnl.gov
Mark Senderling	Environmental Management	(301) 903-7514	Mark.Senderling@em.doe.gov
Warren Black	Environmental Management	(301) 540-5944	Warren.Black@em.doe.gov



# LLW CORE TEAM ASSIGNMENTS

Requirement	Federal Steering Panel	Subject Matter Experts
IV.A. Definition of LLW	Christine Gelles	Doug Tonkay Elmer Wilhite
IV.B. Management of Specific Wastes	Christine Gelles	Doug Tonkay Susan Krenzien Nancy Rothermich
IV.C. Complex-Wide LLW Management Program	Christine Gelles	Doug Tonkay Howard Pope
IV.D. RWMB	Julie Conner	Jhon Carilli Howard Pope Sonny Goldston Lisa Harvego
IV.E. Contingency Actions	Joanna Tinnirella	Howard Pope Bob Petras
IV.F. Corrective Actions	Amanda Anderson	Howard Pope Susan Krenzien
IV.G. Waste Acceptance	Gary Pyles (RL)	Greg Geisinger John Patterson
IV.H. Waste Generation Planning	Gary Pyles (RL)	Doug Tonkay Jhon Carilli *Kerri Crawford
IV.I. Waste Characterization	Jim Donnelly	Kent Mcdonald S.Goldston/G.Humphries *Kevin Mitchell
IV.J. Waste Certification	Jim Donnelly	Greg Geisinger Bob Petras *(Off-site Certification Expert)
IV.K. Waste Transfer	Gary Pyles	Greg Geisinger John Patterson
IV.L. Packaging and Transportation	Frank Disanza	Bob Petras Howard Pope
IV.M. Site Evaluation and Facility Design	Julie Conner	Jhon Carilli Lisa Harvego *(LEX Representative) Roger Seitz Bob Hiergesell
IV.N. Storage and Staging	Tony Bindokas	Kent Mcdonald Bob Petras
IV.O. Treatment	Tony Bindokas	Kent Mcdonald *Brian Moran Mary Willcox Bob Petras



# LLW CORE TEAM ASSIGNMENTS

<b>IV.P. Disposal</b>	Frank Disanza	
<b>IV.P.(A) Performance Objectives - PA/CA Development and Maintenance</b>		Elmer Wilhite
		Roger Seitz
		Bob Hiergesell
		John Patterson
		*Jeff Sondrup
		*Art Rood
		*Joe Williams/Jason Jarby
		* Vefa Yucel
		*Marc Wood
		*Sean French
*Rob Shuman		
Steve Golian		
Will Nichols		
<b>IV.P.(B) DAS - Facility Operations - Special Considerations</b>		Sonny Goldston
		Howard Pope
		Susan Krenzien
<b>IV.Q. Closure</b>	*Amanda Anderson	Steve Golian
		John Patterson
		*Mark Phifer
<b>IV.R. Monitoring</b>	Joanne Tinnirella (NNSA-HQ)	Bob Petras
		Bob Hiergesell
		Roger Seitz
		Steve Thomas
		*(Oak Ridge Rep)
		*Maggie Millings
		*Jane Powell



# HLW CORE TEAM ASSIGNMENTS

Letter Requirement	Team Members <i>(Team leader(s) marked with an *)</i>
A - Definition of High-Level Waste	Bill Hewitt* Jim McNeil* Ginger Humphries
B - Waste Incidental to Reprocessing	Bill Hewitt* Jim McNeil* Linda Lehman Steve Thomas
C - Management of Specific Wastes	Bill Hewitt* Jim McNeil*
D - Complex-Wide High-Level Waste Management Program	Ginger Humphries* Jim Beck
E - Site-Wide Radioactive Waste Management Program	Ginger Humphries* Jim Beck
F - Radioactive Waste Management Basis	Ginger Humphries* Jim Beck
G - Quality Assurance Program	Jim Beck* Roy Grant*
H - Contingency Actions	Jim Beck
I - Corrective Actions	Joel Case
J - Waste Acceptance	Dan Sullivan
K - Waste Generation Planning	Linda Lehman* Ginger Humphries



# HLW CORE TEAM ASSIGNMENTS

L - Waste Characterization	Joel Case* Steve Thomas
M - Waste Certification	Dan Sullivan* Jim McNeil
N - Waste Transfer	Jim McNeil Steve Thomas* Bill Hewitt Ginger Humphries
O - Packaging and Transportation	Jim Beck
P - Site Evaluation and Facility Design	Joel Case* Ron Koll Jim Beck
Q - Storage	Jim Beck* Roy Grant*
R - Treatment	Bill Hewitt* Jim Beck Roy Grant
S - Disposal	Linda Lehman* Joel Case
T - Monitoring	Steve Thomas Ron Koll
U - Closure	Steve Thomas CERCLA expert (Steve Golian or John Patterson) Linda Lehman Bill Hewitt*
EV - Specific Operations	Joel Case



# TRU CORE TEAM ASSIGNMENTS

Requirement	Federal Steering Panel	Subject Matter Experts	Status (2010_07_01)
<b>III.A. Definition of Transuranic Waste</b>	J.R. Stroble	Mark Doherty	Introduce Defense Determination (DD) here. CBFO counsel will be contributing new draft language. Mark to upload initial comments.
<b>III.B. Management of Specific Wastes</b>	Alton Harris	Mark Doherty	<i>A. Harris still reviewing Mark's suggested comments. This section may be the appropriate place to add the following specific wastes: TRU previously managed as HLW, classified TRU waste, commercial TRU waste, and other TRU waste not eligible for disposal at WIPP. The approach needs to be discussed with the TRU Core Team before going forward. (A. Harris 6/17/10)</i>
<b>III.C. Complex-Wide Transuranic Waste Management Program</b>	Alton Harris	Tim Burns	<i>This section is still relevant and needs updating. The development of this item requires coordination with the director of the National TRU Program. The construct of the complex-wide transuranic waste management program and plan likely needed to include elements in the TRU acceleration plan. A draft revision of the manual, technical basis, and guide should be ready by July 1. (A. Harris 6/17/10).</i>
<b>III.D. RWMB</b>	Robert Kong	Lee Fox (or delegate) Lori West Sean Dunagan	Cross cutting. Rob to coordinate with Gary Pyles. Gary to pass cross cutting issues to LLW team.
<b>III.E. Contingency Actions</b>	J.R. Stroble	Tim Burns	<i>Recommended No Changes</i>
<b>III.F. Corrective Actions</b>	Alton Harris	Lori West	<i>Linda Suttora (General Requirements Core Team Lead) concurs that the Corrective Action section for all waste types will be moved to the General Requirements Chapter. Based on this input, no further action is intended for this section in the TRU Waste Chapter. (A. Harris 6/17/10).</i>
<b>III.G. Waste Acceptance</b>	J.R. Stroble	Sean Dunagan	Being reviewed. DD to be referenced (introduced in III.A). Reference rogue guidance if appropriate. RH packaging instructions to be introduced, and subsequently referenced in letter requirements (e.g. WIP, DD) as applicable.



# TRU CORE TEAM ASSIGNMENTS

<b>III.H. Waste Generation Planning</b>	Bert Crapse	Lee Fox Tim Burns Lori West	Being Reviewed. Lee to coordinate with Bert.
<b>III.I. Waste Characterization</b>	J.R. Stroble Lee Bishop George Henckel	Mark Doherty Tim Burns Rod Hollister	No update
<b>III.J. Waste Certification</b>	J.R. Stroble Lee Bishop George Henckel	Mark Doherty Tim Burns Rod Hollister	Mark to complete and upload comments.
<b>III.K. Waste Transfer</b>	Gary Pyles	Lee Fox Lori West	No update
<b>III.L. Packaging and Transportation</b>	Robert Kong	Lori West Dave Haar Tim Burns Rod Hollister	No update
<b>III.M. Site Evaluation and Facility Design</b>	J.R. Stroble	Sean Dunagan	Being reviewed – May be no changes.
<b>III.N. Storage and Staging</b>	George Henckel	Tim Burns Lee Fox	<i>Being reviewed</i>
<b>III.O. Treatment</b>	Alan Jines	Lori West Tim Burns	No Update
<b>III.P. Disposal</b>	J.R. Stroble	Lori West Sean Dunagan	No Update
<b>III.Q. Monitoring</b>	Alton Harris	Sean Dunagan	No Update <i>This section will be reported on during the next call. A. Harris 6/17/10).</i>

