



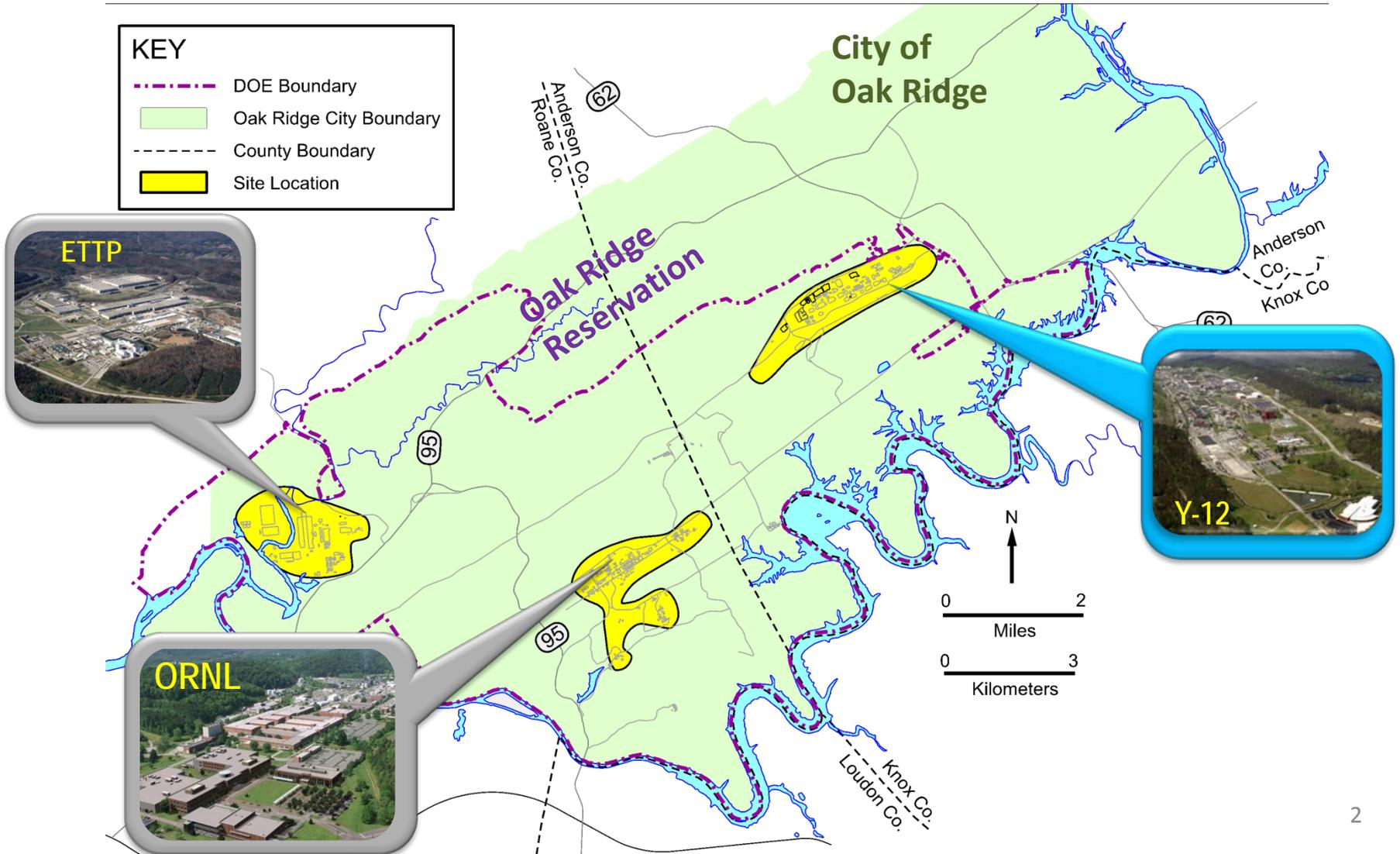
Strategic Plan for Mercury Remediation at Y-12

Laura Wilkerson
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ORSSAB Meeting
April 9, 2014

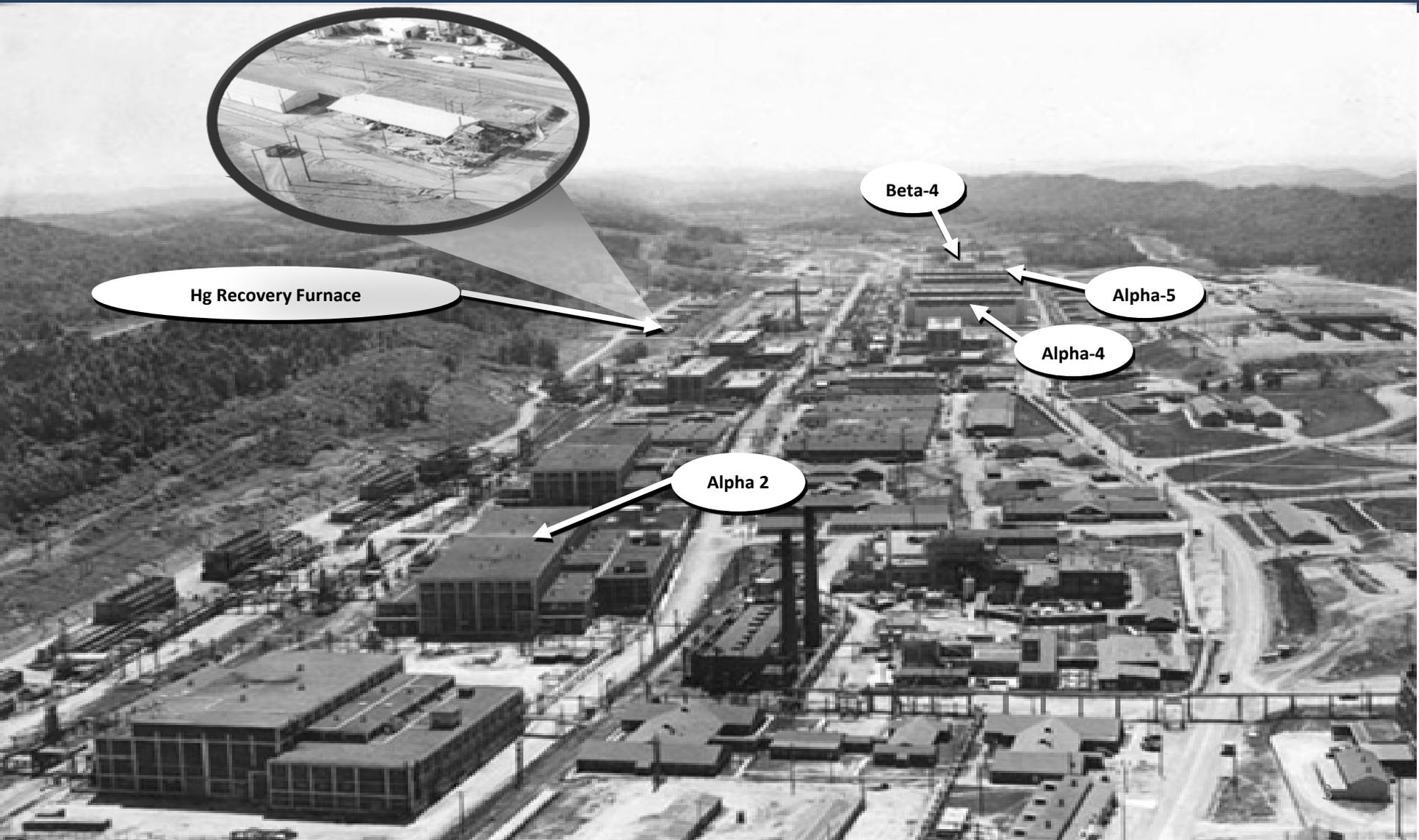


Y-12 National Security Complex (Y-12)





Mercury Contamination Resulted from Historical Operations



Hg Recovery Furnace

Alpha 2

Beta-4

Alpha-4

Alpha-5



Historical Mercury Releases

- From 1950s – 1963 more than 20 million pounds of mercury were used at Y-12 in a process that separated lithium isotopes for weapons production
- Approximately 2 million pounds of mercury were unaccounted for
- Of the 2 M pounds, over 700,000 pounds suspected to have been released to the environment (air, surface water, soils/sediments)

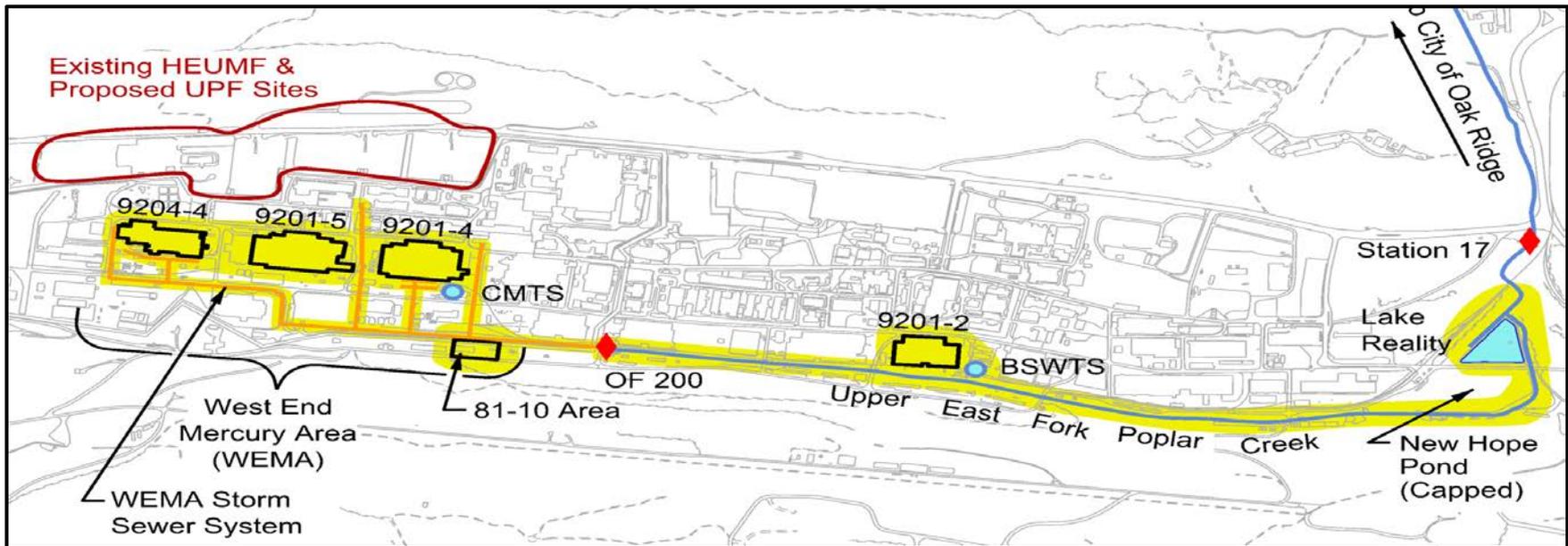


Y-12 workers unload and dump mercury flasks circa 1955



Mercury Cleanup Objectives at Y-12

- Reduce mercury flux leaving site and entering public waters
- Remove or stabilize mercury sources (buildings and soil/sediment)
- Remove and dispose of excess, deteriorating facilities
- Remediate land and make available for future needs and missions



Legend

	Water Boundary
	Building
	Mercury Contamination
	Storm Drain

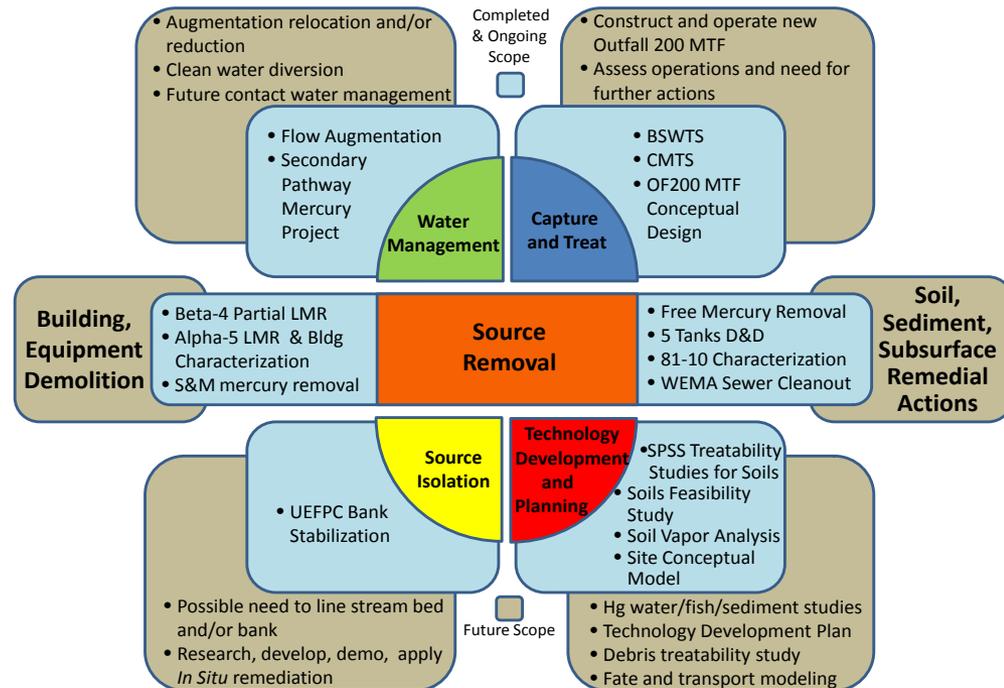
Acronyms

BSWTS	- Big Spring Water Treatment System
CMTS	- Central Mercury Treatment System
HEUMF	- Highly Enriched Uranium Materials Facility
OF	- Outfall
UPF	- Uranium Processing Facility



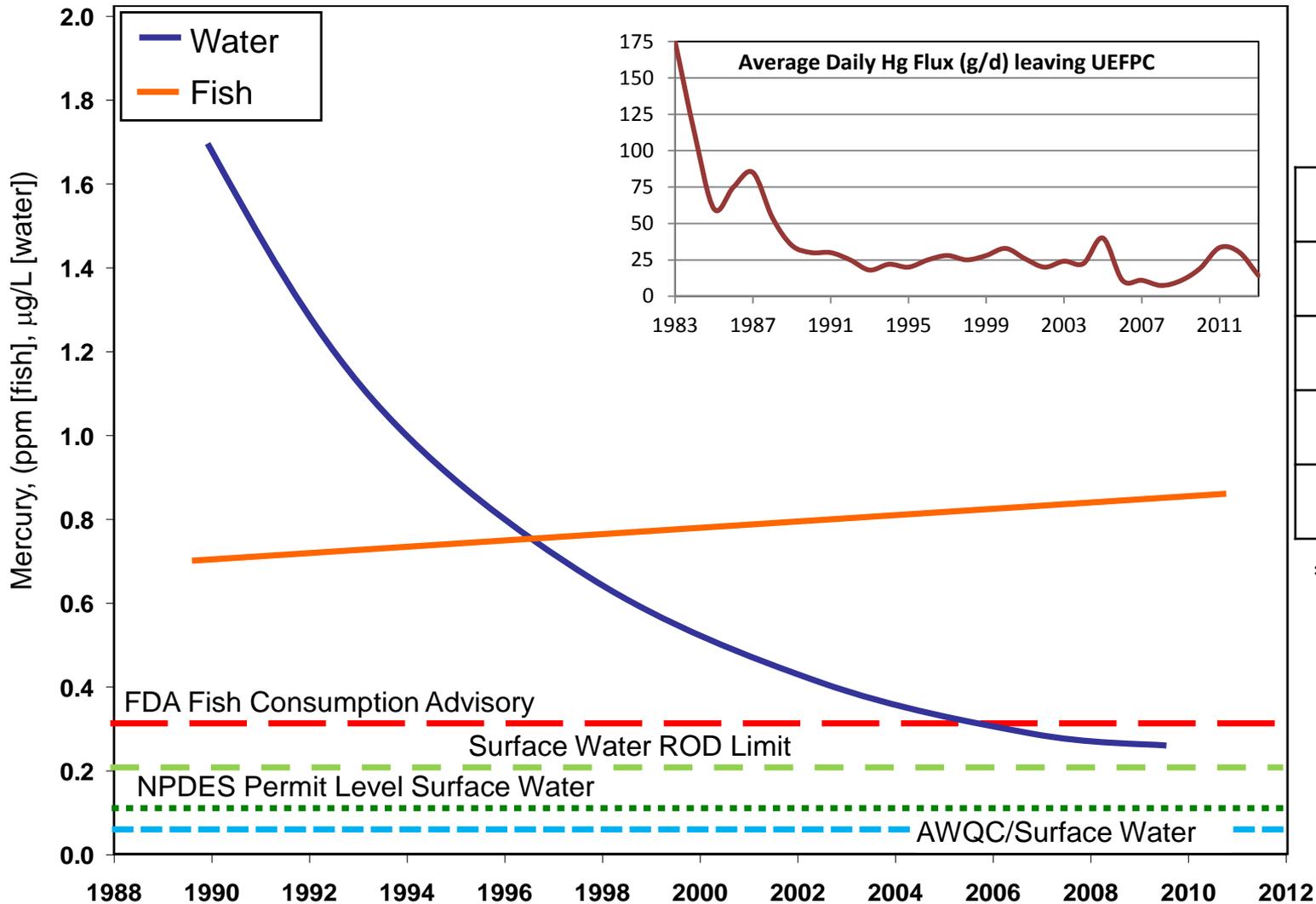
Mercury Strategic Plan Background

- Draft Strategic Plan submitted March 2013, followed by Mercury Workshop in August 2013; Strategic Plan updated and final issued January 2014
- Mercury contamination is a complex problem that requires a phased deliberate, and multi-pronged approach that is responsive and adaptive
- Strategy includes near term and long term actions to complete mercury remediation at Y-12





Near-Term Goal: Reduce Mercury Discharges to Surface Water

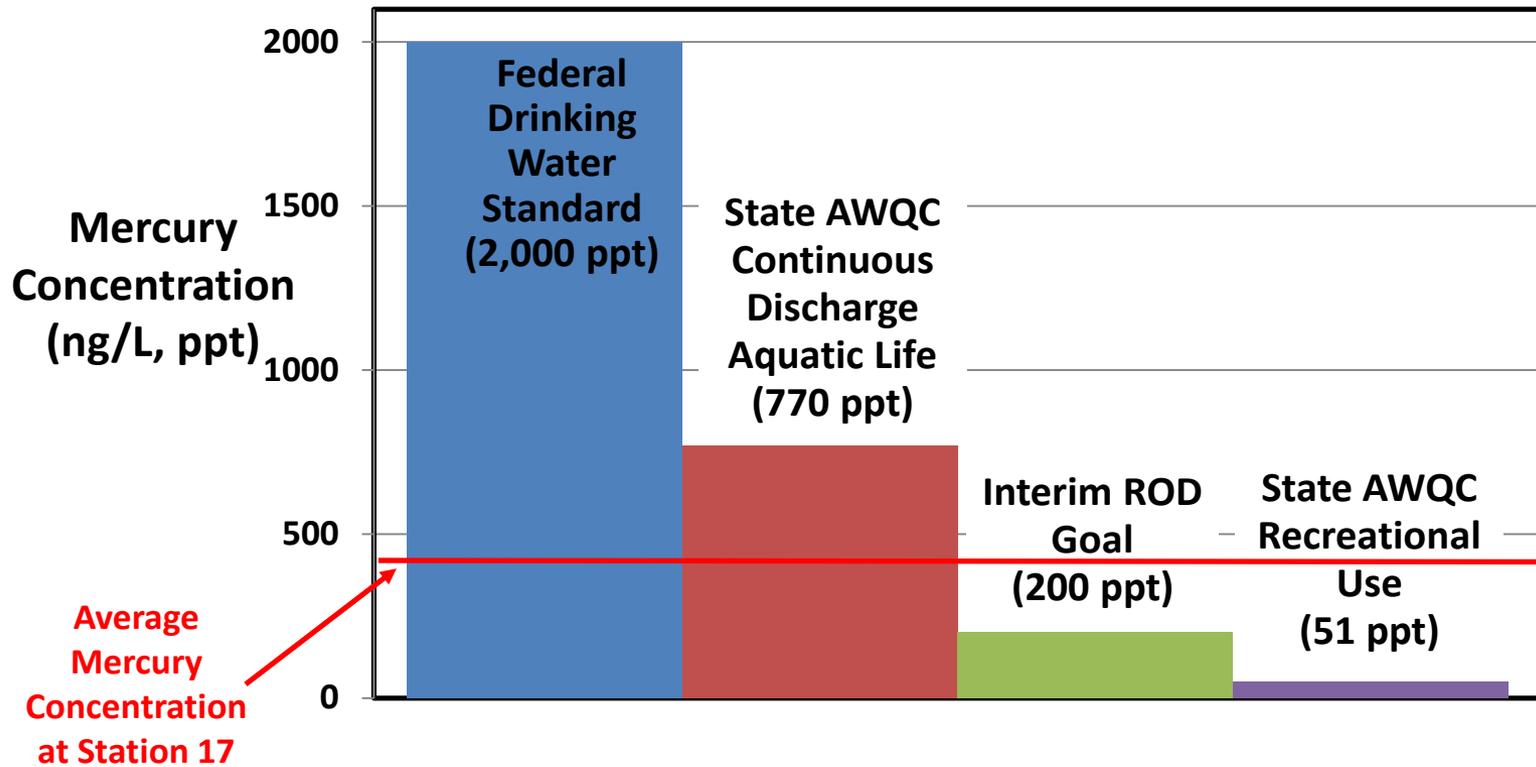


Mercury Flux (kg/yr)	
2009	3.90
2010	7.00
2011*	12.20
2012	11.10
2013	5.20

**WEMA Storm Sewer Cleanout*



Regulatory Standards for Mercury in Water





Near-Term Plan

Proposed Mercury Treatment Facility

- Revised conceptual design to be submitted for regulatory review in April
- Conceptual Design
 - To treat flow at OF 200
 - Capacity 3,000 gallons per minute
 - Allows for further expansion – modular and scalable design
- FY 2014/15: Studies to refine treatment parameters, examine storm and process flows for possible diversion, characterize site
- Mercury remediation goals
 - Reduce mercury flux leaving creek and entering public waters
 - Provide future mercury reduction capabilities for wastewater projected to be generated during large-scale demolition
- Line Item Capital Project
 - Preliminary design planned to begin in FY 2015
 - Operational by FY 2020





Mercury Treatment Facility Schedule

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021																			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																
CERCLA Documents																																																
*D2 RDWP	[Blue]		[Red]																																													
*Focused FS/Proposed Plan	[Blue]		[Red]		★ 9/30/2014																																											
*UEFPC Ph I ROD Amendment					[Blue]		★ 9/30/2015																																									
*Remedial Design Report									[Blue]		★ 9/30/2016																																					
*Remedial Action Work Plan									[Blue]				[Red]		★ 9/30/2017																																	
Pre-Design Studies																																																
*Multiple studies (e.g., storm flow)	[Yellow]		[Yellow]																																													
Design																																																
*Prepare Design Plan & Criteria	[Green]																																															
*Preliminary Design					[Green]																																											
*Final Design					[Green]																																											
Site Development/Construction																																																
*Construction													[Orange]				[Orange]				[Orange]				[Orange]																							
*Facility Startup																																																
																									[Orange]																							
DOE HQ Approval																																																
*Prepare/Submit Critical Decisions	[Purple] CD-1		[Purple]		[Purple] CD-2/3				[Purple]				[Purple]																																			
*HQ Review/Approval	[Purple]		[Purple]																																													

[Red] Review and approvals under CERCLA. ★ = FFA Appendix E Milestones.



Ongoing Studies/Actions

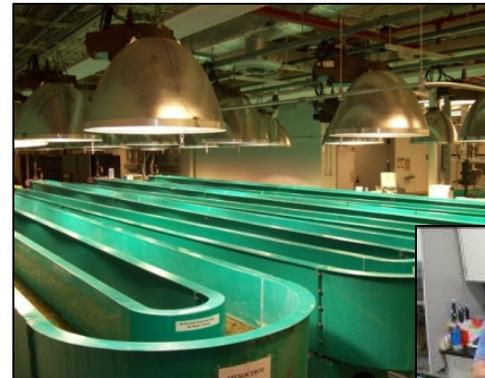
- UEFPC flow augmentation to be eliminated
 - Began in 1996, 4.5 M gal per day flow added per NPDES permit requirement
 - Increases mercury flux due to re-suspension of sediment
- Ongoing field studies in EFPC and related laboratory studies
 - Fish mercury/population studies and trends
 - Methylation studies
 - Mercury sources in LEFPC (bank erosion studies, sediment characterizations)
 - Floodplain mercury bioaccumulation studies (spiders)



...in the FIELD



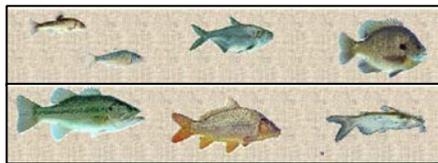
...in the Laboratory



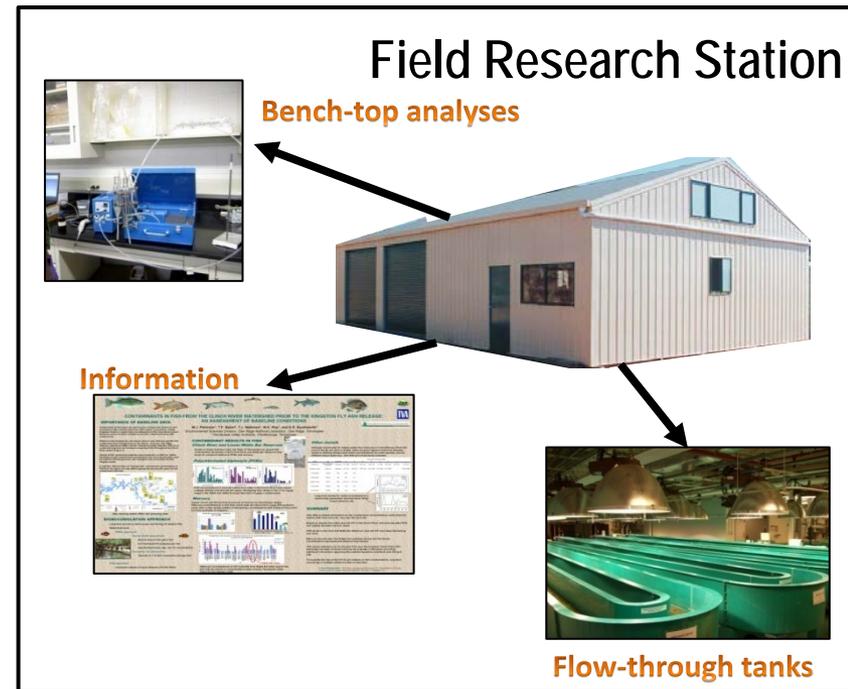


Additional Near-Term Studies Proposed

- Proposed studies outlined in Mercury Strategic Plan planned to begin this FY, based on sufficiency of funding and priorities
 - Field Research Station
 - Eco-Enhancement
 - Water Chemistry Manipulations
 - LEFPC Sediment/Bank Stabilization
 - UEFPC Sediment Stabilization/Removal
 - Reclassification of UEFPC (OF200 to St. 17)

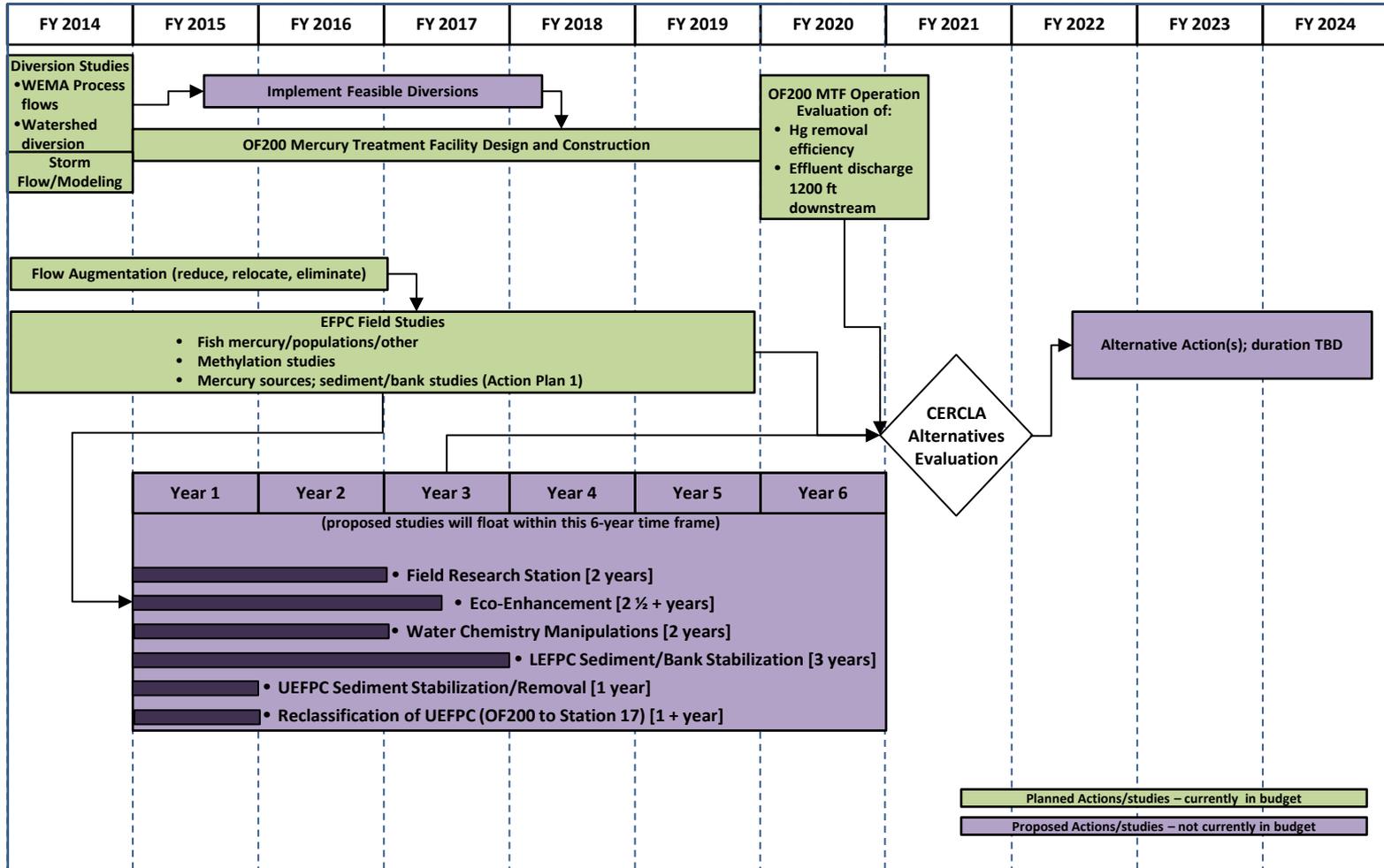


Eco-Enhancement





Near-Term Approach





Long-Term Goal: Mercury Source Remediation

Y-12 Mercury-use Facilities



Beta 4



Alpha 2



Alpha 4



Alpha 5

- Four large former mercury use buildings to be demolished
- Local soil remediation to follow each building demolition
- Cleanup to occur along side ongoing missions and within high security footprint
- Remediation to include UEFPC sediments and Lake Reality



Y-12 Mercury Clean-up Schedule

Oak Ridge Environmental Management Planning Baseline – Y-12	Fiscal Years (2014 – 2046)					
	14 - 17	18 – 22	23 - 27	28 - 32	33 - 37	38 - 46
Mercury-Related D&D and RA Scope						
Outfall 200 Mercury Treatment Facility Planning, Construction (■) and Operation (□)	[Dotted pattern]					
Ongoing/Proposed Field/Laboratory Studies (□) Possible Follow-on Actions (■, duration?)	[Dotted pattern]					
Mercury-Use Facility D&D and RA	[Dotted pattern]					
Other Mercury-Related RA and RODs	[Dotted pattern]					

 = CERCLA Alternatives Evaluation



Summary of Strategic Plan

- Plan presents phased approach to reaching goals, including in-stream AWQC for mercury, 51 ppt
- Near-Term Plans (Interim Actions)
 - Outfall 200 Mercury Treatment Facility design, construction, operation
 - Ongoing fish-mercury studies, bank studies, flow augmentation modification
 - Proposed eco-enhancement, water chemistry, stabilization studies
- Long-term plans for source removal
 - Building demolition
 - Soil remediation
 - UEFPC sediment and Lake Reality remediation