



100-K Area Remediation

Summary of Draft
Remedial
Investigation/Feasibility
Study and Proposed Plan

October 2011

Purpose

- The 100-K Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan has been submitted to the Regulators
- This presentation provides an informational overview of the RI/FS and Proposed Plan
- The documents are still considered draft, and we will be working with the regulators on clarifications and revisions
- Public comment on the Proposed Plan is anticipated in Spring 2012

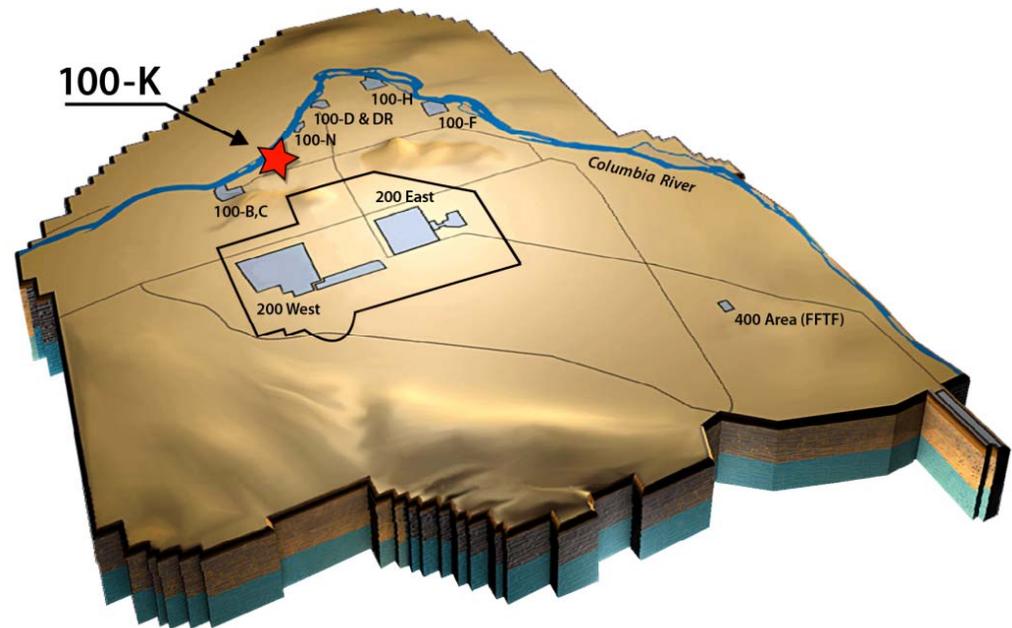
Overview

- Six River Corridor Remedial Investigation/Feasibility Studies (RI/FS) and Proposed Plans.
 - 100-K is the first
 - Remaining Proposed Plans by December 2012
 - Proposed Plans:
 - Considers the extensive work under Interim Actions
 - Evaluates the effectiveness of the Interim Actions
 - Propose additional actions needed to complete cleanup of the River Corridor

Location of 100-K Operable Unit

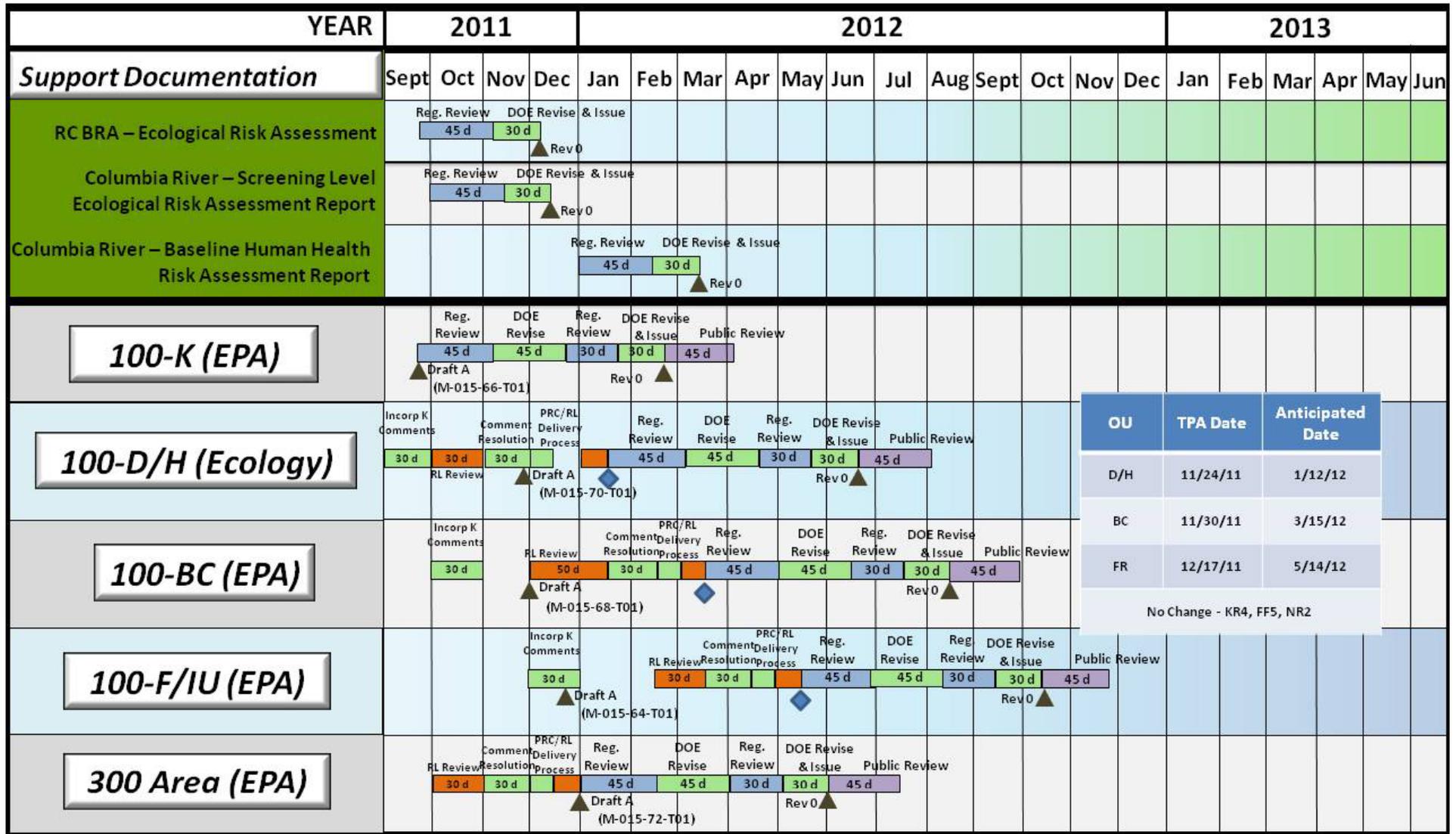
River Corridor consists of six cleanup areas (Operable Units):

- 100-BC
- 100-K – focus of this RI/FS
- 100-D/H
- 100-N
- 100-F/IU
- 300 Area



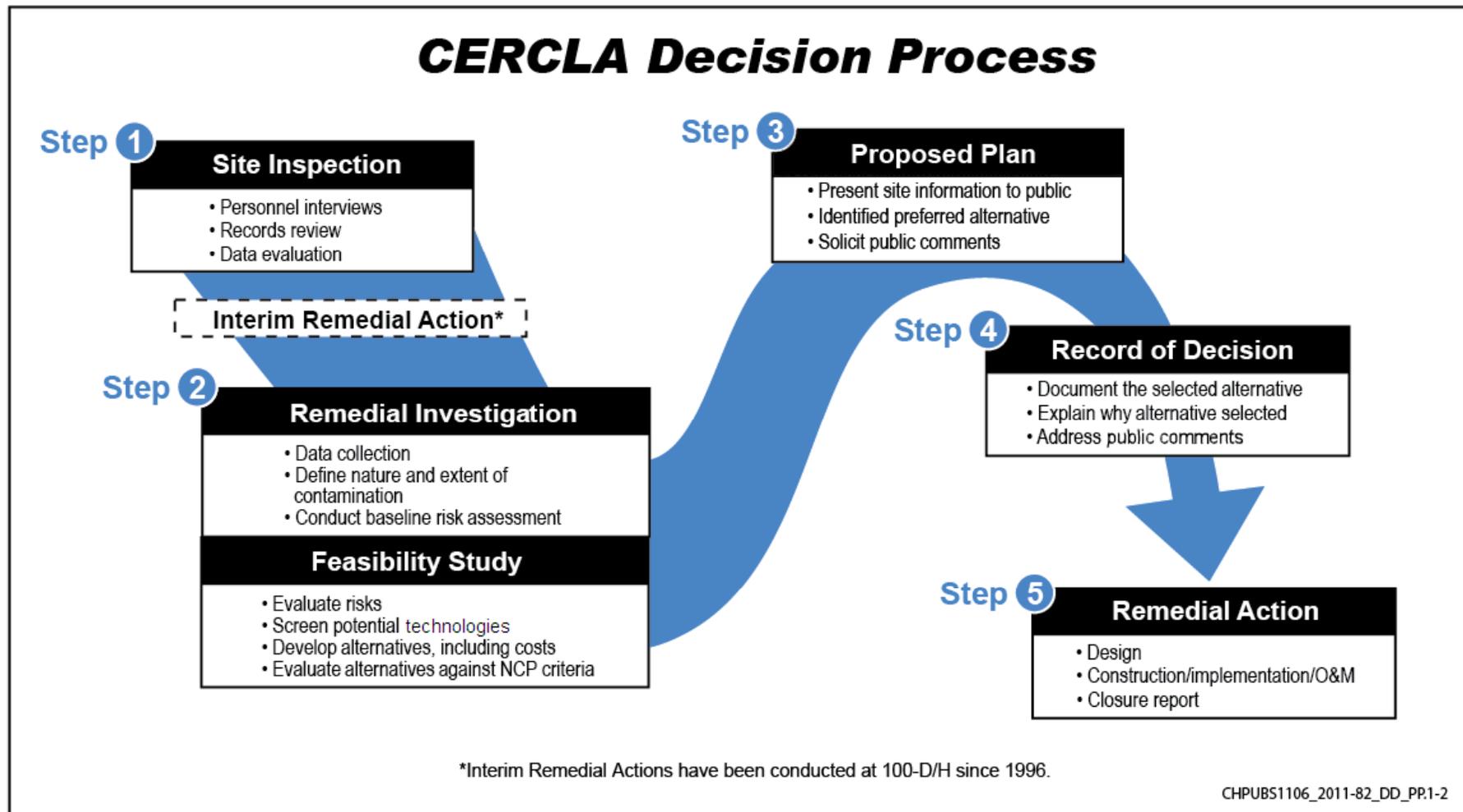
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River Corridor Decision Documents



DRAFT

CERCLA Process



RI/FS Structure

- Structure of the document
 - Introductory information
 - Data Collected and Used (including cleanup work to date)
 - Site Description
 - Nature and Extent of Contamination
 - Fate and Transport of Contamination
 - Human Health and Groundwater Risk Assessment
 - Ecological Risk Assessment
 - Cleanup Technologies
 - Description of Alternatives for Cleanup
 - Analysis of Alternatives for Cleanup

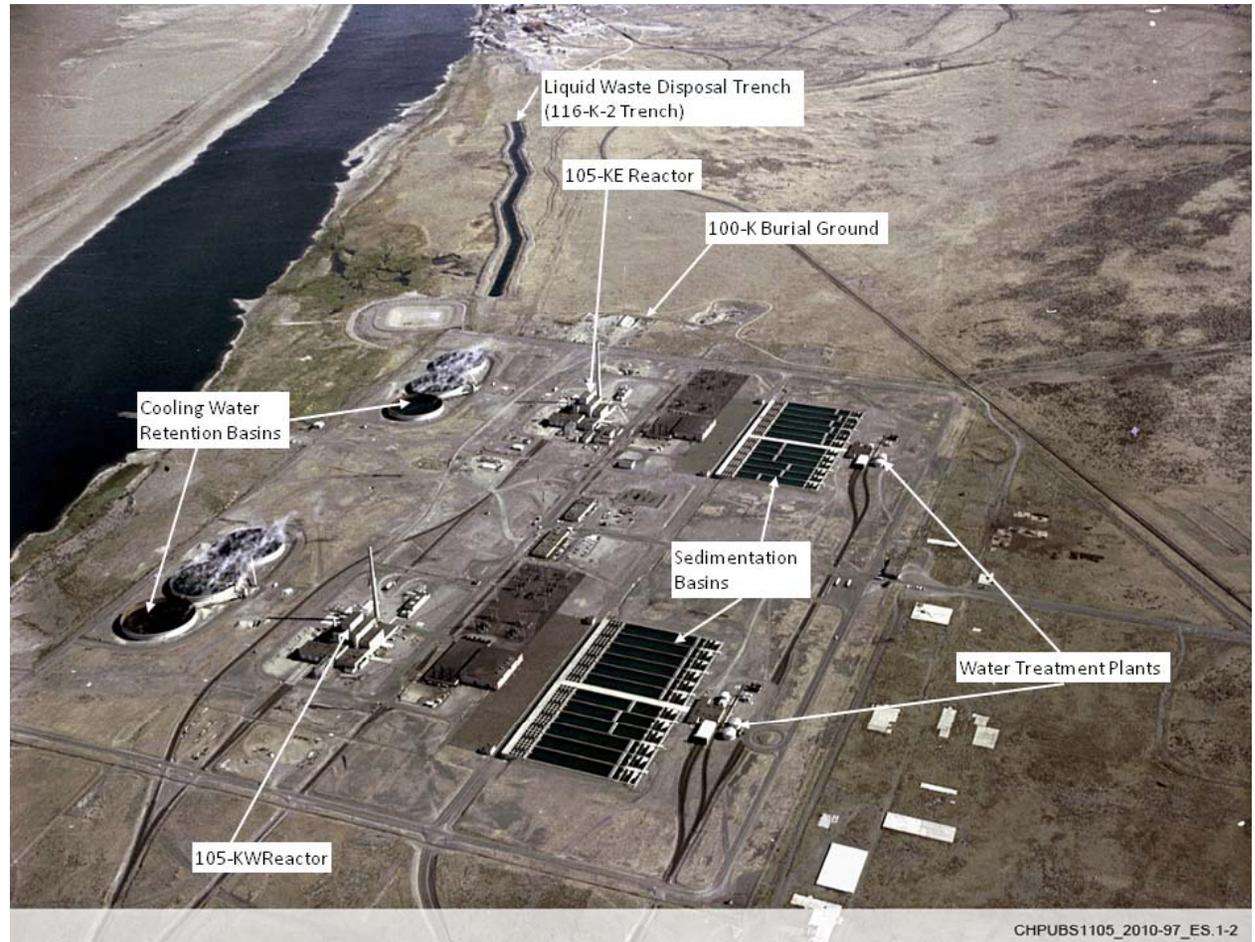
100-K Background

The 100-K area includes:

- two former nuclear reactors
- support facilities
- solid waste burial grounds
- liquid disposal trenches and cribs

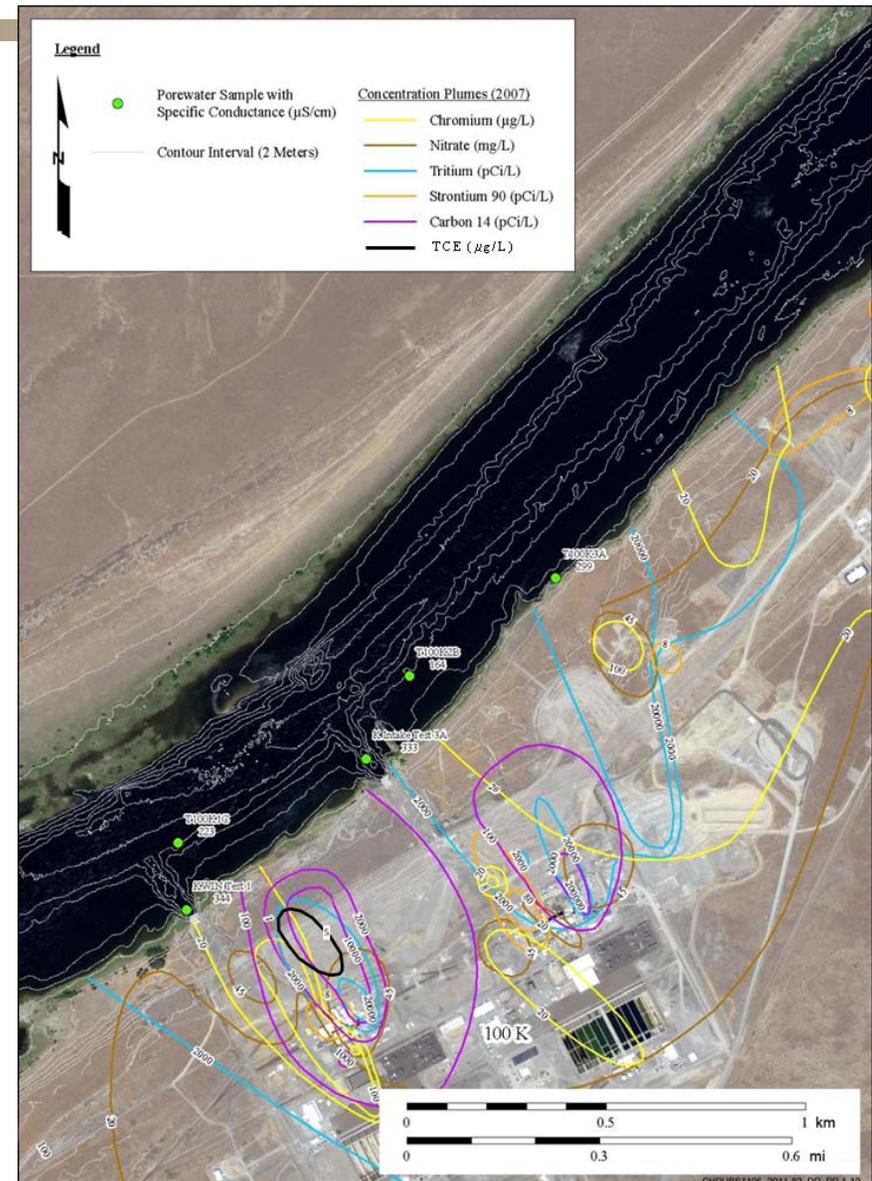
Past operations resulted in:

- 165 waste sites
- contaminated facilities
- contaminated groundwater plumes



100-K Background

- Current pump-and-treat systems to protect the river by treating the hexavalent chromium plume
- Remedial investigation performed to better define nature and extent of contamination
- Other groundwater contaminants identified: **Chromium, Nitrate, Trichloroethene, Strontium-90, Carbon-14, and Tritium**
- Ongoing soil/facility cleanup actions



Nature and extent of contamination assessment

- Nature and Extent of Contamination, and Fate and Transport of Contaminants was developed using:
 - Extensive site history was evaluated to identify areas and contaminants of interest
 - Review of historic data and Interim Action Record of Decision (IAROD) cleanup verification data
 - Additional data collected through the EPA approved 100-K RI/FS Work Plan addendum

River Corridor Baseline Risk Assessment – Human Health Key Findings

Risk Assessment based on State Unrestricted Use and Residential Scenarios

Scenario	Waste Sites with Acceptable Risk	Waste Sites with Acceptable Risk - 2075	Waste Sites with Future Potential Risk after 2075
Residential (Cancer)	142	153	3*
Residential (Non-cancer)	154	154	2*

Note: Data presented here are based on CVP

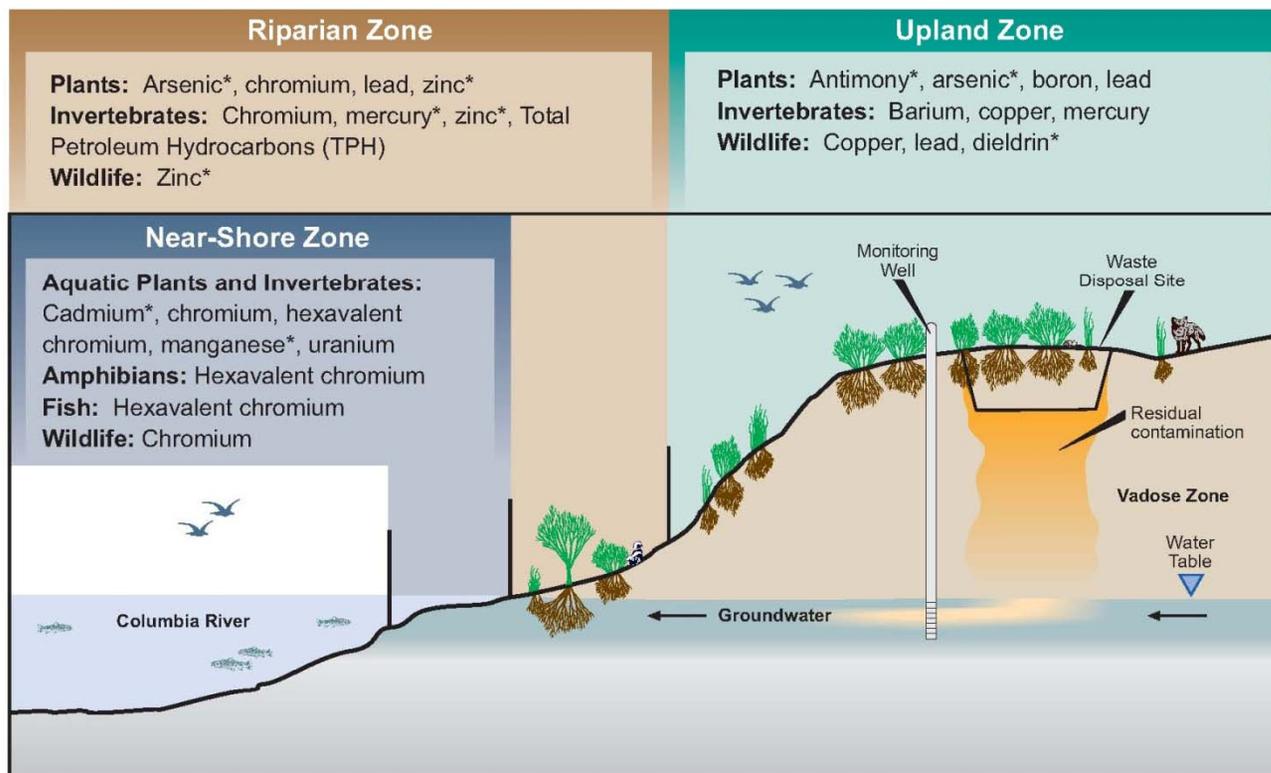
* indicates industrial cleanup sites in 300 area

- IAROD cleanups met interim standards and the risk assessment findings indicate the majority of sites are within an acceptable risk range
- Use of cleanup verification data may not represent soil conditions on the surface after the remediated waste sites are backfilled. This uncertainty may overestimate potential risk for surface exposure.

River Corridor Baseline Risk Assessment - Ecological

Contaminants Indicating Potential Risk to River Corridor Ecological Receptors

- Concentrations exceed levels that may cause observable effects
- Ecological preliminary remediation goals for soil are proposed that are protective of the receptors



RI/FIS Conclusions Regarding Risk Assessment

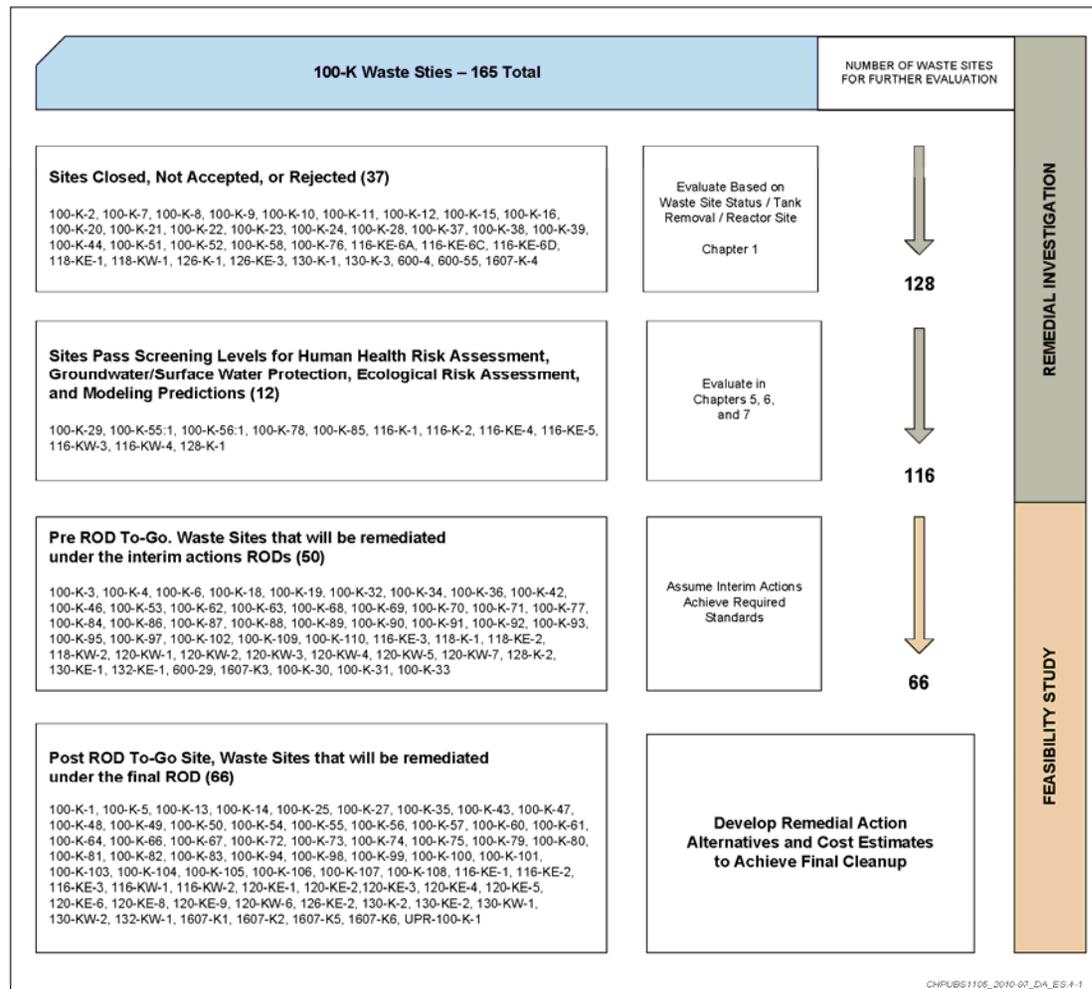
- Interim soil cleanup actions have been largely effective in achieving River Corridor cleanup goals to protect human health
- Cleanup actions in the river corridor are protective of a range of exposure scenarios
- The Ecological Risk assessment indicates that some refinement of IAROD cleanup goals is needed to protect ecological communities

100-K Risk Evaluation

# of Waste Site Screening Exceedances	Ecological Protection	Human Health (Deep Zone)	SW/GW Protection	CONSTITUENTS
4	●			Metals (mercury)
3		●		Radionuclides (deep zone human health)
7	Total exceedances out of 14 sites screened			

100-K Background

- 165 waste sites:
 - 37 closed, not accepted, rejected sites
 - 16 remediated
 - 50 scheduled to be remediated under the IAROD
 - 66 remaining waste sites



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100-K Remedial Alternatives

Alternative 1 - "No Action":

Waste Sites	Discontinue further remedial actions after December 2012, including any additional monitoring
GW	Discontinue Interim Action P&T

Alternative 2 - "RTD and GW P&T Optimized with Other Technologies":

Waste Sites	RTD of shallow vadose zone areas, GW monitoring, biological infiltration, soil flushing, bioventing or land farming for sites with TPH, surface barriers
GW	P&T with soil flushing, air stripping for C-14, biological infiltration and injection, and ICs

Alternative 3 - "RTD and Expanded GW Treatment":

Waste Sites	RTD for waste sites, with excavation until standards are achieved, surface barriers
GW	Aggressive P&T, air stripping for C-14

100-K Remedial Alternatives, continued

CERCLA Nine Criteria

Threshold Criteria	Overall protection of human health and the environment Compliance with applicable or relevant and appropriate requirements
Balancing Criteria	Long-term effectiveness and permanence Reduction of toxicity, mobility, or volume through treatment Short-term Effectiveness Implementability Cost
Modifying Criteria	State Acceptance* Community Acceptance*

* These criteria are not assessed in this report.

Preferred Remedy

Alternative 2 – RTD & GW P&T Optimized with Other Technologies

- Waste Site Components
 - Remedy Decision made for each waste site:
 - Shallow waste sites:
 - excavate to meet cleanup levels (Human Health, Ecological, and Groundwater/Surface water Protection)
 - Deep waste sites (GWP/SWP contamination > than 15’):
 - Excavate with soil flushing and bioinfiltration contingency to meet cleanup levels
 - Waste sites with TPH:
 - excavate to meet cleanup levels, land farming or bioventing
 - Cultural review of each waste site
 - Temporary surface barrier for waste sites near reactor (up to 75 years). Waste sites removed with reactor removal
 - ICs will be identified to assure short- and long-term protection

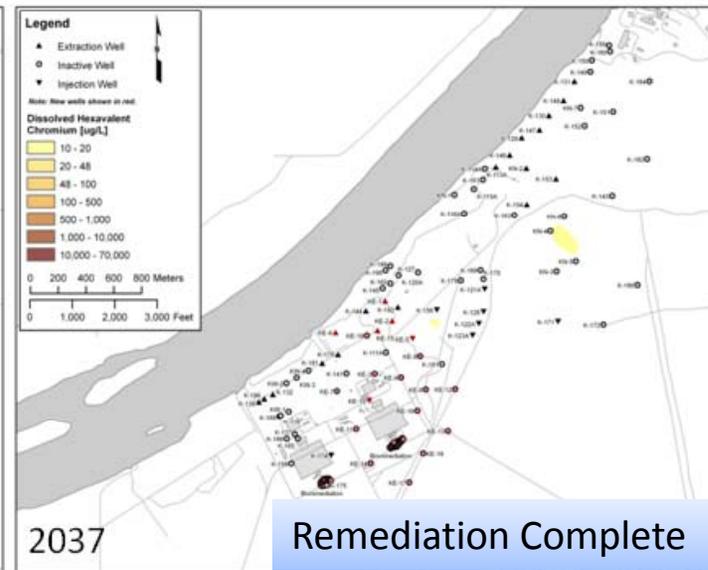
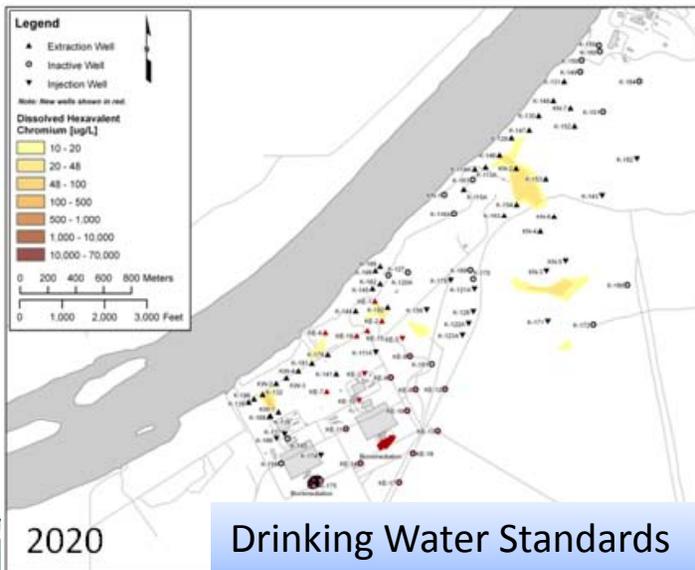
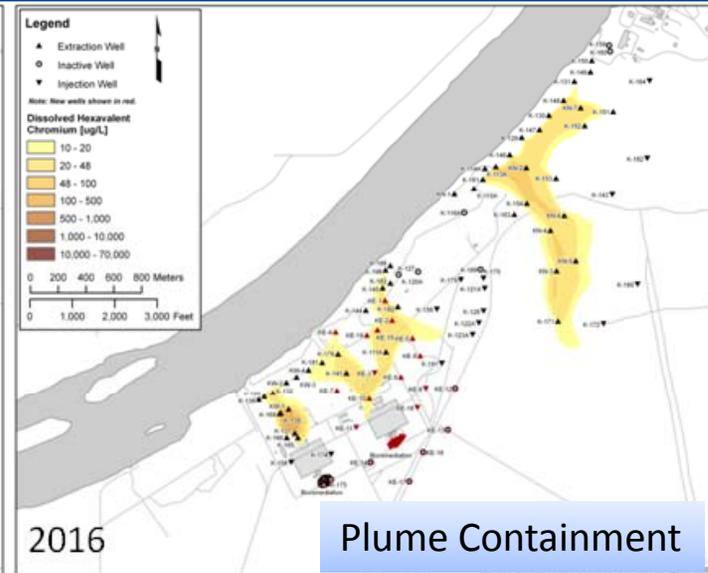
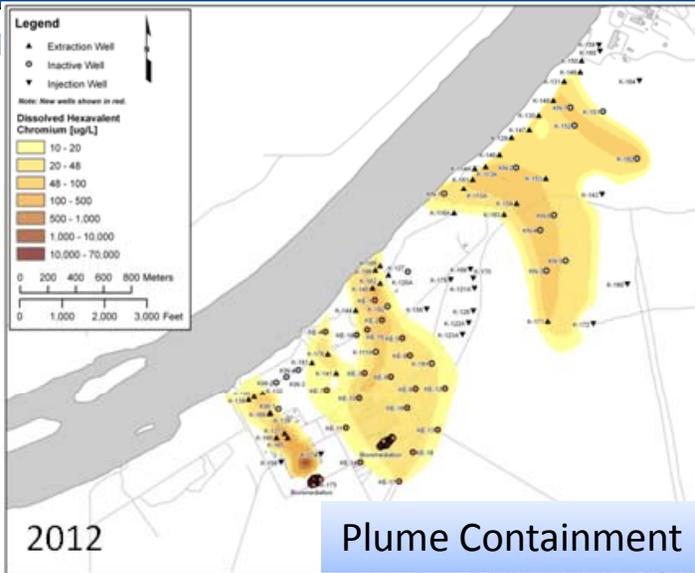
Preferred Remedy, continued

Alternative 2 – RTD & GW P&T Optimized with Other Technologies

- Groundwater Components
 - Optimized pump and treat to protect the river and meet drinking water standards
 - Bioinjection (based on hot spots or low flow)
 - Soil flushing supplemented with bioinfiltration at locations with suspect continuing source or persistent plumes
 - Air stripping for C-14
 - Co-extraction of Tritium, Sr-90, Nitrate, and TCE
 - Institutional Controls during remediation

Preferred Remedy, continued

Alternative 2 – RTD & GW P&T Optimized with Other Technologies



What Does the Proposed Plan Achieve?

- Soil and waste site cleanup actions achieve direct-contact human health protection goals for a range of exposure scenarios and protect ecological communities
- Groundwater is restored to drinking water standards
- The Columbia River is protected from discharges of groundwater that would impact aquatic communities

Next Steps

- Spring 2012: Release Proposed Plan for 30-day public comment period
 - Tri-Parties will consider all comments before making a final decision
- Fall 2012: Issue Record of Decision