



# 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

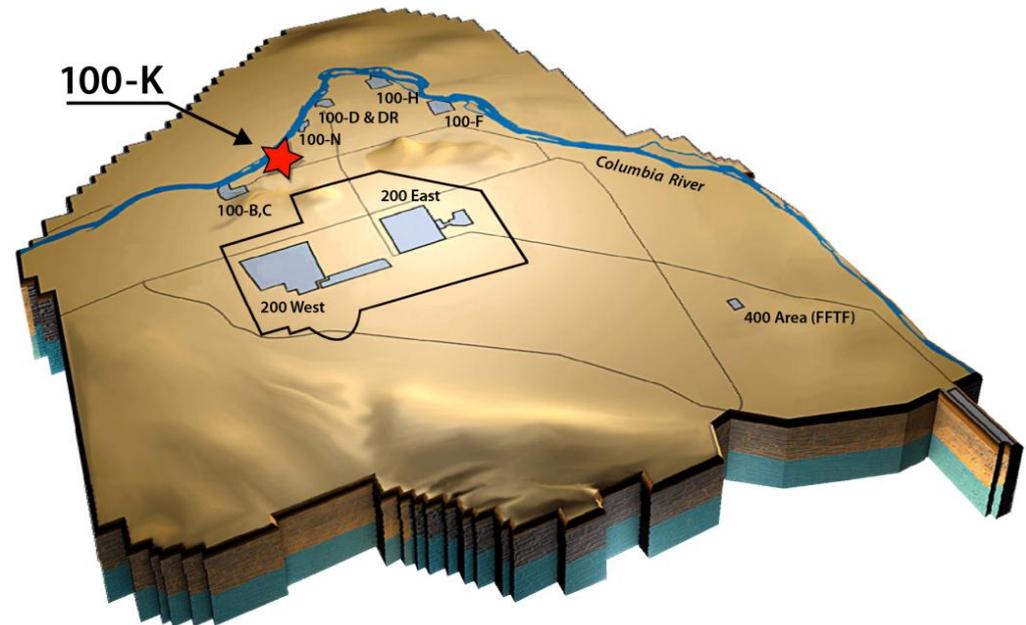
# Overview

- 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

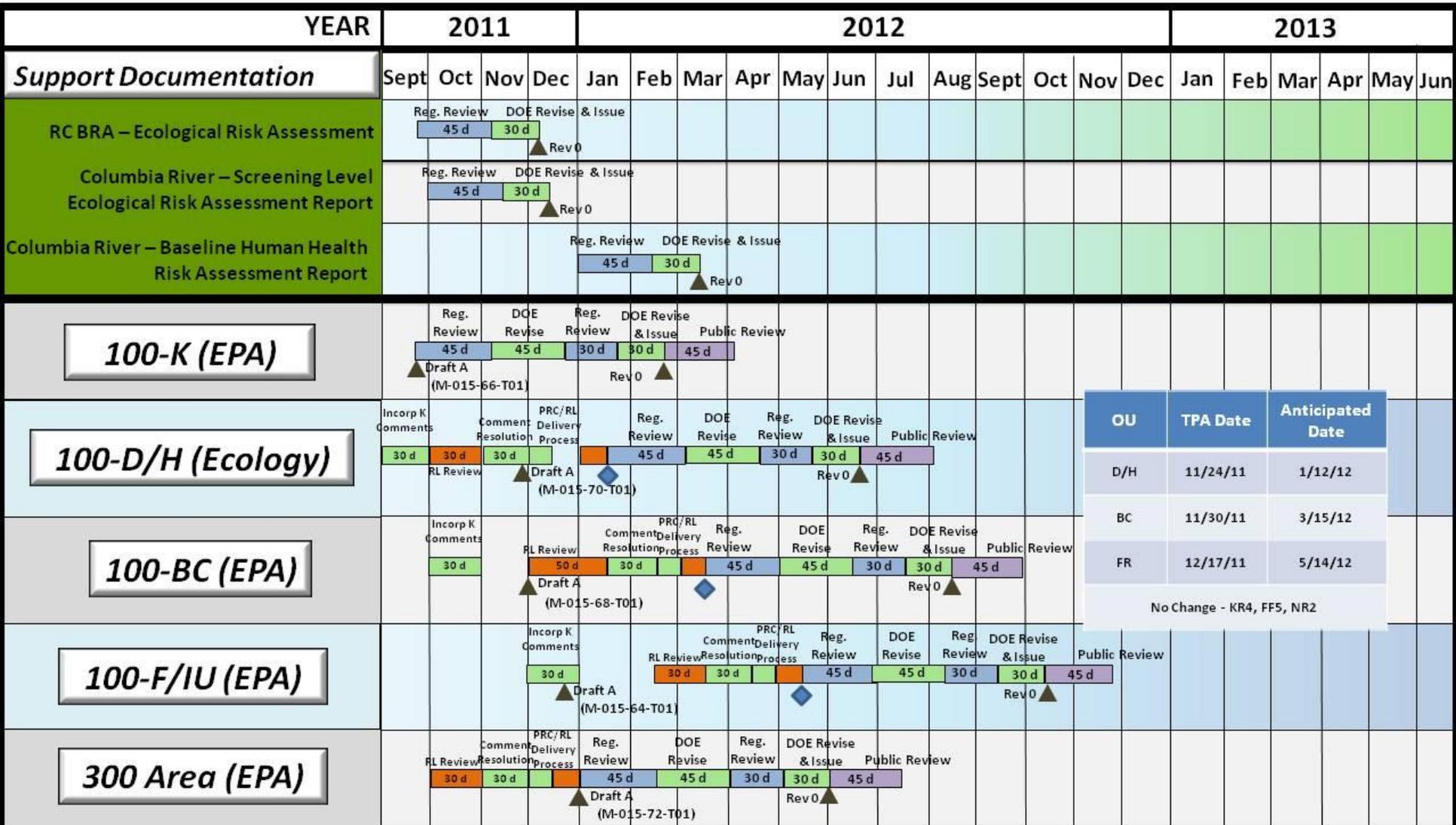
River Corridor consists of six cleanup areas (Operable Units):

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



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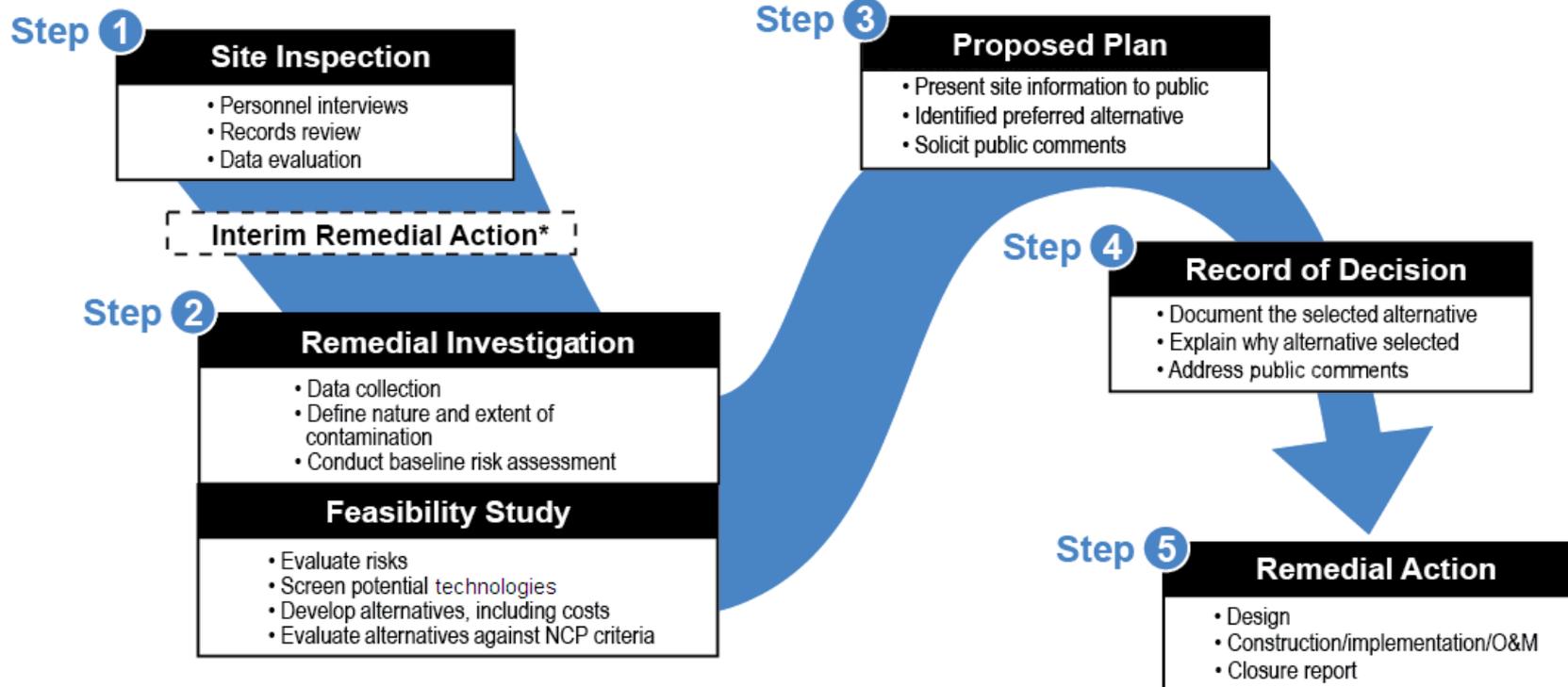
# River Corridor Decision Documents



DRAFT

# CERCLA Process

## CERCLA Decision Process



\*Interim Remedial Actions have been conducted at 100-D/H since 1996.

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# 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

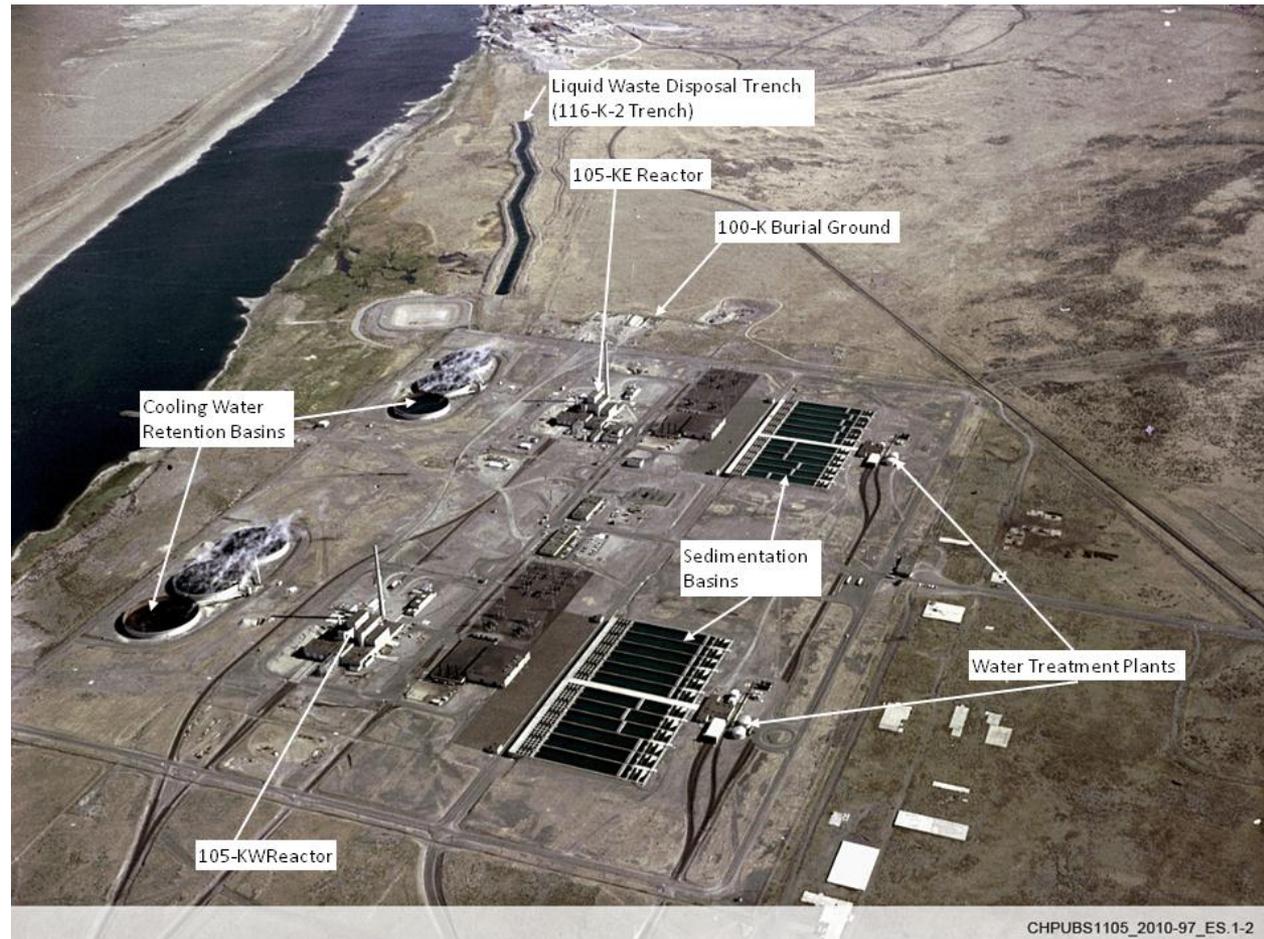
# 100-K Background

## 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





# 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

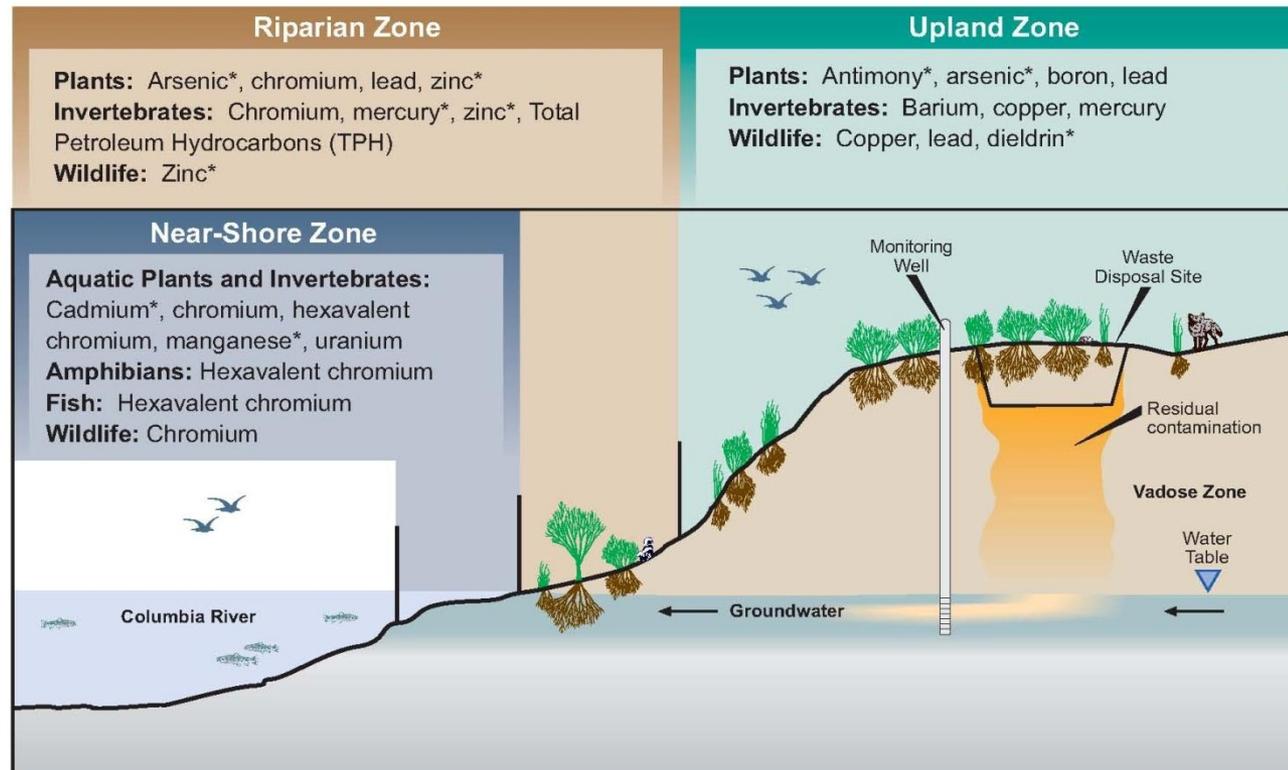
\* indicates industrial cleanup sites in 300 area

- 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



\*Lacks a clear tie to Hanford releases.

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# RI/FIS Conclusions Regarding Risk Assessment

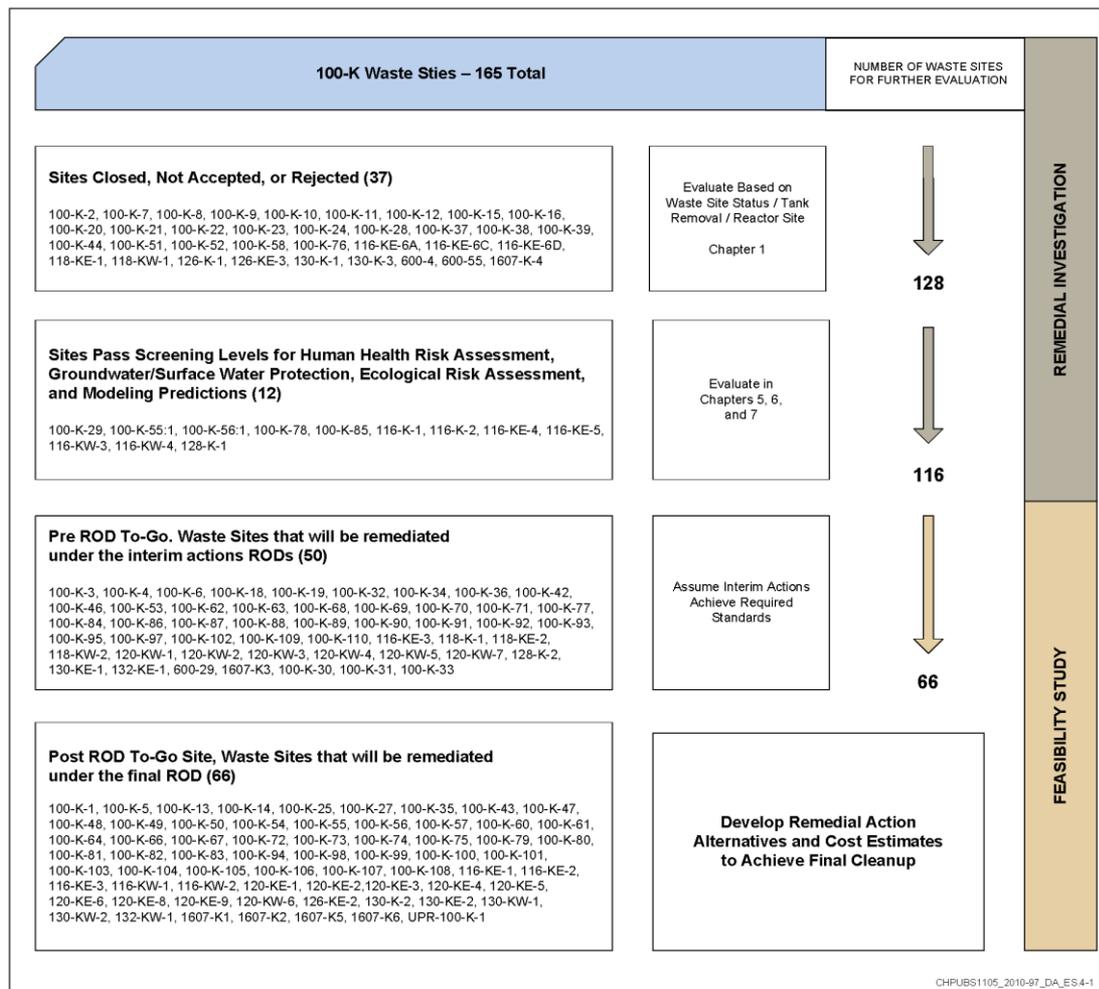
- Interim soil cleanup actions have been largely effective in achieving River Corridor cleanup goals to protect human health
- Cleanup actions in the river corridor are protective of a range of exposure scenarios
- The Ecological Risk assessment indicates that some refinement of IAROD cleanup goals is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



# 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

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

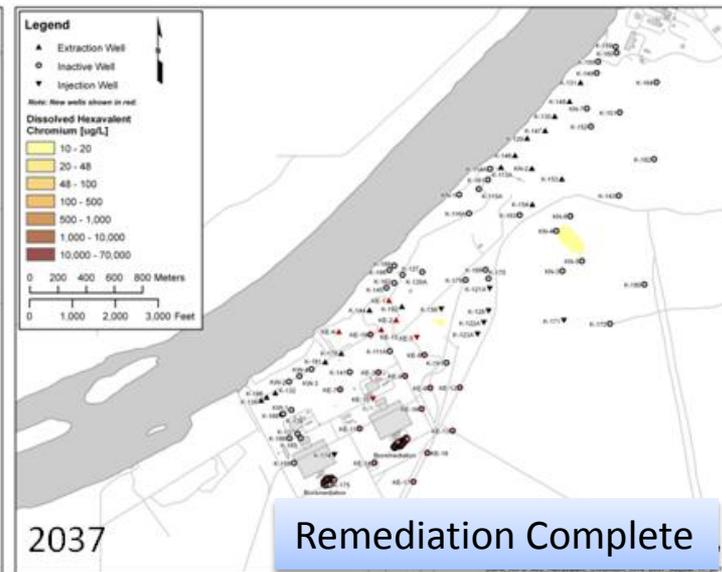
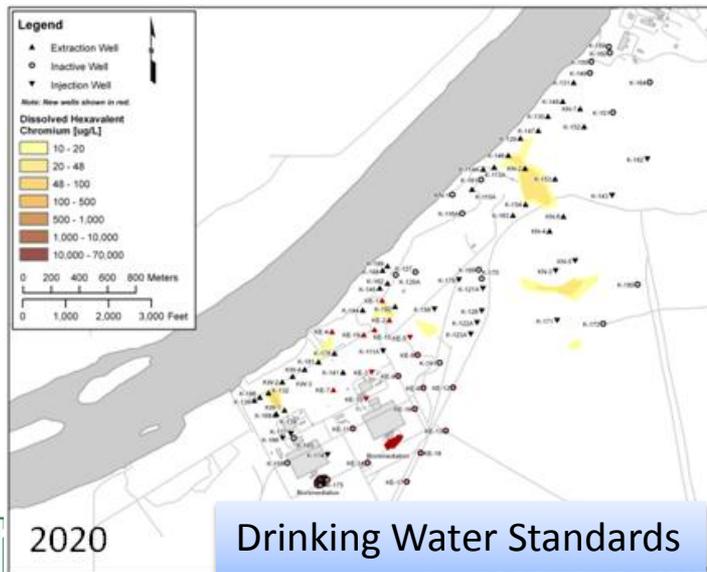
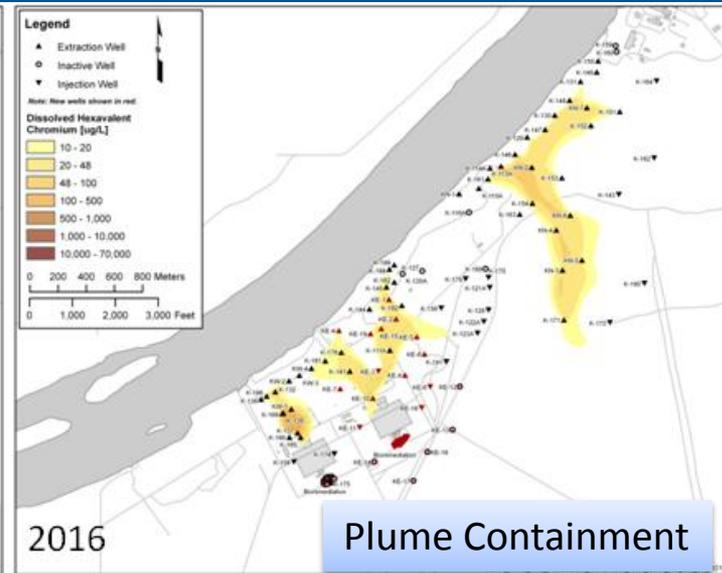
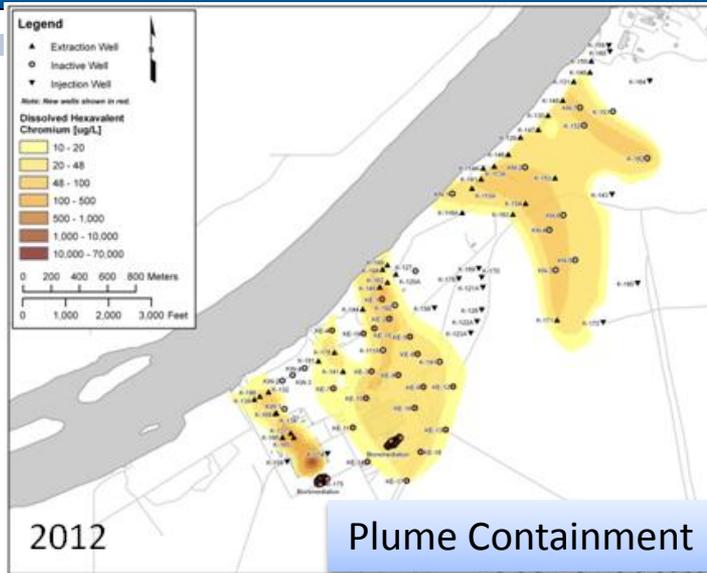
# Preferred Remedy, continued

## 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