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US Department of Energy

Privacy & Security Notice

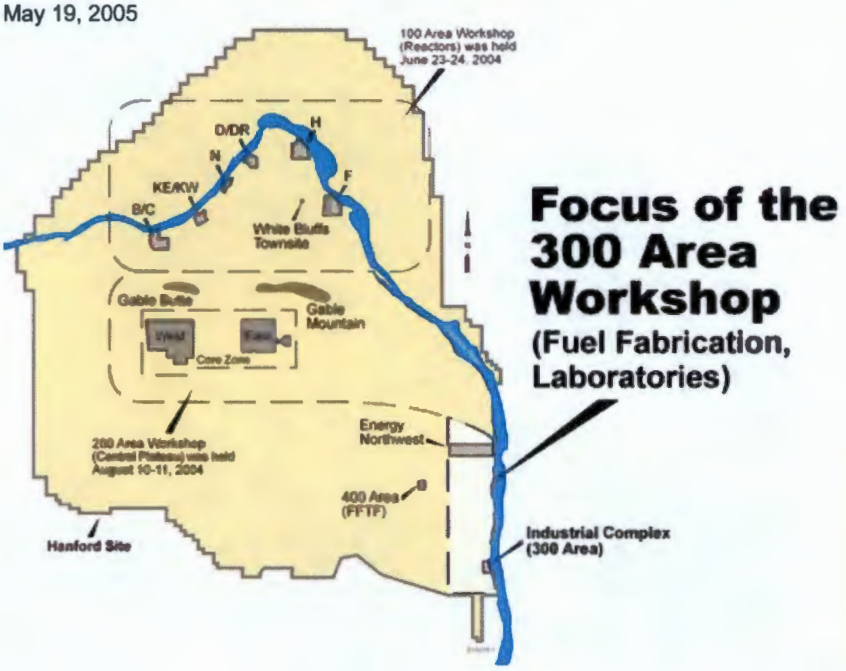
Hanford Site End State Vision

DOE/RL-2005-57

- Interagency Management Integration Team (IAMIT) Charter
- Public Involvement Schedule
- Public Workshop Outcomes
  - June 23 - 24, 2004
  - August 10 - 11, 2004
  - May 19, 2005
- Background Material
- Submit Comments/ RBES Mail Box
- End State Vision
- Hanford Site End State Vision Home
- Hanford Home Page

Focus on 300 Area Including Groundwater

May 19, 2005



The 300 Area end state workshop is the last of three workshops, designed to clarify a vision for the Hanford Site. Background documents for this workshop include the City of Richland's preliminary assessment of redevelopment of Hanford's 300 Area, and the summary of the DOE-Headquarters end state workshop, held in October, 2004 with a broad range of stakeholder organizations. These documents can be accessed through the "Background Material" section of this web site. Additional information will be added as it becomes available.

- Meeting Agenda
- Discussion Questions
- Breakout Discussion:
  - Future Land Uses
    - Summary of notes taken
    - Verbatim bulleted notes
  - Groundwater - Remediation and Remedy Selection
    - Summary of notes taken
    - Verbatim bulleted notes

At the end of the workshops, participants were asked again to write down comments on any aspect of the workshop, particularly lessons learned. You will find these comments in two forms:

- Comment matrix

- Comment summary

For questions or comments, please send a message to RBES@rl.gov
URL: http://www.hanford.gov/docs/rbes/5-19.CFM
Last Updated: 07/19/2010 14:56:19

Interagency Management Integration Team (IAMIT) Charter

Public Involvement Schedule

Public Workshop Outcomes
June 23 - 24, 2004
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End State Vision

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TPA-Sponsored End States Workshop #3 Agenda

Purpose: Continue the end states public dialogue and portray the desired end states for the 300 Area of the Hanford Site.

Venue and timeline: CIC (WSU library) - 2nd Floor Conference Room
2770 University Drive, Richland, WA
May 19, 2005 (8 am - 4:30 pm)

Agenda:

8:00-8:45	**Orientation: Welcome, Opening Comments, Participant Introductions**
	• Overview of the End States Development Process
	  o Shirley Olinger
	• EPA Opening Comments
	  o Nick Ceto
	• Ecology Opening Comments
	  o John Price

8:45-9:00	Key Outcomes from the 100-Area and 200-Area Workshops • Shirley Olinger

9:00-10:00	Background information on 300-Area contaminants, end state decision-making processes, and other related activities
	• Status of 300-Area Cleanup
	  o Dave Einan
	• 300-FF-5 Groundwater RI/FS Investigation
	  o Mike Thompson
	• City of Richland 300-Area Reuse Study
	  o Rick Simon
	• Comprehensive Land Use Plan
	  o Tom Ferns

10:00-10:15	Break
10:15-10:30	Reiterate questions to be asked and provide clarification if necessary. Assume the cleanup will be done in 2018. Focus on 300-Area uses 20 years into the future and beyond.
10:30-12:00	Breakout groups – Facilitators record answers to questions. 3 or 4 breakout groups will address all questions in parallel (i.e., the groups will not rotate from question to question as they did in previous workshops).
12:00-1:00	Lunch
1:00-2:30	Breakout groups (continued) - Facilitators record answers to questions.
2:30-2:45	Break
2:45-4:15	Breakout Group Summaries - Tri-Parties discussion on "What we've heard"
4:00-4:15	Wrap-up

For questions or comments, please send a message to RBES@rl.gov
URL: http://www.hanford.gov/docs/rbes/5-19_agenda.cfm
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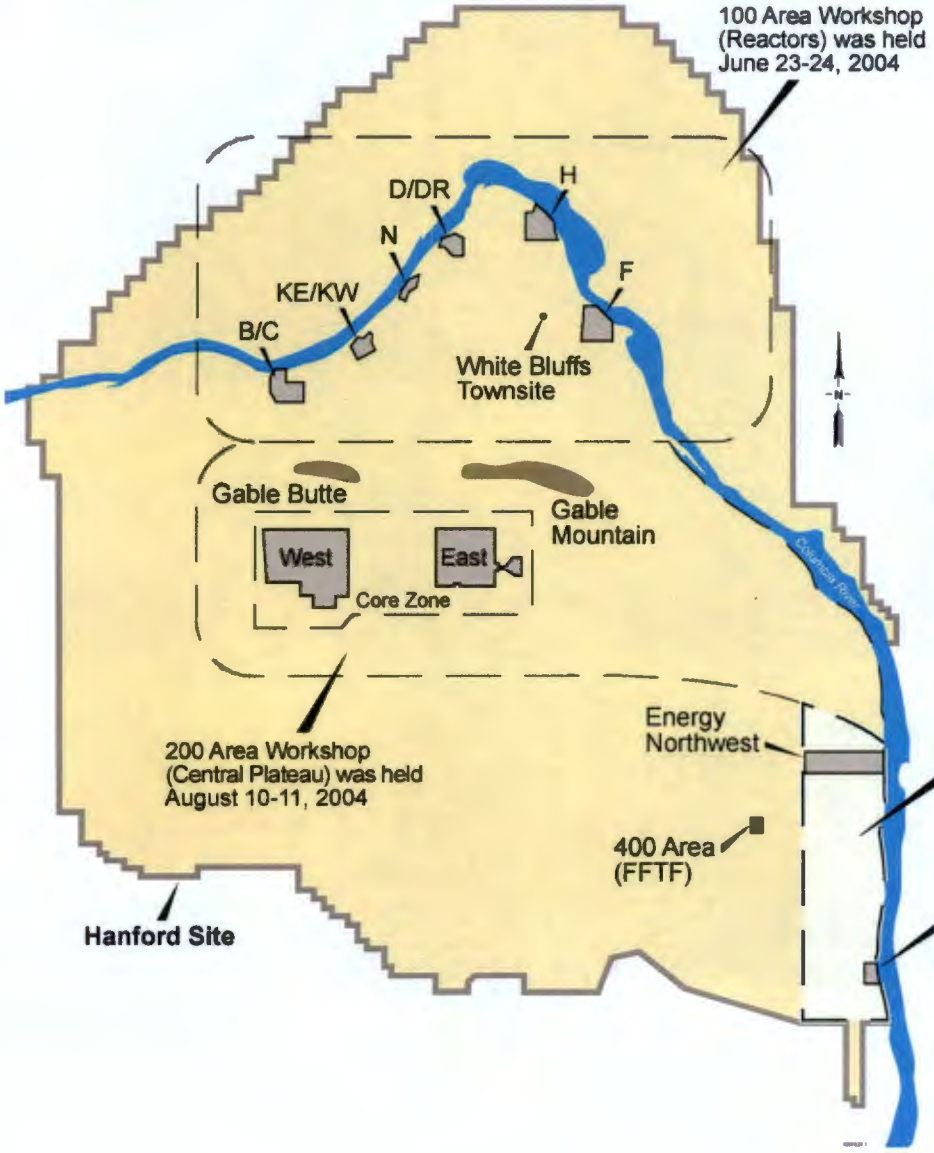
300 Area End State Workshop

Shirley J. Olinger

U.S. Department of Energy
Richland Operations Office

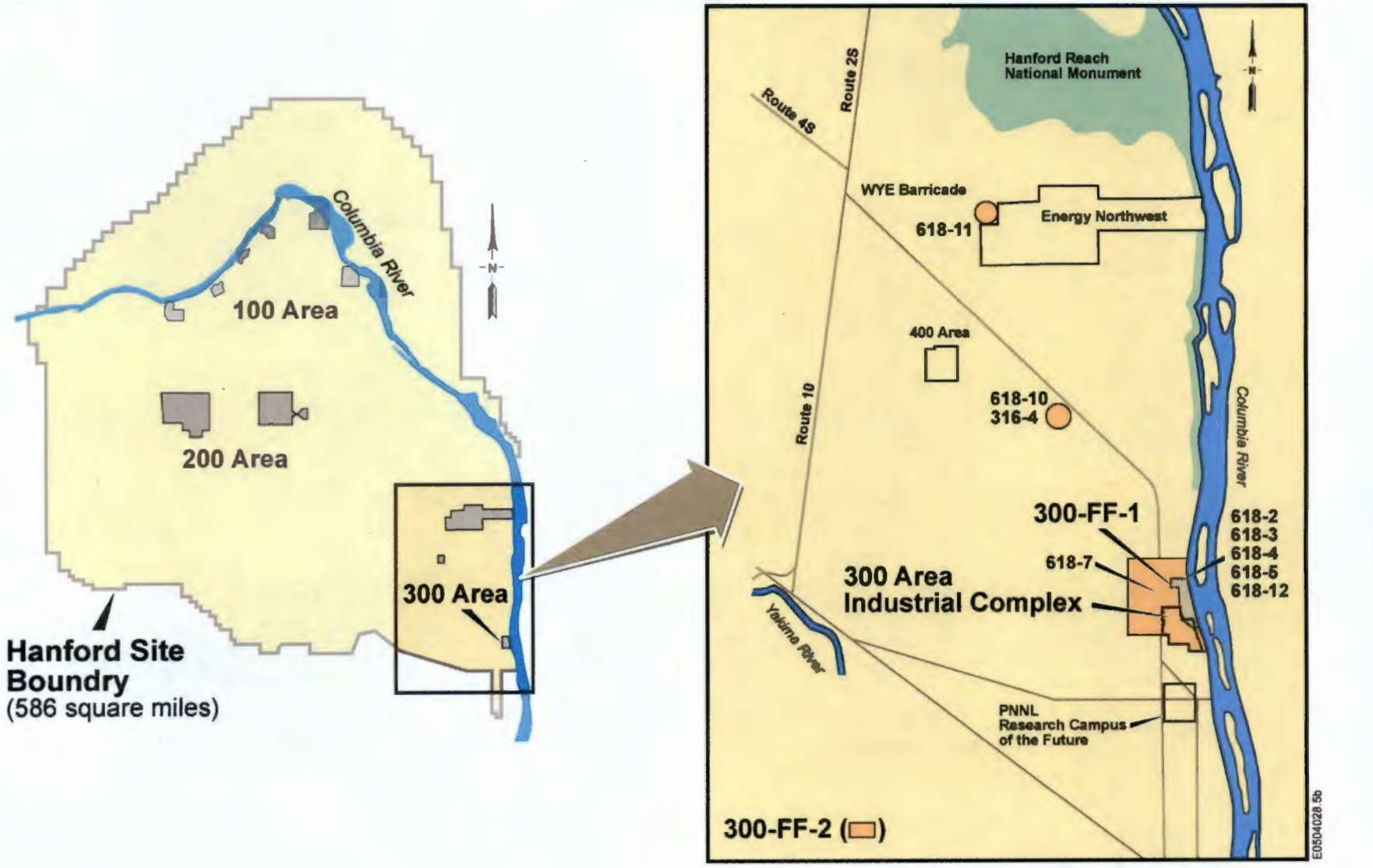
May 19, 2005

300 Area End State Workshop



Focus of the 300 Area Workshop
(Fuel Fabrication, Laboratories)

300 Area End State Workshop



Note: 300-FF-5 is Groundwater beneath 300-FF-1 and 300-FF-2

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Drivers

- *DOE and the Regulatory Agencies are faced with a number of cleanup decisions and would like public, stakeholder and Tribal input*
- The Tri-Party agencies are working together to develop a clear picture of the Hanford Site when cleanup is complete
  - A three-dimensional description of the Site (i.e., air, surface, soil/groundwater)
  - What structures, operations or waste left on-site
  - What are the probable land use activities and institutional controls at the conclusion of Hanford cleanup

Background

Numerous public interest initiatives have provided perspectives on Hanford end states including:

- Future Site Uses Working Group (FSUWG)
- Tank Waste Task Force
- NEPA activities associated with the Comprehensive Land Use Plan (CLUP)
- Hanford Advisory Board (HAB)-sponsored Exposure Scenarios Task Force

Looking Forward

- Initiatives identified a range of acceptable end states for Hanford
- More detailed end state definition is needed to support the many key decisions that need to be made in the next several years.
- *Intent of the agencies is to build upon the principles and outcomes of these earlier public processes as well as to add detail and clarity for cleanup*

Process Overview

- Hold workshops to provide background information and have focused discussions on pertinent questions
- Summarize results and make available for review and comment on website (http://www.hanford.gov/docs/rbes/ES_Index.cfm)
- DOE plans to use this information to revise DOE's End State Vision for Hanford
- Consider input received as Tri-Party agencies finalize cleanup decisions in the 300 Area

Today's Focus

- Several questions are being posed to solicit your input and values
- These questions are associated with the following three topics:
  - 300 Area Future Land Uses
  - Groundwater Remediation Alternatives and Technologies
  - Groundwater Remedy Selection Considerations

300 Area Future Land Uses

...20 Years Into the Future and Beyond

- What range of activities could the public, workers and/or visitors be involved in outside the industrialized 300 Area?

  and, within the region now known as the (industrialized) 300 Area?

- Should other alternative activities (beyond those consistent with the assumed land uses) be considered for comparison or other purposes?

- Based on the desired land-use and exposure scenarios, what types of institutional controls are appropriate, and over what time frames?

Groundwater Remediation Alternatives and Technologies

- Are the alternatives we are considering for the groundwater feasibility study appropriate?
- Are you aware of any other potential groundwater technologies which should be considered?
- Are there other considerations that should be evaluated?

Groundwater Remedy Selection Considerations

Given the possible types of surface uses and the potential groundwater remediation alternatives, what considerations are important for groundwater remedy selection? For example,

- What is an acceptable period of time to achieve groundwater goals?
- Under what surface end states would it make sense to continue with monitored natural attenuation?
- Under what surface end states would it make sense to pursue an alternative approach?

Summary

We want to

- *Build on what we have heard in the past*
- *Focus on 300 Area specific cleanup questions*
  - *Background on existing cleanup decisions*
  - *Decisions remaining to be made*
  - *5-year review of existing decisions*
- *Hear public, Tribal and stakeholder expectations to add detail and clarity for cleanup*

300 Area Opportunities for Public Involvement

- The River Corridor Baseline Risk Assessment
  - Ongoing with Hanford Natural Resources Trustee Council and Tribal Nation participation, and will take input from this workshop
- The Proposed Plan for final remedy decision for the 300 Area will include a public review, most likely in late FY08/early FY09
- The 300-FF-5 remedial action may be modified by changing the current cleanup strategy. The draft proposed plan is scheduled for June 2007. Public comment will occur shortly thereafter

State Role at 300 Area

John B. Price
Washington Department of Ecology

Overview

- State Interests for 300 Area
- Regulatory role of state at 300 Area
  - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
  - Resource Conservation and Recovery Act (RCRA)
  - Model Toxics Control Act (MTCA)

State Interests at 300 Area

- Groundwater is a state resource
  - Our goal remains restoration to highest beneficial use
  - Restoration goal is independent of land use
- Cleanup should be sustainable
  - One of Ecology's agency goals is "support sustainable communities and natural resources"
  - We support strategies that keep protections in place

EPA is lead regulatory agency for all three operable units at 300 Area

- Hanford waste sites - grouped into operable units (OUs)
  - Regulatory oversight of OUs divided between US EPA, Ecology
  - EPA uses CERCLA regulations
- Ecology role in CERCLA cleanup of 300 Area
  - Ecology is the CERCLA "support agency"
  - DOE and EPA must address support agency comments in all CERCLA decision documents
  - "state acceptance" is one of 9 CERCLA criteria for making decisions

Hanford Tri-Party Agreement (TPA) integrates CERCLA and RCRA

- State administers RCRA to permit treatment, storage and disposal (TSD) units at Hanford
  - Includes 300 Area facilities (e.g., 325 building)
  - 300 Area land disposal trenches
- Hanford including the 300 Area has mixed-waste groundwater contamination plumes originating from a combination of TSD and OUs
  - EPA addressing 300 Area plume as the 300-FF-5 operable unit

MTCA

- MTCA is the state's version of Superfund (CERCLA)
  - but imposes some different (& therefore additional) requirements
- CERCLA regulations require its cleanups to use applicable or relevant and appropriate requirements (*ARARs*) from other laws
  - TPA Sec. 7.5: *DOE will comply w/ all ARARs*
  - MTCA is called out by name

Jan. 13, 1995 agreement between EPA and Ecology on applicable MTCA sections (*precedes 2001 amendments)*

Applicable

- Cleanup technologies order of preference
- Restoration time frame
- Institutional Controls
- non-petroleum UST releases
- Cleanup standards

"Gray Areas"

- Cleanup costs test
- Practicability of groundwater treatment
- Periodic review
- Analytical, risk assessment & compliance monitoring *technical methodology*

MTCA, Federal Facilities, and Superfund Sites

- MTCA regulation begins after listing a site on the MTCA "Hazardous Sites List"
- Listings include priorities of 1 (high) through 5 (low)
- Federal facilities & Superfund sites are given a "0" priority and MTCA regulation is deferred until Federal or Superfund work is completed
- Hanford sites have been given a "0*" priority

MTCA Hazardous Sites List (HSL)

http://www.ecy.wa.gov/programs/tcp/mtca_gen/hazsites.html

Hazardous Sites List

SITE REGISTER SPECIAL ISSUE – February 23, 2005

HQ SITE CLEANUP SECTION

Contact Persons: Barry Rogowski (360) 407-7236 or Michael Spencer (360) 407-7195

SPOKANE

FS ID	SITE NAME	CITY	RANK	STATUS
110	COLBERT LANDFILL	SPOKANE	0▼	Construction Completed, O&M underway
19894	SPOKANE ANG STA SWAMP DUMP	SPOKANE	2	RA in progress
112	US AF FAIRCHILD AFB	SPOKANE	0*	RA in progress
113	US AF FAIRCHILD CRAIG RD LDFL	SPOKANE	0*	Construction Completed, O&M underway
114	USAF FAFB PR1	SPOKANE	0*	RA in progress
122	USAF FAFB PR1 FT 1	SPOKANE	0*	Construction Completed, O&M underway
118	USAF FAFB PR1 LTM	SPOKANE	0*	RA and all other activities completed
120	USAF FAFB PR1 PS 2	SPOKANE	0*	Construction Completed, O&M underway
123	USAF FAFB PR1 WW 1	SPOKANE	0*	RA and all other activities completed
115	USAF FAFB PR2	SPOKANE	0*	RA and all other activities completed
58757186	USAF FAFB PR2 PS1	SPOKANE	0*	Construction Completed, O&M underway

Hazard Sites List Legend:

- ◆ New site added to the ranked list
- ● New site aded to the National Priorities List (NPL)

Ranking
- 0▼ Superfund site; State has lead
- 0▲ Superfund site; Federal (EPA) has lead
- 0■ Superfund site; Joint lead
- 0* Superfund site; Site is under a Federal Facilities Agreement

Hanford Listing on State HSL

NUCLEAR WASTE PROGRAM

Contact Persons: John Price (509)736-3029 or Brenda Becker-Khaleel (509)736-3003 or Michael Spencer (360) 407-7195

BENTON

FS ID	SITE NAME	CITY	RANK	STATUS
312	HANFORD 100 AREA DOE	RICHLAND	0✻	RA in progress
313	HANFORD 1100 AREA DOE	RICHLAND	0✻	RA Completed, Confirmational Monitoring Underway
314	HANFORD 200 AREA DOE	RICHLAND	0✻	RA in progress
315	HANFORD 300 AREA DOE	RICHLAND	0✻	RA in progress
311	US ECOLOGY INC RICHLAND	RICHLAND	5	RA conducted, residual contam. left, instl. contrl

SOUTHWEST REGION

Contact Persons: Rebecca Lawson (360) 407-6241 or Michael Spencer (360) 407-7195

CLALLAM

FS ID	SITE NAME	CITY	RANK	STATUS
6904640	FREDS AUTO	PORT ANGELES	1	Ranked, Awaiting RA
1002	K PLY INC	PORT ANGELES	5	Construction Completed, O&M underway
1008	PETTIT OIL CO PORT ANGELES WAREHOUSE	PORT ANGELES	1	Ranked, Awaiting RA
1005	PORT OF PORT ANGELES MARINE TRADES AREA	PORT ANGELES	1	RA in progress
1003	QUALITY 4 X 4	PORT ANGELES	3	Ranked, Awaiting RA

Hazard Sites List Legend:

- ◆ New site added to the ranked list
- ● New site aded to the National Priorities List (NPL)

Ranking
- 0▼ Superfund site; State has lead
- 0▲ Superfund site; Federal (EPA) has lead
- 0■ Superfund site; Joint lead
- 0✻ Superfund site; Site is under a Federal Facilities Agreement

How is Ecology currently regulating Hanford under MTCA?

- Ecology's current regulation of Hanford under MTCA includes:
  - "providing informal advice and assistance" to DOE and EPA on its use as an applicable requirement. **WAC 173-340-130**
  - investigation and corrective action for confirmed petroleum releases from underground storage tanks
    - *example*: 300 Area powerhouse fuel oil tanks
  - RCRA corrective action

How will Ecology regulate Hanford in the future under MTCA?

- Hanford will continue to be listed as a "0*" priority on the state Hazardous Sites List while CERCLA/RCRA remediation continues
- EPA may consider deleting portions of the 100 and 300 *Areas* from National Priorities List following completion of cleanup activities
- After CERCLA remedies are completed, state will change site status, & remove operable units (not whole *Areas*) from the state Hazardous Sites List

How does MTCA apply to radionuclides?

- Radionuclides are incorporated within the definition of "hazardous substances" under MTCA
  - By virtue of incorporating CERCLA hazardous substances
- While not recognizing any limits on its authority, to this point the State has not chosen to focus its authority through MTCA on the cleanup of released radionuclides
- The Cleanup Priority Act (CPA)(I-297), Section 5, directs the State to focus such authority
  - i.e., to consider released radionuclides as hazardous substances and require remediation of such releases

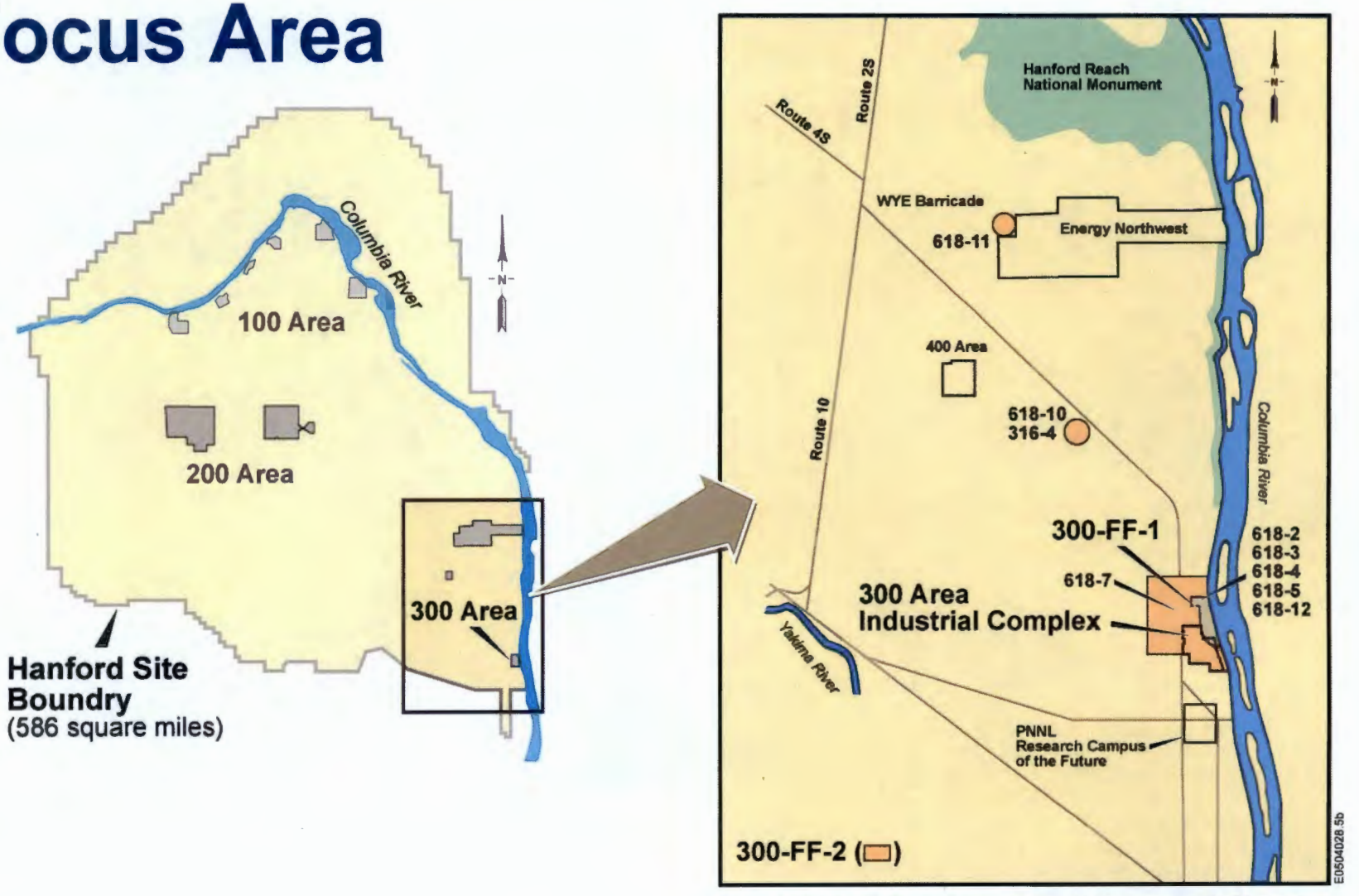
How does MTCA apply to radionuclides? (*continued*)

- The United States (Department Of Justice) challenged the CPA on, among other matters, whether this is a constitutional exercise of state authority
- There is no implementation of the CPA at Hanford while this challenge is being litigated

Hanford's 300 Area: Background and Cleanup Status

Dave Einan,
USEPA Region 10
Hanford Project Office

Focus Area



Note: 300-FF-5 is Groundwater beneath 300-FF-1 and 300-FF-2

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300 Area Industrial Complex

- 0.25 sq mile industrial complex area and surrounding locations
- Approx 150 buildings and structures
- Approx 70 soil waste sites

Waste Disposal Past Practices

- 62 years of ongoing nuclear operation and research
- 51 years of liquid discharges to the ground
- 27 years of solid waste disposal in burial grounds

The Legacy

- ***Contaminated...***
  soil, debris, groundwater
  and... an aging infrastructure

300 Area - Then and Now

1944

Cleanup Decision Framework

- **300 Area placed on National Priorities List (1989)**
  - Requires cleanup
- **CERCLA Records of Decision (1996 and 2001)**
  - Define cleanup requirements
- **Tri-Party Agreement Milestones (ongoing)**
  - Define cleanup schedules

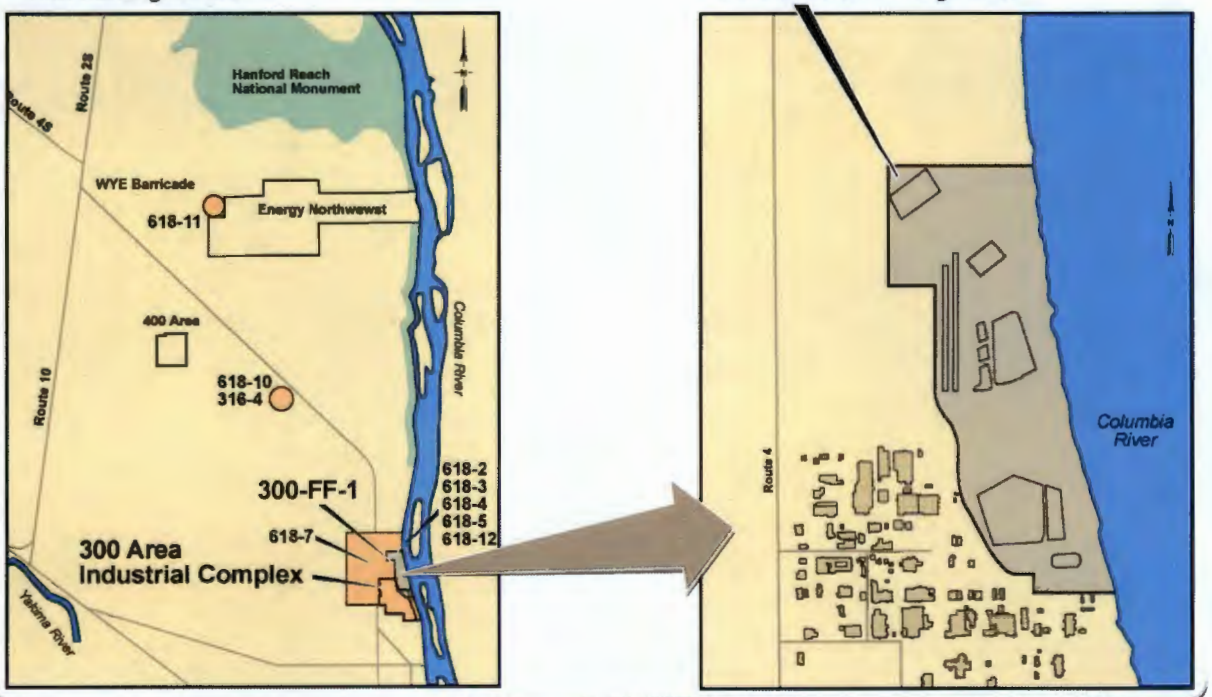
Cleanup Decision Framework (cont'd)

- **ROD for 300-FF-1 and 300-FF-5 Operable Units (1996)**
  - Initial focus on liquid discharge sites, 1 burial ground, and groundwater
- **ROD for 300-FF-2 (2001)**
  - Remainder of 300 Area complex, associated waste sites in outlying areas
  - Refined cleanup requirements in ESD (2004)

300 Area Cleanup Boundaries

300-FF-2 (▭)
- Outlying source sites (soils)
- TRU burial grounds

300-FF-1
- Liquid disposal sites
- Landfills and burial grounds



300-FF-5
- 300 Area groundwater below FF-1 and FF-2
- and, the remaining contamination in the vadose zone that could affect groundwater

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Cleanup Approach

- **Remove, treat where necessary, and dispose of contaminated soil and debris**
  - Buildings impeding the cleanup of contaminated soil and groundwater will be removed as part of cleanup
  - Excavate and remove subsurface structures (e.g., burial grounds, pipelines)
  - Backfill as necessary
- **Monitored natural attenuation and institutional controls for groundwater**
  - Being revisited by additional 300-FF-5 work

Cleanup

Demolish

Excavate

Treatment/Disposal

Backfill and Revegetate as Necessary

Regrade

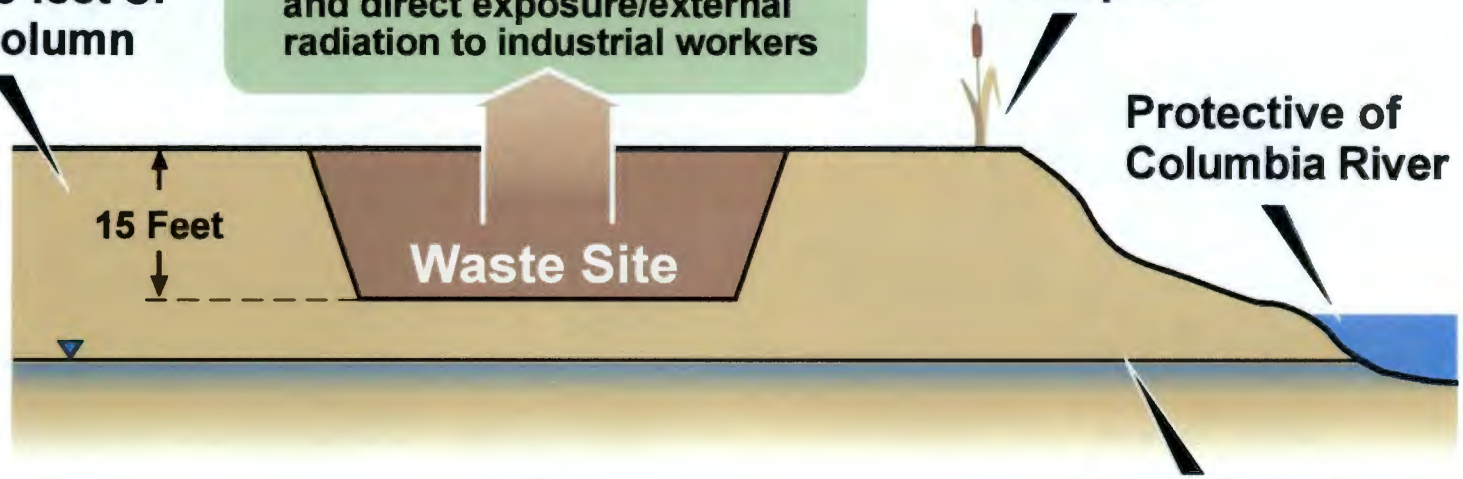
Revegetate

Industrial Cleanup Standard

Soil must be protective of industrial uses in the top 15 feet of the soil column

Reduce Risks from...

- **Ingestion and uptake by biota**
- **Inhalation and ingestion of soil and direct exposure/external radiation to industrial workers**



Protective of ecological receptors

Protective of Columbia River

Protective of groundwater quality

Note: Unrestricted Surface Cleanup Standard would require additional lateral excavation and a lower concentration of uranium in the backfill material

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Cleanup Status

300-FF-1

- Cleanup, including one major burial ground, is complete
- 560,000 tons of contaminated materials removed and disposed at ERDF

300-FF-2

- Cleanup of burial grounds and contaminated soils is underway – about 30 percent complete
- Demolition of the first large-scale production facility is underway

300-FF-5

- Remedies and technologies to control sources of contamination affecting the groundwater are being investigated

300-FF-5 Groundwater RI/FS Investigation

K. Michael Thompson

May 19, 2005

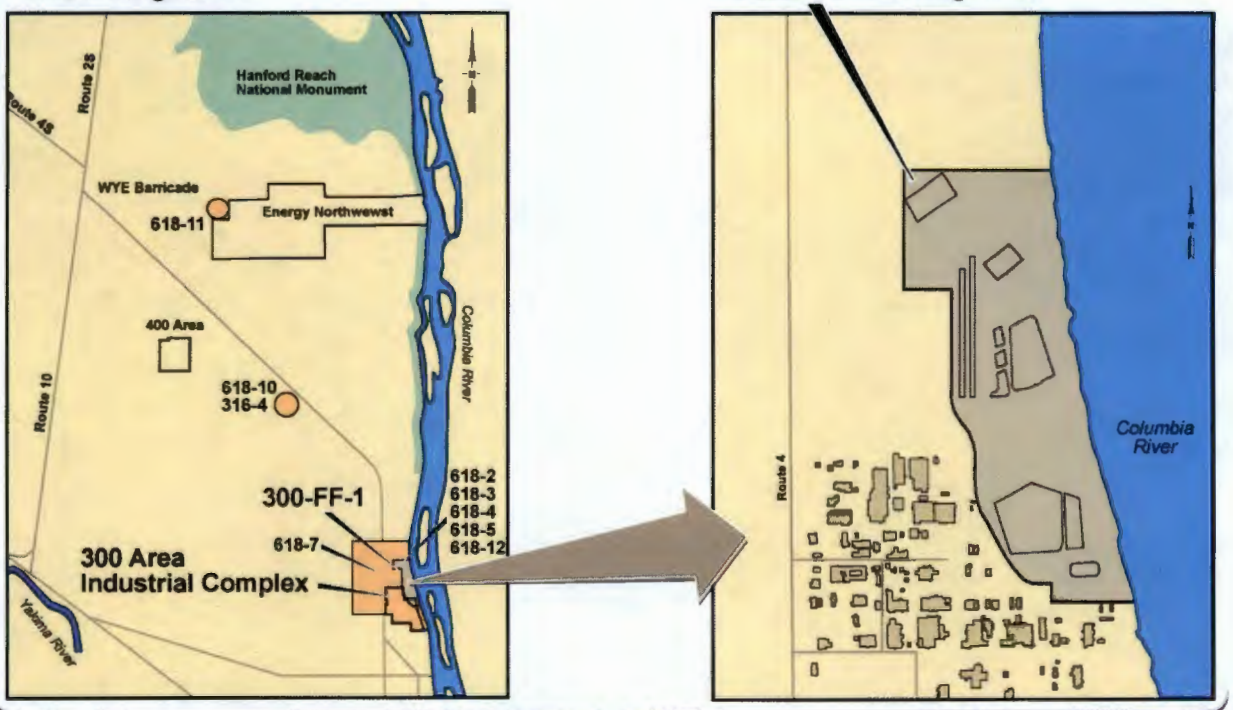
300-FF-05 Record of Decision

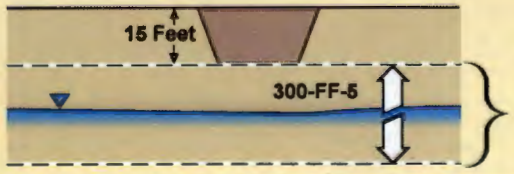
- The 300-FF-5 CERCLA Record of Decision (ROD), July 1996, selected groundwater monitoring and natural attenuation as the interim remedial action.
- The decision to select natural attenuation was based on the 300-FF-05 RI/FS that predicted the Remedial Action Objective (RAO) of meeting the drinking water standard for uranium would be attained in 3 to 10 years (from late 1993).
- The IROD requires continued groundwater monitoring "to verify modeled predictions of contaminant attenuation and to evaluate the need for active remedial measures".
- The IROD also requires that, "If monitoring does not confirm the predicted decrease of contaminant levels, DOE and EPA will evaluate the need to perform additional response actions."

Cleanup Boundaries

300-FF-2 (▭)
- Outlying source sites (soils)
- TRU burial grounds

300-FF-1
- Liquid disposal sites
- Landfills and burial grounds





300-FF-5
- 300 Area groundwater below FF-1 and FF-2
- and, the remaining contamination in the vadose zone that could affect groundwater

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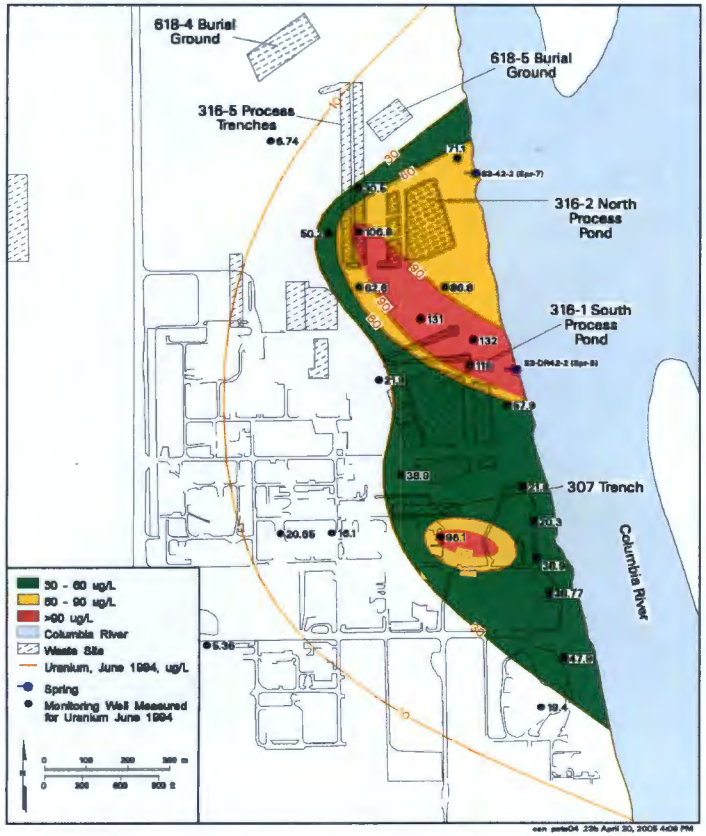
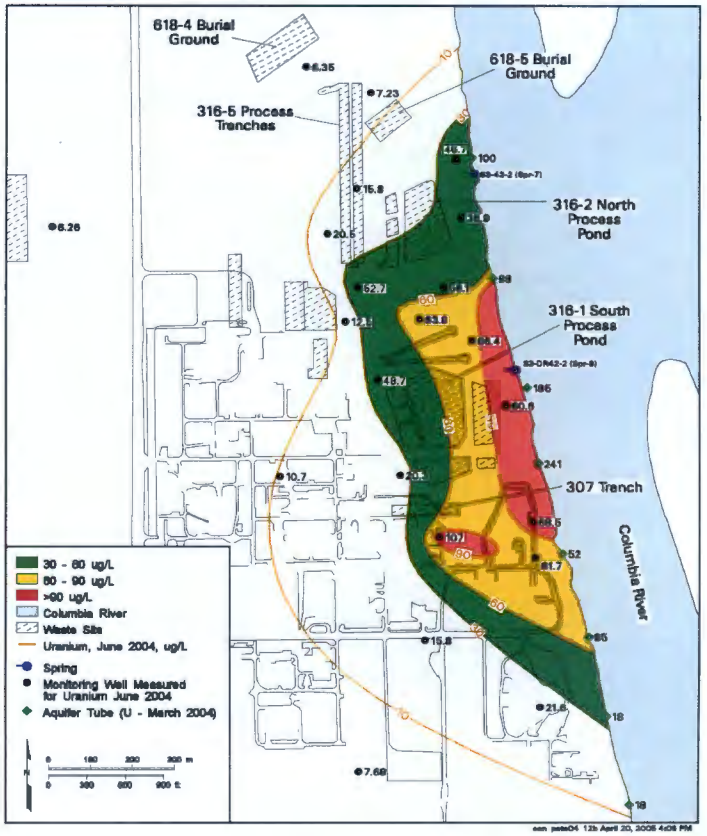
300 Area Uranium Plume

Exceeding Current Drinking Water Standard 1994 & 2004

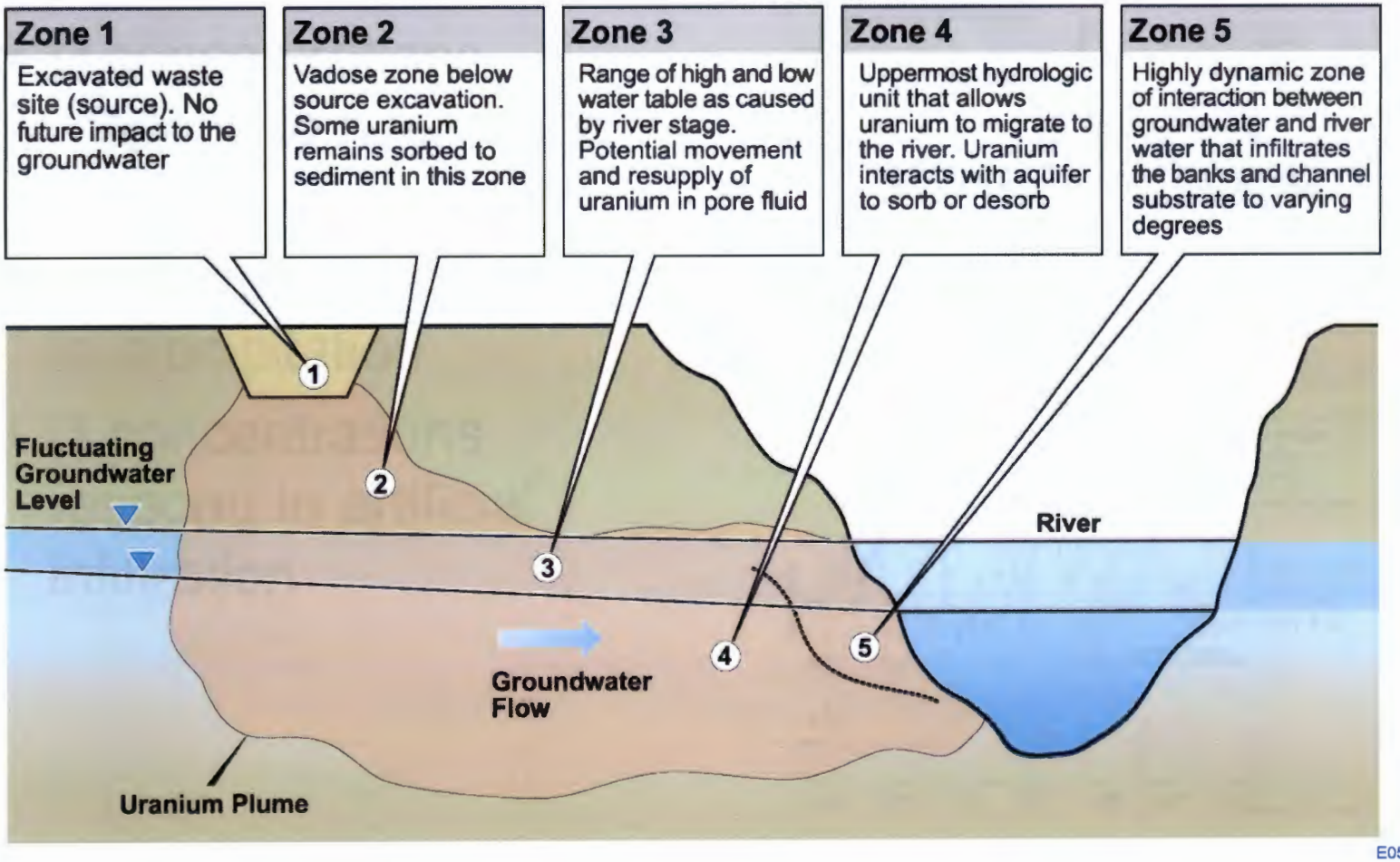
Shaded 300 Area Uranium, June 1994



Shaded 300 Area Uranium, June 2004



Key Components of Uranium Conceptual Model



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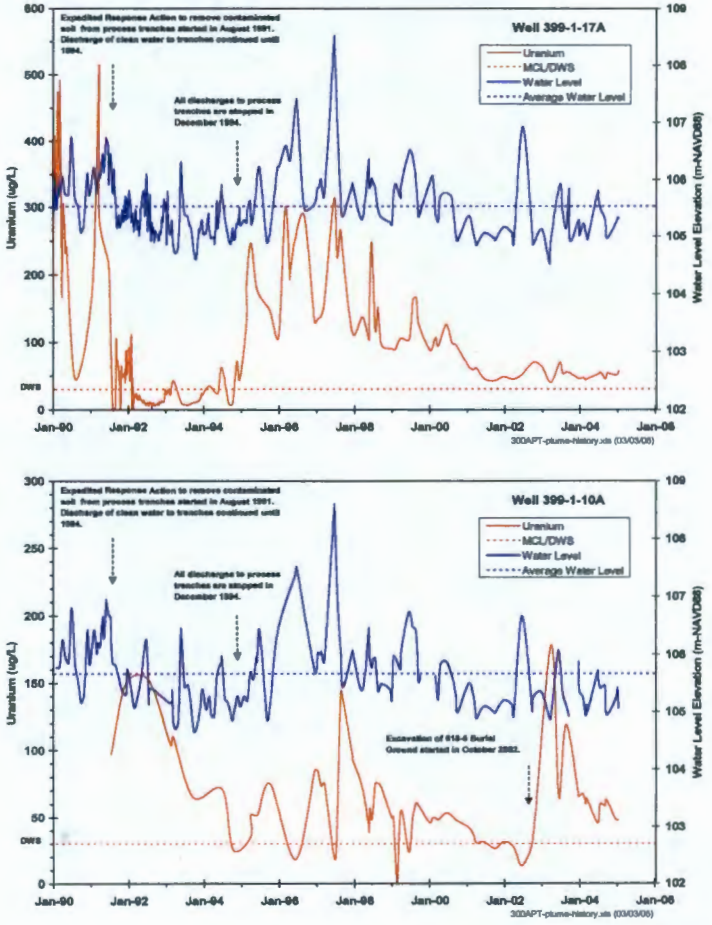
Uranium Responses Observed in 300 Area Groundwater

- U concentrations respond to river stage
- No observation of U concentration response to precipitation
- U concentrations respond to artificial infiltration



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The FS Process

- Establish Remedial Action Objectives
- Develop general response actions
- Inventory applicable technologies and management strategies
- Screen appropriate technologies
- Assemble technologies into remediation alternatives
- Screen alternatives
- Compare select alternatives

Feasibility Study Process

- Remedial action objective: Identify, develop and select remedial actions that have potential to
  - Restore the groundwater to its highest and best use
  - Reduce risk to human health and the environment

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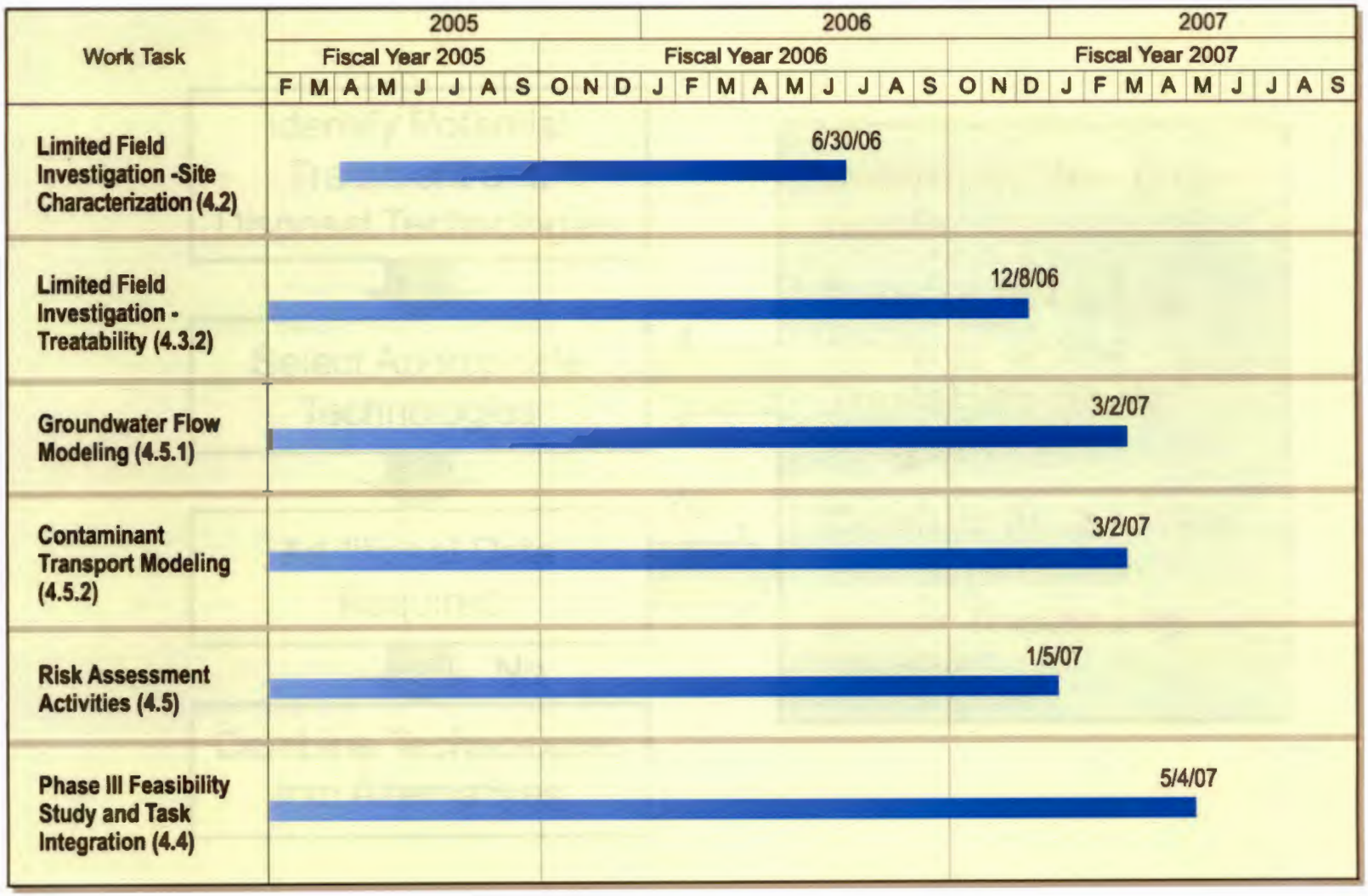
300-FF-5 Phase III Feasibility Study



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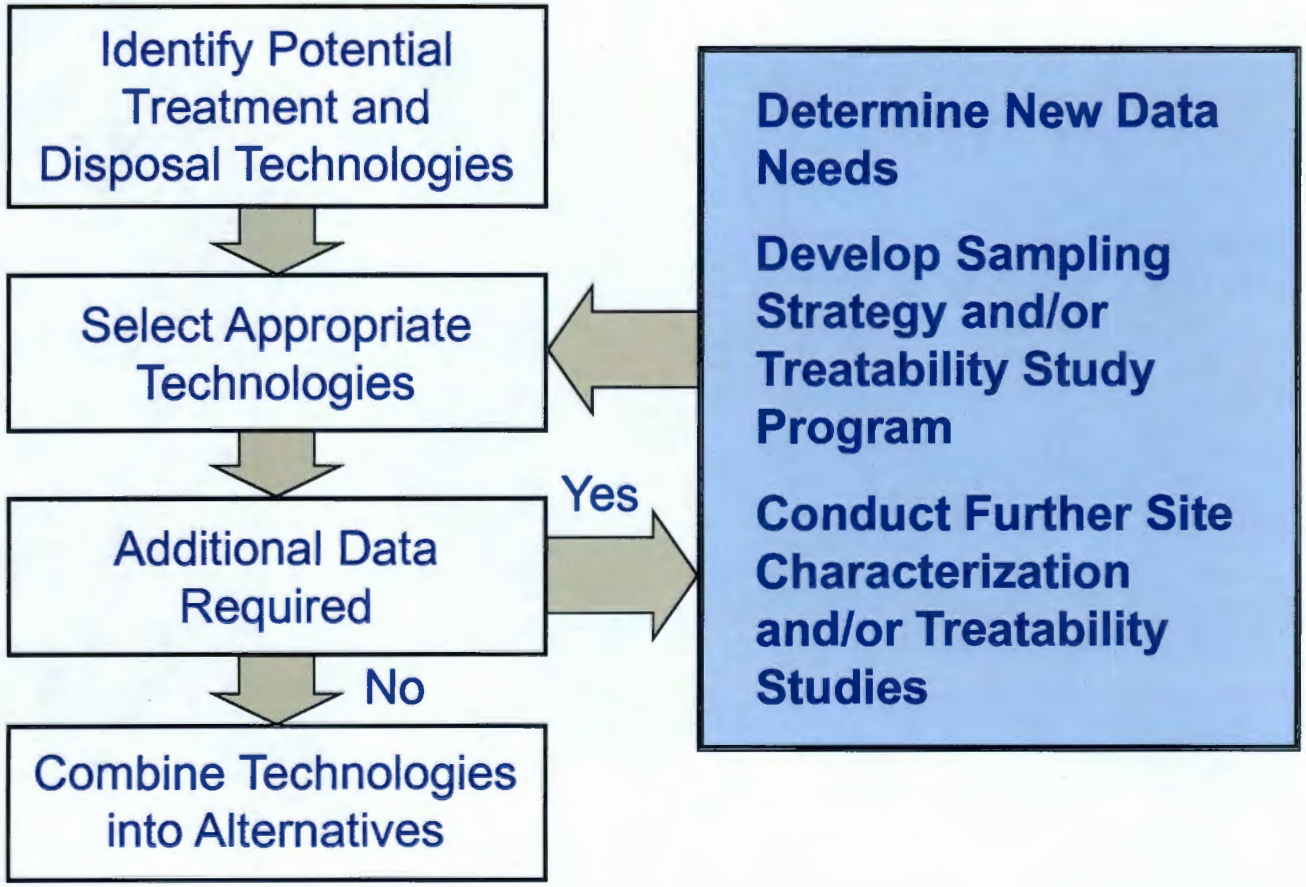
Feasibility Study Process



Additional Information Required

- Additional information is required before assembling technologies into remedial alternatives
- Limited field investigation
  - Uranium inventory
  - Refine conceptual model
- Treatability investigation, if required
  - Application techniques

Define and Evaluate Alternatives

- Once alternatives are defined, evaluate and compare.
- Screening evaluation to approximately 4 to 6 alternatives
- Detailed evaluation using 9 criteria

More Investigation is Needed

To continue the Feasibility Study, more information is needed about contamination affecting 300 Area groundwater, including

- Quantity of uranium
- Location of uranium
- Geochemical environment of uranium

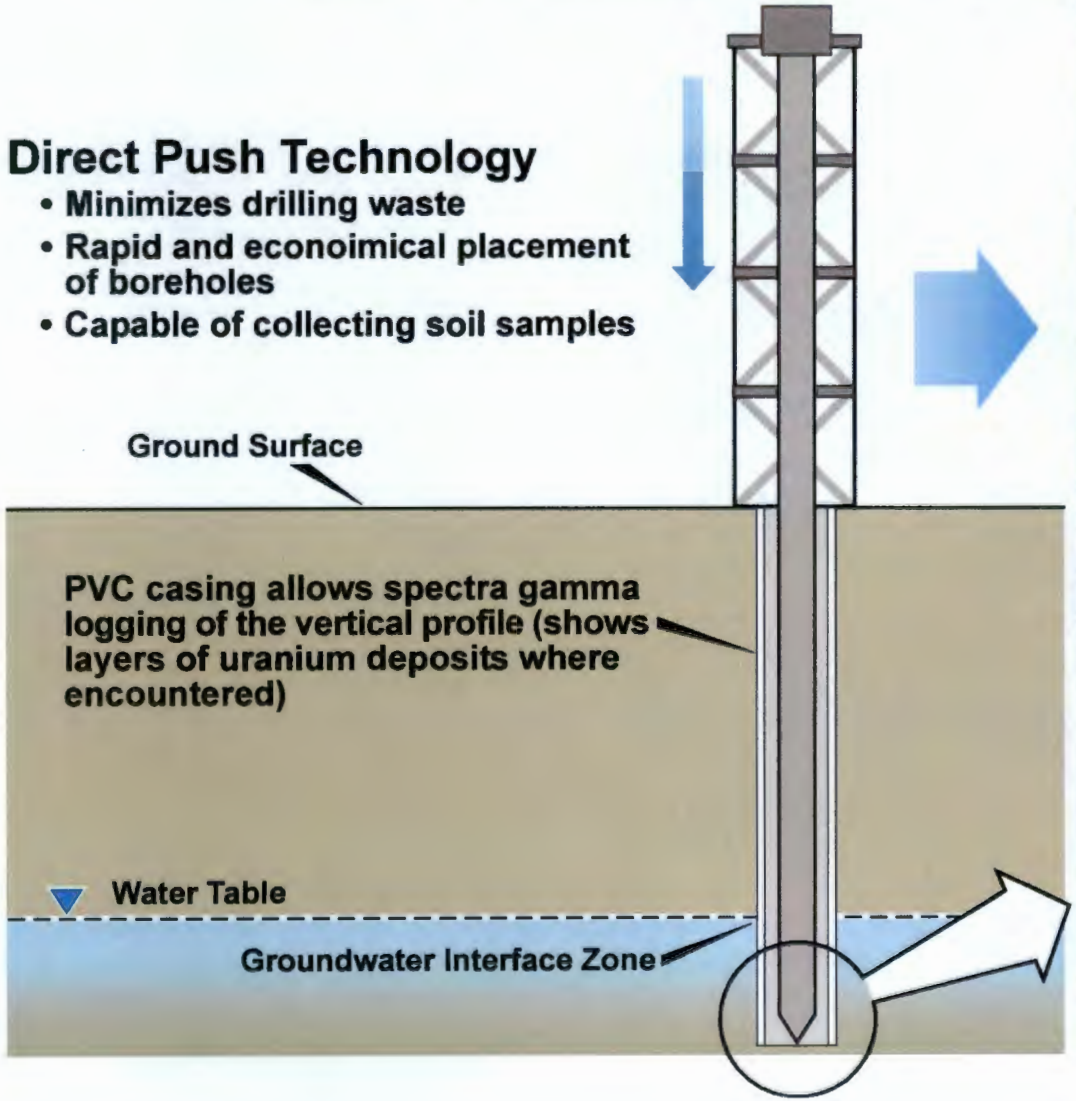
Further investigation also will provide injection and monitoring wells for testing in-situ treatment technologies

Limited Field Investigation

...Use rapid survey technologies to maximize coverage

Direct Push Technology

- Minimizes drilling waste
- Rapid and econoimical placement of boreholes
- Capable of collecting soil samples



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Comparative Analysis to Produce the Feasibility Study

- Evaluate the relative performance of alternatives with each other
- Document in the Feasibility Study Report:
  - Alternatives and analysis with 9 criteria
  - Compare alternatives with each other
  - Document ARARs
- Basis for selection; decision makers choose alternative

Open to Suggestions for Additional Technologies before Definition of Alternatives

- Preliminary list of technologies is not final
- We welcome suggestions for additional technologies to stabilize, remove or reduce risk of uranium in the groundwater or subsurface

CERCLA Evaluation Criteria

Threshold Criteria

1. **Overall protection of human health and the environment**
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**

Alternatives that do not protect human health and the environment or that not comply with ARARs are eliminated from further consideration.

Balancing Criteria

3. **Long-term effectiveness and performance**
4. **Reduction of toxicity, mobility, or volume through treatment**
5. **Short-term effectiveness**
6. **Implementability**
7. **Cost**

Each Alternative is evaluated against these criteria in a detailed analysis prior to a comparative analysis.

Modifying Criteria

8. **State acceptance**
9. **Community acceptance**

These criteria are addressed in the Proposed Plan which is provided for public review and comment.

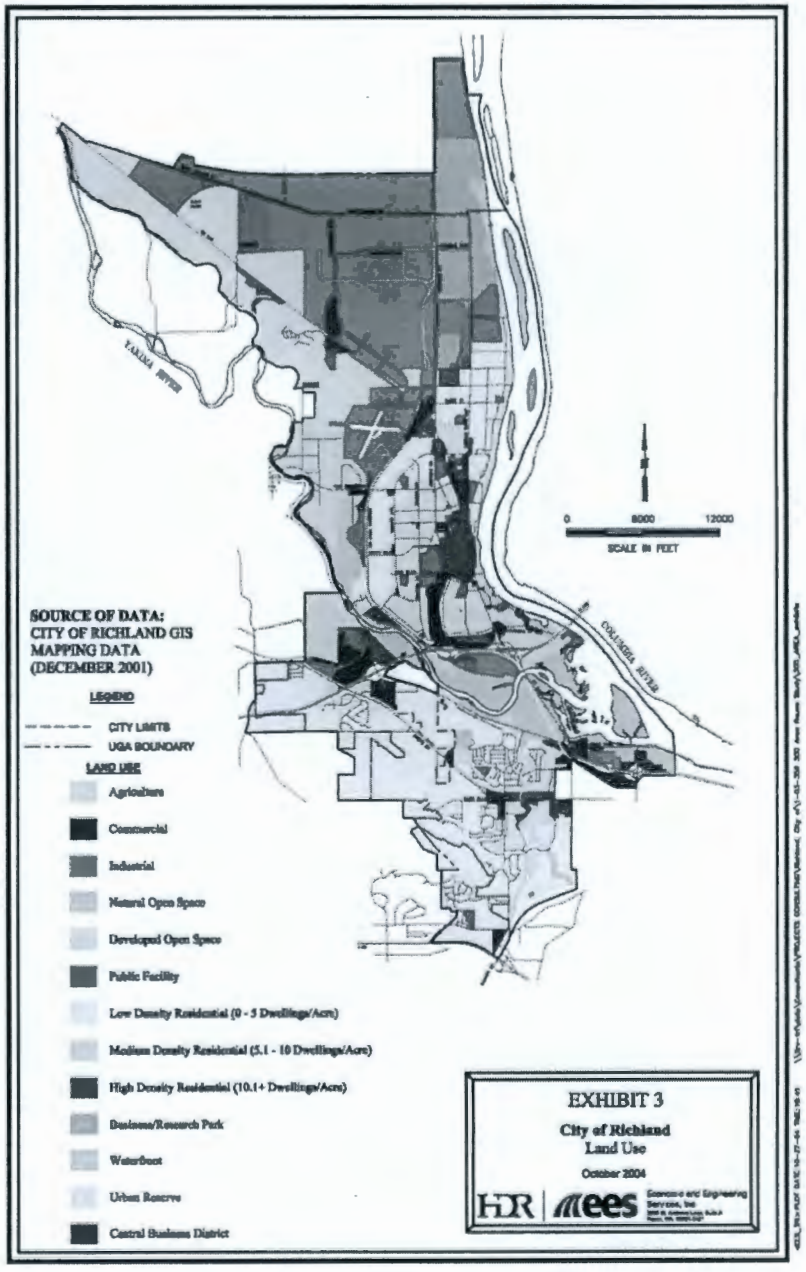
HANFORD 300 AREA PRELIMINARY REUSE PLAN

City of Richland

www.ci.richland.wa.us

Existing Plans

- City of Richland Land Use Plan classifies 300 Area as *Industrial* and *Business Research.*
- City plan assumed existing industrial facilities would remain in place.



Richland

300 Area Reuse Planning

Committee

- City of Richland
- Benton County
- USDOE
- USEPA
- Dept. of Ecology
- PNNL/Battelle
- Port of Benton
- Consultant: HDR/EES

Process

- Review prior plans
- USDOE Mounds Facility workshop
- National market study
- Local market study
- Preliminary conceptual ideas

National Market Analysis

300 Area Assets

- Columbia river
- Strong local economy
- Continued federal presence
- Unique construction activity nearby
- Highly educated labor force
- Twice national average near retirement age

Reuse Recommendations

- Multiple Uses
- Housing tailored to retirement market & river location
- R&D park focused on emerging construction technologies
- Incubator technology center tied in to PNNL R&D
- Design & manufacturing

Local Market Analysis

Conclusions

- Limited demand for industrial use
- Other local sites are superior
- Excess supply of industrial land
- Stigma of contamination

Reuse Opportunities

- Relocation of PNNL facilities
- Reuse of some existing buildings
- Gateway to recreation

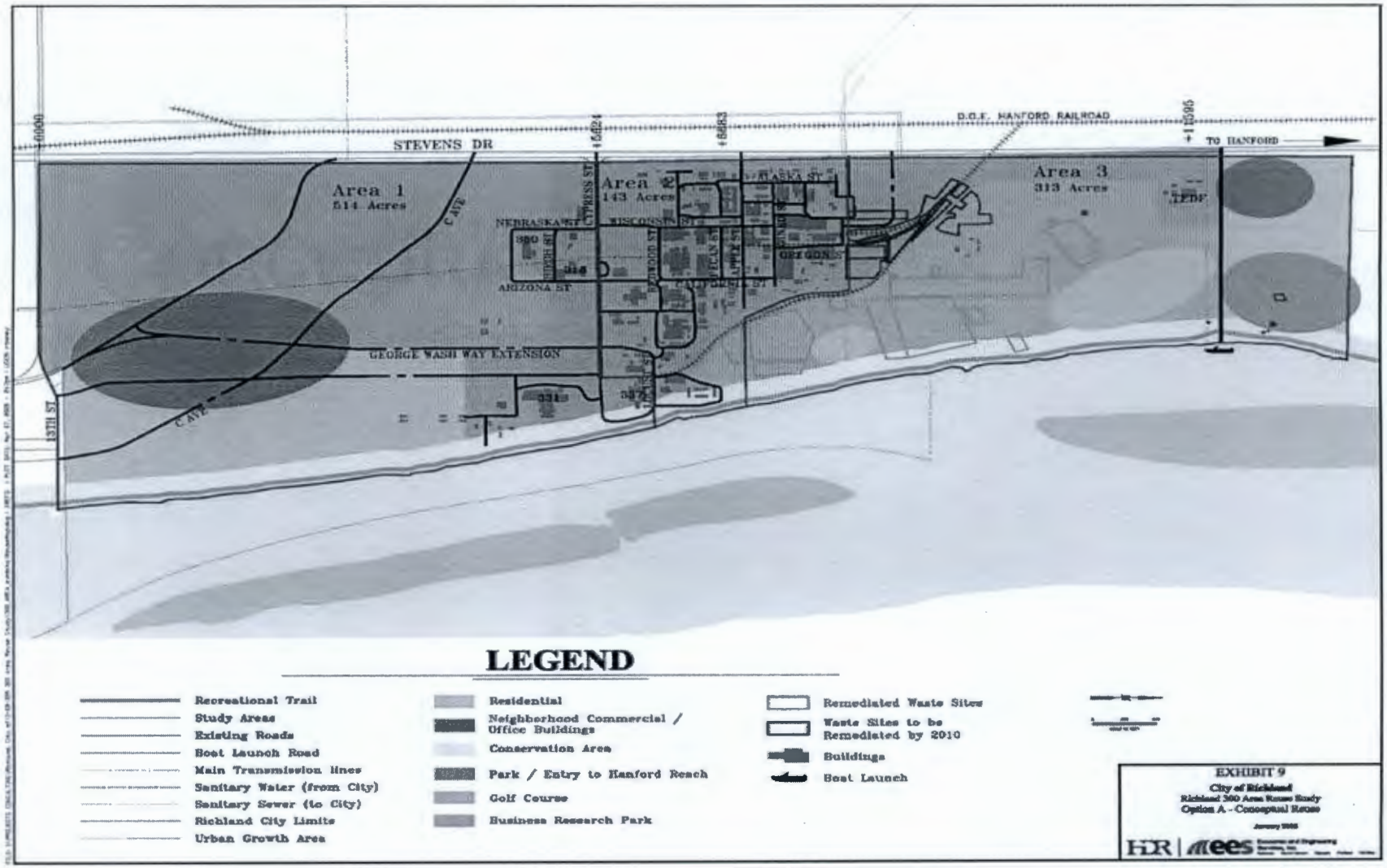
Potential Facility Reuse

- Bldg 318 – Radiological Calibrations Lab
- Bldg 331 – Life Sciences Lab
- Bldg 337 – Technical Management Center
- Bldg 350 – Plant Operations and Shop
- TEDF – Treated Effluent Disposal Facility

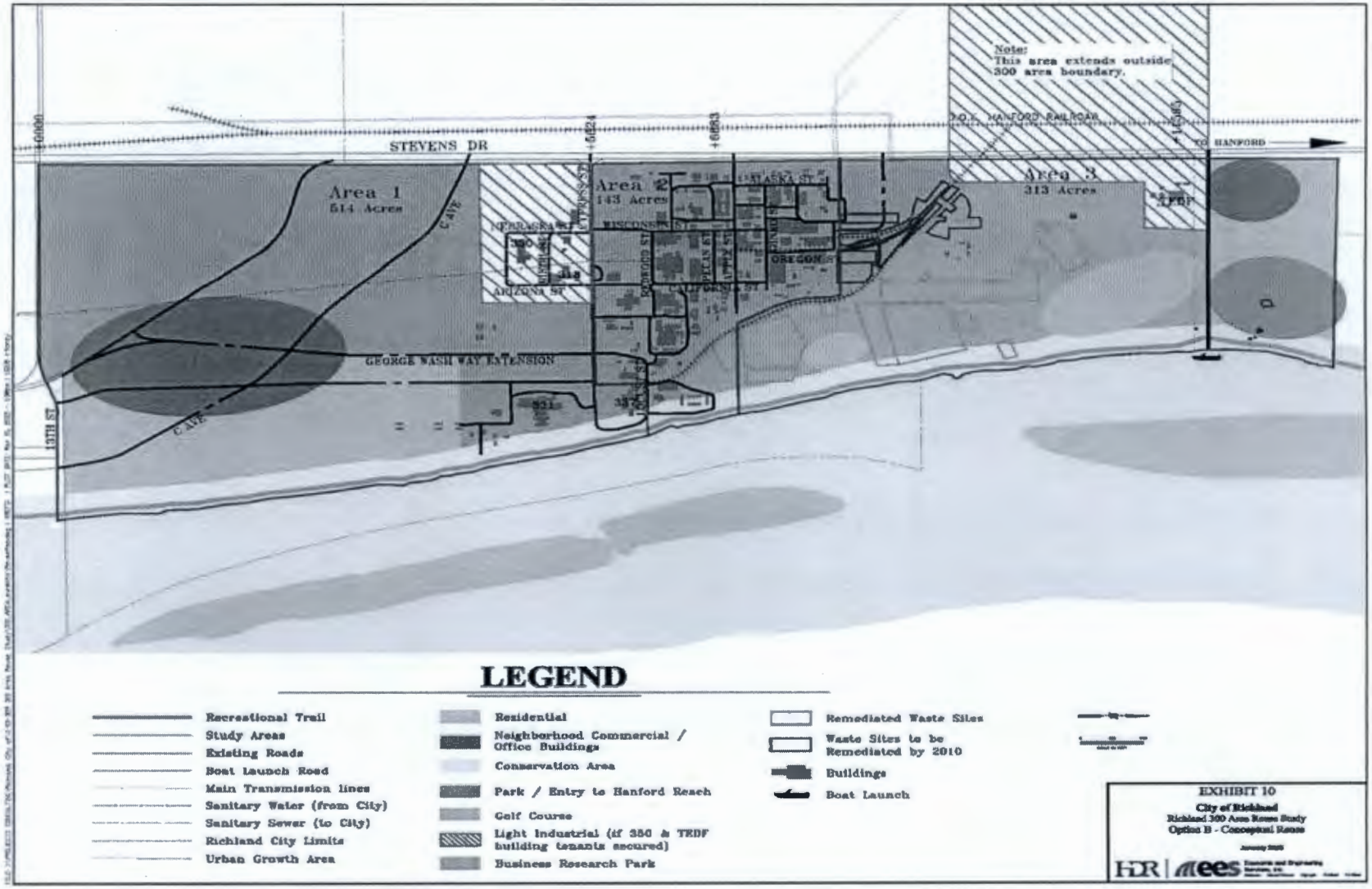
Principles for 300 Area Reuse Planning

- Location on Columbia River is key.
- Plans should include:
  - Protective riverfront buffer to protect cultural resources, provide for a bike path/trail and to maintain riparian habitat.
  - Mixed land use scenario
  - Local gateway to the recreational resources of the Hanford Site and Hanford Reach National Monument
  - Mix of public and private land ownership
  - Some land reserved for future federal mission opportunities.
- A federal incentive will be needed as a catalyst for spurring redevelopment.

Conceptual Reuse Option A



Conceptual Reuse Option B



Data Needs and Questions

1. Difference in remediation costs for an industrial cleanup standard versus unrestricted cleanup standard for lands not yet remediated?
2. Difference in remediation costs between leaving one or more of the facilities considered for reuse versus removal of the facilities and remediation as originally planned?
3. Can a mixed use scenario be realized without changing the current industrial cleanup standard?
4. Can some limited facilities and the infrastructure needed to serve them be retained in the 300 Area?
5. Is irrigation, such as for a golf course or a park, feasible for certain portions of the site, including areas where remediation has been completed?
6. Complete a cultural resources survey and develop a cultural resources protection plan for the site that would remain in place during redevelopment.

Develop a Detailed Reuse Plan

Next Steps…

- Determine market demand for key existing buildings
- Determine potential for construction technology center
- Identify state and federal incentive opportunities for reuse
- Identify desired future land ownership and mechanisms for transfer
- Consider integration with North Richland Research Park planning

Future Plans

- Preliminary assessment will be presented to City Boards and Commissions
- No formal acceptance of assessment is anticipated
- Planning Commission and/or City Council may or may not determine that changes to the City's Land Use Plan are desirable based on the assessment
- Changes to the land use plan would be through amendments to the City Comprehensive Plan

Discussion/Questions

Looking south towards Richland, 2004

300 Area Workshop
Richland, WA
May/18/05

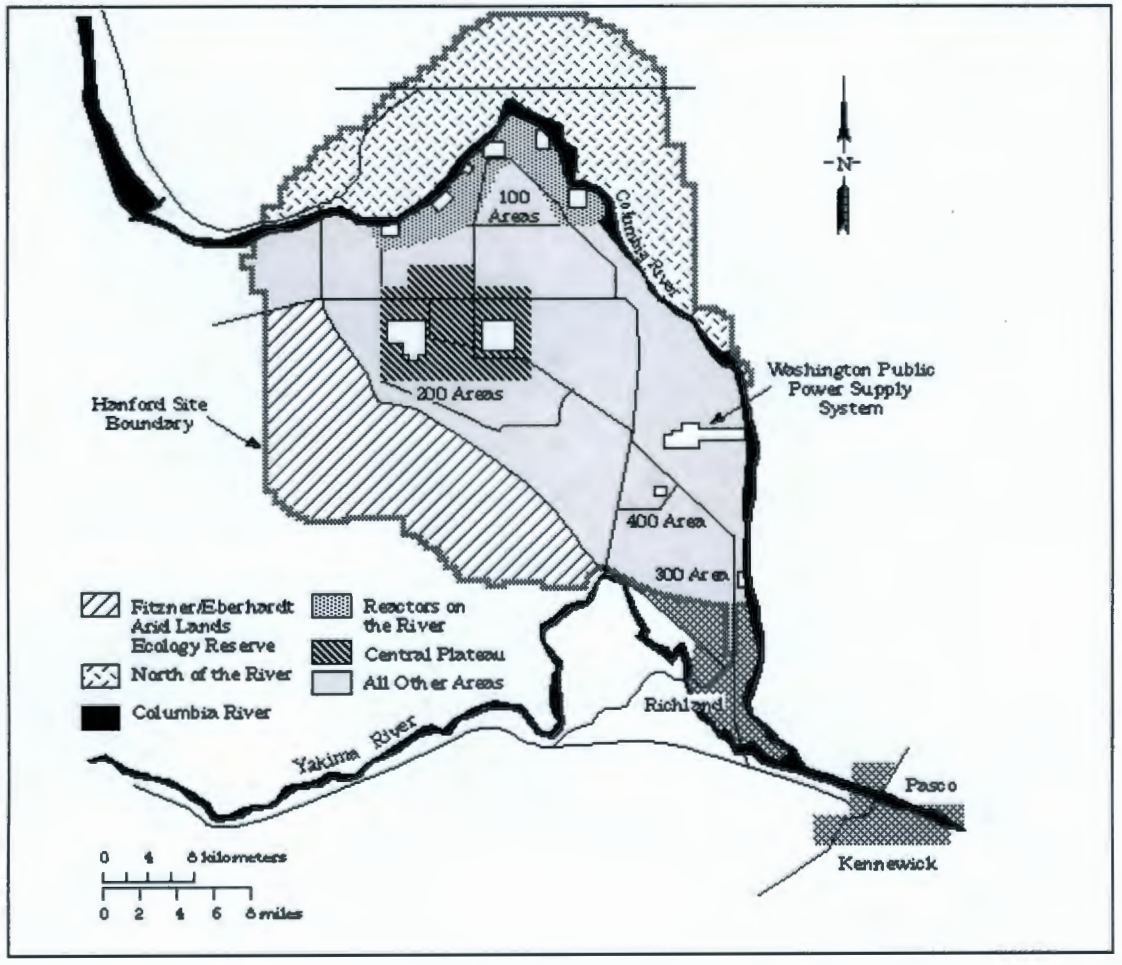
Tom Ferns, U.S. Department of Energy
Richland Operations Office

Aerial View of Land Use

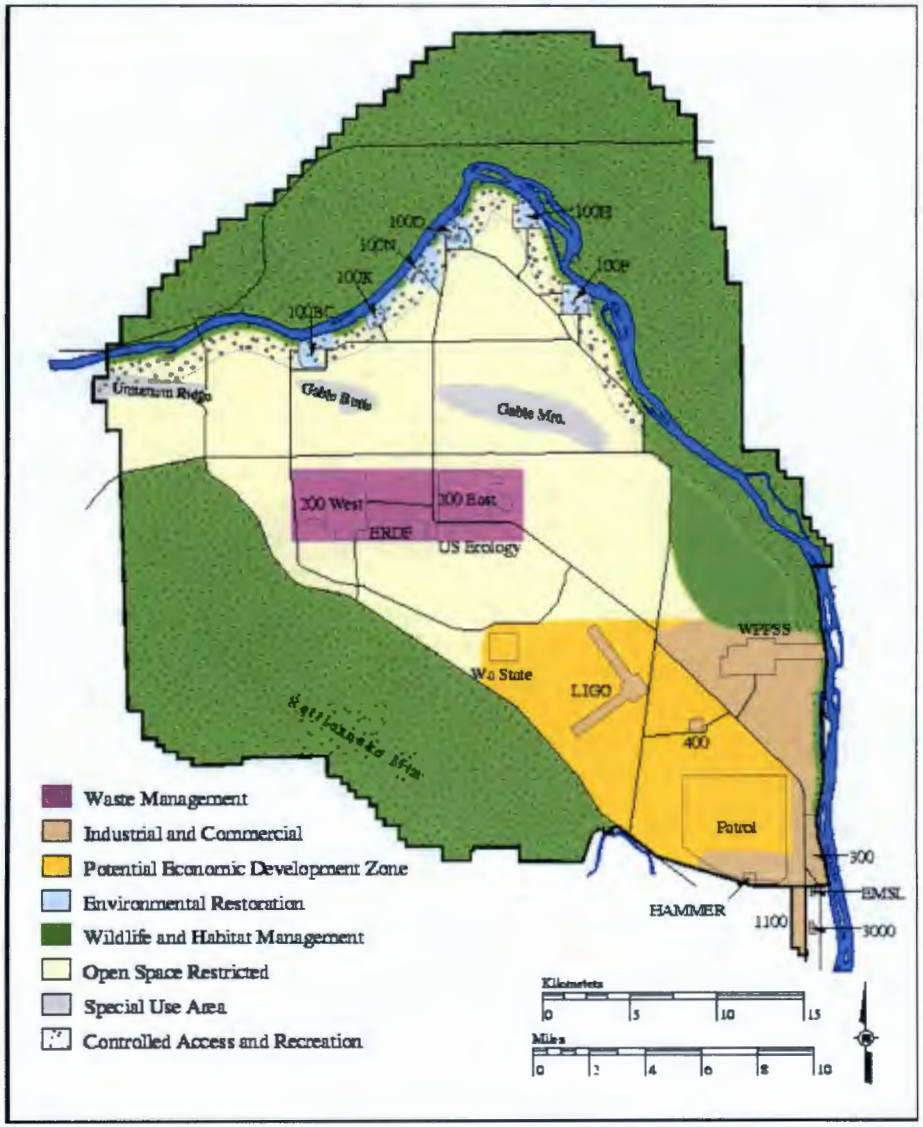
Hanford Site Planning Issues

- Size-- 586 miles^2
- Four NPL Sites
- Columbia River (49 miles)
- Five ESA Listings
- Over 20 State Listings
- Archaeological & Historical Districts
- NRDA Concerns
- Withdrawn Public Domain Lands
- DOE and DOD Dual Use
- Tribal Treaty Rights
- Redevelopment
- Pristine Areas
- Institutional Controls
- Congressional Direction

Future Site Uses Working Group
Six Geographic Areas



Draft HRA-EIS Land Use



Land Use Definitions

- **Industrial-Exclusive** An area suitable and desirable for treatment, storage, and disposal of hazardous, dangerous, radioactive, and nonradioactive wastes. Includes related activities consistent with Industrial-Exclusive uses.
- **Industrial** An area suitable and desirable for activities, such as reactor operations, rail, barge transport facilities, mining, manufacturing, food processing, assembly, warehouse, and distribution operations. Includes related activities consistent with Industrial uses.
- **Agricultural** An area designated for the tilling of soil, raising of crops and livestock, and horticulture for commercial purposes along with all those activities normally and routinely involved in horticulture and the production of crops and livestock. Includes related activities consistent with Agricultural uses.

Land Use Definitions

- **Research and Development** An area designated for conducting basic or applied research that requires the use of a large-scale or isolated facility. Includes scientific, engineering, technology development, technology transfer, and technology deployment activities to meet regional and national needs.
- **High-Intensity Recreation** An area allocated for high-intensity, visitor-serving activities and facilities (commercial and governmental), such as golf courses, recreational vehicle parks, boat launching facilities, Tribal fishing facilities, destination resorts, cultural centers, and museums.
- **Low-Intensity Recreation** An area allocated for low-intensity, visitor-serving activities and facilities, such as improved recreational trails, primitive boat launching facilities, and permitted campgrounds.

Land Use Definitions

- **Conservation (Mining and Grazing)** An area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining and grazing could occur as a special use (e.g., a permit would be required) within appropriate areas.
- **Conservation (Mining)** An area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining could occur as a special use (e.g., a permit would be required) within appropriate areas.
- **Preservation** An area managed for the preservation of archeological, cultural, ecological, and natural resources. No new consumptive uses (e.g., mining) would be allowed within this area. Public access controls would be consistent with resource preservation requirements.

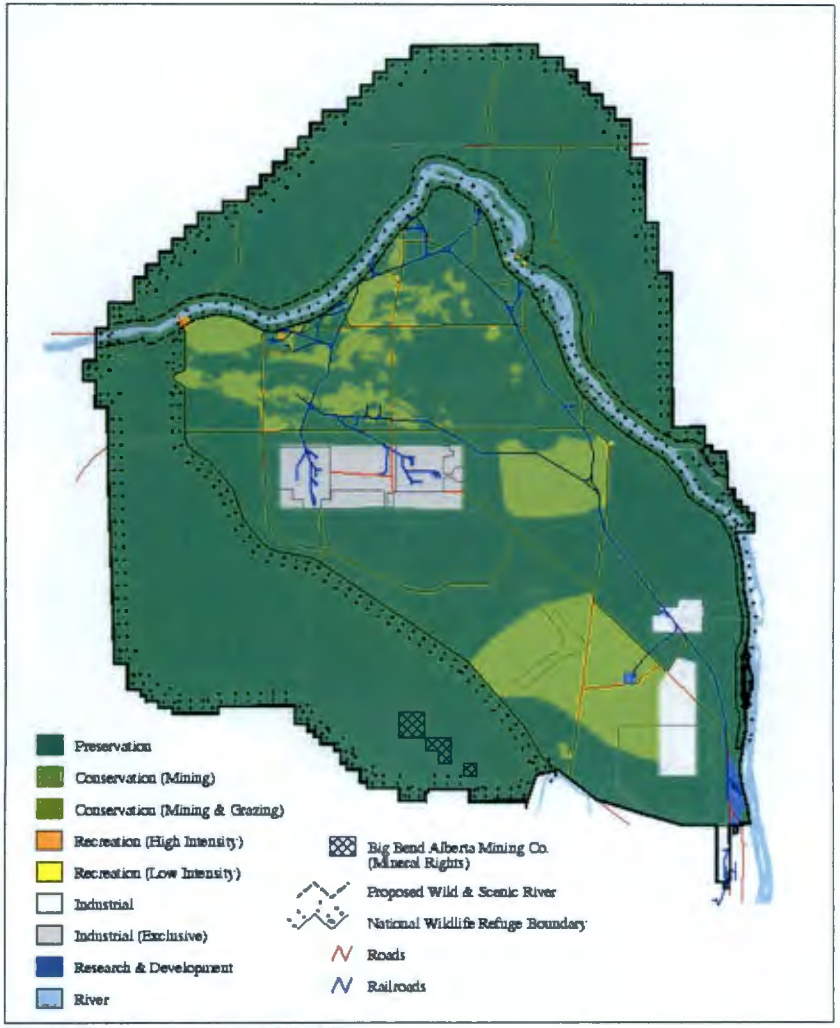
Preferred Alternative (DOE)

Figure 3-3. Preferred Alternative

BH:zoo 04/23/98 clus/prefalt.aml Database: 25-AUG-1999

Alternative One (Trustee)

Figure 3-4. Alternative 1



BHI:rpp 04/23/98 cis/p/alternative 1.aml Database: 26-MAR-1999

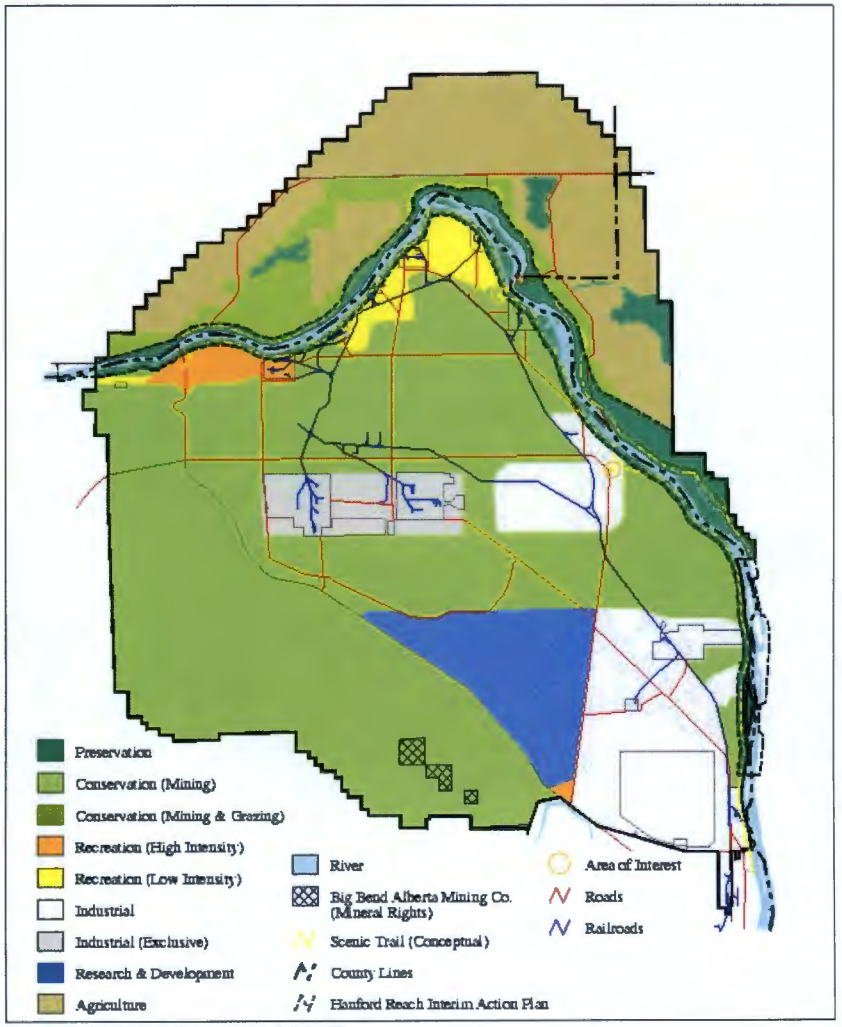
Alternative Two (NP Tribal)

Figure 3-5. Alternative 2

BHI:rep 04/13/98 clsp/alternative2.ai Database: 26-MAR-1999

Alternative Three (Local Gov't's)

Figure 3-6. Alternative 3



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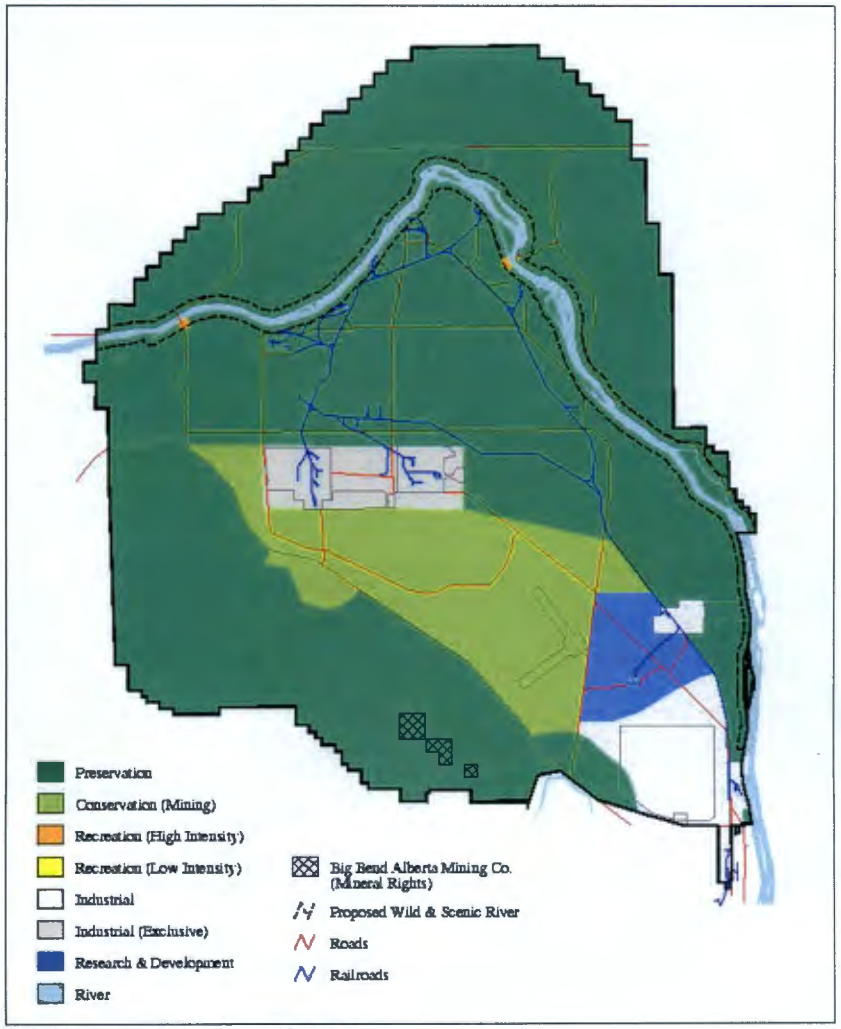
Alternative Four (CTUIR Tribal)

Figure 3-7. Alternative 4



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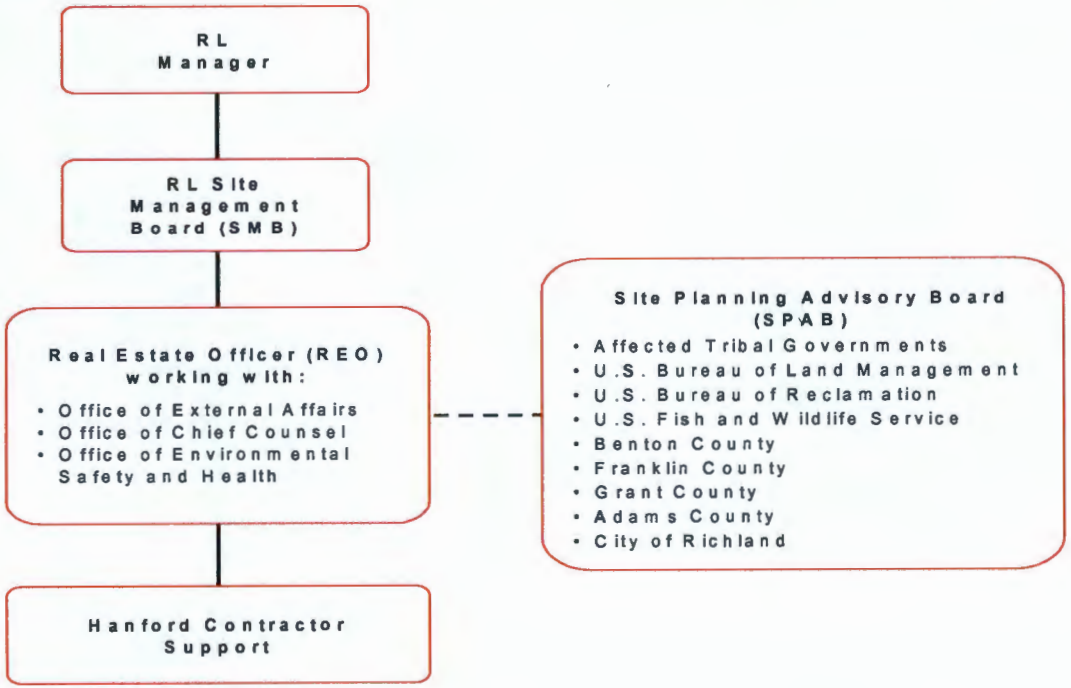
No-Action Alternative (DOE)

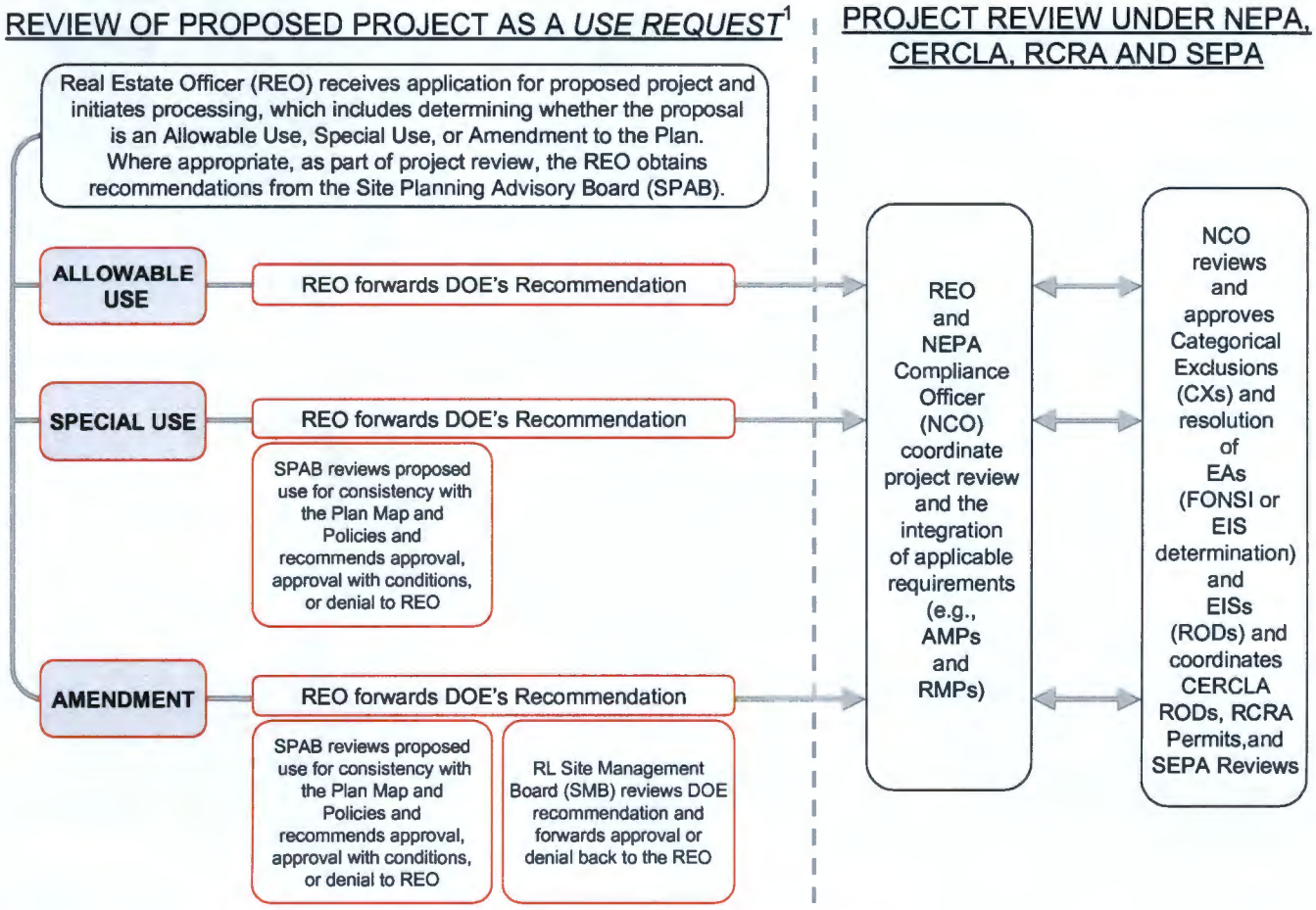
Figure 3-2. No Action Alternative

HRA-EIS

Organizational Structure for the Comprehensive Land-Use Plan



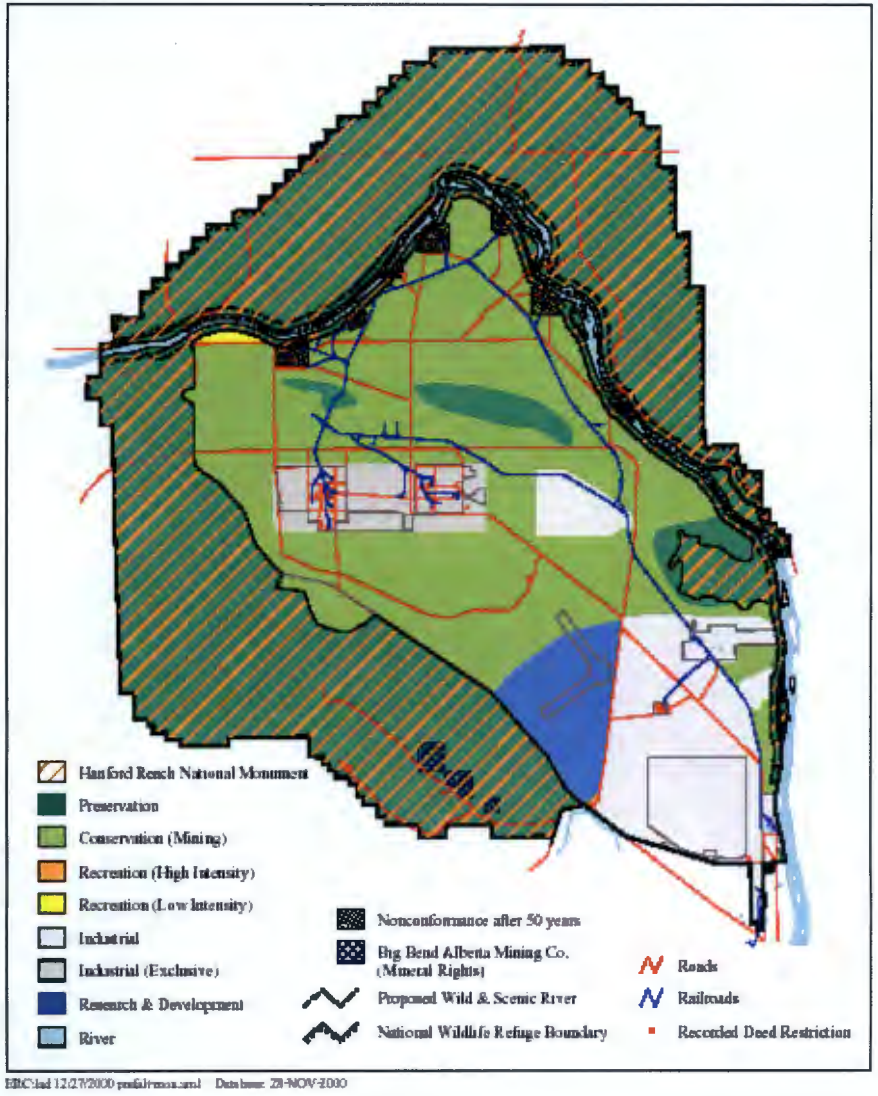
Review Process for Use Requests



[1]The proposed land or facility use, and location are reviewed for consistency with the Plan Map and Policies.

Hanford National Monument

National Monument Overlay



Salmon Fishing Camp

Energy Northwest's Nuclear Plant

N Reactor Area in Monument

Elk

HRA-EIS

Cultural Resources

Summary

The Final HCP-EIS is available at:
http://www.hanford.gov/eis/hraeis/hraeis.htm.

300-Area End States Questions

Future Land Uses

Based on the possible post-cleanup land uses (primarily focused on the time frame of 20 years into the future and beyond),

- What range of activities could the public, workers, and/or visitors be involved in within the region now known as the (industrialized) 300 Area?
- Outside the industrialized 300 Area?
- Should other alternative activities (beyond those consistent with the assumed land uses) be considered for comparison or other purposes?
- Based on the desired land-use and exposure scenarios, what types of institutional controls are appropriate, and over what time frames?

Groundwater Remediation Alternatives and Technologies

Are the alternatives we are considering for the groundwater feasibility study appropriate? Are you aware of any other potential groundwater technologies which should be considered? Are there other considerations that should be evaluated?

Groundwater Remedy Selection Considerations

Given the possible types of surface uses and the potential groundwater remediation alternatives, what considerations are important for groundwater remedy selection? (For example, what is an acceptable period of time to achieve groundwater goals, and under what surface end states would it make sense to continue with monitored natural attenuation or be necessary to pursue alternative approaches?)

300 Area End State Workshop, May 19, 2005

Future Land Uses

Question: Based on the possible post-cleanup land uses (primarily focused on the time frame of 20 years into the future and beyond),

- What range of activities could the public, workers, and/or visitors be involved in within the region now known as the (industrialized) 300 Area?
- Outside the industrialized 300 Area?
- Should other alternative activities (beyond those consistent with the assumed land uses) be considered for comparison or other purposes?
- Based on the desired land-use and exposure scenarios, what types of institutional controls are appropriate, and over what time frames?

Summary – Potential Future Land Uses

Industrial

- Industrial business uses by DOE or Department of Defense, such as biological and chemical research, high-tech engineering, and research on how to get uranium out of the environment.
- Agricultural uses (e.g., wineries)
- Passive Energy Generation
- Office Complex Development
- Energy Development
- Sustainable research and development for "green" energy and development.
- Redevelop the area with facilities for educational use
- Redevelop with light industry – especially those that could make use of the Treated Effluent Disposal Facility.
- Develop the area into a transportation HUB because of the proximity to rail lines, barge dock and major highways.
- Bridge to Pasco
- The area could be used for future government missions.
- Entry to National Monument

Recreational

- Retirement area (unconstrained uses similar to 100-Area Workshop, such as a golf course, swimming pools, walking path along the river)
- Recreation, especially along the River – biking, boating, walking
- Recreation – biking, boating, walking
- When excavating contaminated soil, continue digging to excavate the contaminated aquifer material and create "One Big Marina"

Other

- Any land with a river view should be unrestricted (because of its high value).
- Leave the 300 Area as an open area with natural vegetation – no irrigation will be required resulting in less uranium being released to groundwater, protect cultural and historical resources

- The area could be developed for a variety of uses like the Columbia Point area in Richland

Considerations for Future Land Use decisions

- Several requirements that need to be included to attract industrial users
    - The user's liability must be capped so they are not taking the risk of being responsible for preexisting contamination
    - Must provide other incentives to use previously contaminated land when lots of clean land is available – tax reduction or other incentives.
- Protect Cultural Resources
- Secure a 100 meter strip along the river for unrestricted use cleanup standard
- A preference for non irrigated uses over irrigated uses to minimize mobilization of uranium.
- Water (the Columbia River) is an attractant – people will want to use this area for recreation or other uses that give them access to the location and the river shore in the future.
- Reuse the land for industrial development rather than have industry continue to sprawl into undeveloped areas.
- Reuse of the area will lead to better protection of any contamination that remains. People living and working in a region with remaining contamination and institutional controls will pay attention which will lead to better protection. An example given was the desecration of Civil war battle fields that are not set aside and maintained. Isolated locations in the woods are much more often looted than those that are identified and maintained.
- Kids will dig – concern that where ever they are, kids like to dig and will encounter any contamination that will remain.
- The contamination distribution must be well understood so decision makers can be well informed as they make trade off decisions about where cleanup effort is focused. Can a large area be cleaned up to unrestricted use for the same cost remediating a small hot spot buried deeply – and is that an appropriate trade off?
- Need to understand the consequences of failure of institutional controls.
- Risk to environment from uranium may push cleanup more than the drinking water standard
- Cleanup should be protective of biota – the industrial standard is not protective of biota, animals they are there 24/7.
- Riverfront property is the key distinction, not contaminated areas (i.e., inside versus outside the fence).
- Stay flexible during cleanup decision process.
- Based on cleanup technology availability, use a phased approach for land use.
- Institutional controls for uranium won't work, but other shorter-term institutional controls are valid.
- Need to clarify confusing technical issues for the public (e.g., the difference between U-235 and U-238, or the differences between radiological dose and toxicological exposure).
- <u>Institutional Controls</u>
    - Need to be redundant
    - Integrated with land use and cleanup standards
    - The consequence of failure needs to be understood - failure seems certain, especially over time (who enforces cleanup then?)
    - Enforcing agencies in the future must ensure compliance with required controls.

300 Area End State Workshop, May 19, 2005

Future Land Uses

Question: Based on the possible post-cleanup land uses (primarily focused on the time frame of 20 years into the future and beyond),

- What range of activities could the public, workers, and/or visitors be involved in within the region now known as the (industrialized) 300 Area?
- Outside the industrialized 300 Area?
- Should other alternative activities (beyond those consistent with the assumed land uses) be considered for comparison or other purposes?
- Based on the desired land-use and exposure scenarios, what types of institutional controls are appropriate, and over what time frames?

Group 1 – Facilitator - Shelley Cimon

Range of activities/uses:

- Leave the 300 Area as an open area with natural vegetation – no irrigation will be required resulting in less uranium being released to groundwater.
- Develop the 300 Area in a way that includes residential and commercial uses
- Recreational use – bike paths
- Redevelop the area with facilities for research or educational use –
- Housing and other facilities to support research and educational uses of the area.
- The area could be used for future government missions.
- The area could be developed for a variety of uses like the Columbia Point area in Richland
- Maintain the area in a preservation state

  No development, protect cultural and historical resources
- Redevelop with light industry – especially those that could make use of the Treated Effluent Disposal Facility.
- Develop the area into a transportation HUB because of the proximity to rail lines, barge dock and major highways.
- Industrial users will prefer new space to redevelopment of the 300 Area
- Several requirements that need to be included to attract industrial users
  - The user's liability must be capped so they are not taking the risk of being responsible for preexisting contamination
  - Must provide other incentives to use previously contaminated land when lots of clean land is available – tax reduction or other incentives.
- A preference for non irrigated uses over irrigated uses was expressed because some uranium will most likely remain at depth.
- Protect Cultural Resources
- At some time uranium may again be a needed resource and the uranium beneath the surface could be recovered for reuse.
- Future use should be guided by sufficient characterization of the problem and a good understanding of what will impact the remaining uranium.
- Redevelopment will require digging to install utilities.
- There may be alternate scenarios for who controls the land long term –

    - DOE
    - Other government agencies
    - Tribes
- A key decision is who will be the future owner of the land.
- It isn't an all or nothing situation with the surface cleanup – much of the land will be clean enough for unrestricted use.
- With the cleanup planned – if you have a breach of institutional controls that is sufficient to cause a hazard you would most likely be able to detect it. A small shallow excavation will not expose people to significant hazard. And a hole large enough and deep enough to create a hazard will be large enough to be noticeable to whoever is maintaining the institutional controls.
- The requirements for cleanup need to be well defined now – cleanup is underway and will be even more aggressive once the river corridor contract is in place.
- Water (the Columbia River) is an attractant – people will want to use this area for recreation or other uses that give them access to the location and the river shore in the future.
- Reuse the land for industrial development rather than have industry continue to sprawl into undeveloped areas.
- Reuse of the area will lead to better protection of any contamination that remains. People living and working in a region with remaining contamination and institutional controls will pay attention which will lead to better protection. An example given was the desecration of Civil war battle fields that are not set aside and maintained. Isolated locations in the woods are much more often looted than those that are identified and maintained.
- Kids will dig – concern that where ever they are, kids like to dig and will encounter any contamination that will remain.
- The contamination distribution must be well understood so decision makers can be well informed as they make trade off decisions about where cleanup effort is focused. Can a large area be cleaned up to unrestricted use for the same cost remediating a small hot spot buried deeply – and is that an appropriate trade off?
- The conservation area identified in the City of Richland study does not protect all cultural resources.
- Disturbance of cultural resources is not acceptable.
- How will remediation address the long term question – the impact of uranium on the shoreline and the river?
- Need to understand the consequences of failure of institutional controls.
- Risk to environment from uranium may push cleanup more than the drinking water standard

Group 2 – Facilitator - Gariann Gelston

- Encourage the City of Richland to adopt multiple uses for the 300 Area, not just industrial use. There should be no limits on the types of development.
- The Tribes want the groundwater and the vadose zone cleaned up to allow unrestricted use per NAGPRA.
- What model was used to determine the 37 pCi/g cleanup standard?
- What's the difference between U-235 and U-238?
- Use of the 300-Area groundwater for irrigation with sprinklers could result in airborne contamination.
- If the 300 Area were developed, there would be no well drilling allowed. The City would provide drinking water.
- Uses could vary in different parts of the 300 Area based on the location of the groundwater plume.
- PNNL is moving out of the 300 Area and their "Research Campus of the Future" will be located near the existing PNNL campus.

- If DOE releases the land, the City would provide utilities, so they need a plan for where not to dig.
- Future uses include all life forms, not just humans.
- Regulations are the drivers for cleanup; land use is not the driver.
- Cleanup should be protective of the biota as well as the groundwater.
- Land use discussions don't consider where the wastes are going (e.g., the groundwater plume is migrating to the river).
- The River Corridor Risk Assessment includes ecological impacts.
- Hanford groundwater discharges are closely monitored where they enter the river and also farther down river.
- Fertilizers from local farms contain uranium that gets into the river.
- The City uses institutional controls to draw water from the river, sends it to a mound area, and withdraws water from the opposite side of the mound for drinking water.
- Currently no well drilling is allowed in North Richland residential areas.
- The half life of U-238 is more than four billion years, so institutional controls won't work.
- A recent Long-Term Stewardship study said that two million people could be living in the Tri Cities in 100 years. A demographic study is needed. (Demographic information may be available on the Risk-Based End States website.)
- How can we ensure water use for many generations in the future?
- The potential for a dam to collapse and result in flooding of the 300 Area should be considered.
- The groundwater doesn't pose a risk to humans if it isn't pumped out of the aquifer. Most land uses should be OK if they use City-supplied water.
- Recreation and residential uses are likely (i.e., unrestricted surface use).
- The residential cleanup standard requires less-contaminated backfill material. There is one small area with some contaminated backfill (between 37 and 267 pCi/g), which would not be too difficult to dig up and replace with clean soil.
- All future cleanup should use clean backfill.
- How can you have an industrial cleanup standard for biota?
- Agricultural scenarios (e.g., wineries) are needed.
- This could be a prime retirement area with a golf course, swimming pools, and walking paths along the river.
- Institutional controls not related to uranium are valid for a shorter time frame.
- Other technologies exist for uranium in the vadose zone and the groundwater.
- The area could be a business and research park with light industries, high-tech industries, and/or PNNL spin-off companies.
- The City of Richland should determine the answers to the questions that were raised in their 300-Area reuse study.
- There is the potential for a bridge across the river in this area.
- The Tribes don't want DOE to give up control of this land.
- We should assume similar land uses to what we heard in the 100-Area Workshop (i.e., unconstrained uses).
- Uranium is a hexavalent heavy metal that has toxic impacts on the environment.
- Don't forget about risks to the cleanup workers as well as the public. Considering all the unknowns, there are likely to be more surprises as cleanup progresses.
- At the present time, we should distinguish between the industrial 300 Area and the land outside the fence, which is already clean for the most part. The industrial cleanup standard was meant for the land inside the fence. However, we shouldn't distinguish between the two areas for the long term.
- The riverfront area is the key distinction for land-use activities, not whether the land is contaminated (i.e., inside or outside the fence).

- Potential future uses by DOE or Department of Defense could include biological and chemical research, high-tech engineering companies, and agricultural research.
- Look at radon (daughter product of uranium) equilibrium issues.
- The 300 Area could be used for research on how to get uranium out of the environment (for Hanford and for other sites such as uranium mining areas).
- Could create a new industry here focused on new methods and materials for construction, making use of vitrification plant construction knowledge and PNNL computer expertise.
- Comply with the TPA, which says to remove all the facilities and clean up the area for multiple uses.
- May need institutional controls to train workers in the future.
- Liability issues may prevent future use of this area by the nuclear industry. But some locations don't want nuclear, so maybe this is a good location since we're pro-nuclear.
- Indemnification may be required to encourage industry to locate here.
- Industry should go to the 200 Area. The 300 Area should be cleaned up for other uses.
- Based on cleanup technology availability, use a phased approach for land use.
- Stay flexible while going through the cleanup decision process.
- It's very likely that we will find some surprises, even in the clean areas outside the fence (e.g., 618-10/11 burial grounds).

Group 3 – Facilitator – Susan Leckband

Future Land Uses

- Access to the River, e.g., boat launch
- Unrestricted uses, all uses
- There is limited land on or near water. There will be pressure to use this premium land for residences, offices, condos, recreational uses – needs to be unrestricted use for that reason.
- Green area; sustainable, renewable industrial and residential (e.g., energy conservation, green building); different image than the current one of contamination, e.g., R&D for green technologies/demonstrations
- One big marina (dig deep)
- Industrial (passive)uses, e.g., power panels
- 337 Building – Buildings of value (if available) should be preserved for future re-use.
- Preserve many more buildings; re-evaluate in future for re-use
- There are "hotel" costs for maintaining buildings until there is an owner.
- Preserve infrastructure (water, roads) supporting the buildings
- Zero-scaping: no irrigation for any use (green building concept) in the 300 Area
- Need to consider the risks to the workers to D&D buildings; risk-management impacts, worker safety, time
- Visitors to sustainable R&D
- Envision recreational visitors – biking, running, recreation from people living in homes near the River
- Depends on use; if residential – bike paths; if industrial – walking paths; do not believe people will spend 40 hrs/week in the area
- 337 Building is worth saving. Others are too old; need too much work.
- 331 Building – upgraded; great potential
- Proximity of Area to Richland – much boating – people will get off their boats and wander the area
- Digging on shore, diving, shoreline activity – Where does contamination enter the River? Is there a pathway of exposure? Pathway – ingestion of River shore organisms; inhale dust from digging in gardens

- What about beryllium contamination to workers during D&D? Concern over inhalation pathway – addresses thru applying fixatives and the workers using supplied air
- Not see any wells being dug
- Uranium concern – toxicity of heavy metal
- Not see another cultural center in the 300 Area (There will be one at the Reach Interpretative Center.)
- No golf course
- Not see any irrigation outside the (300) area because it would change the hydrology.
- Lawns and parking lots supporting industry
- Energy production, solar
- Any energy production, e.g., nuclear
- North Richland bridge to Pasco
- Daycare, food services, strip malls – amenities supporting a work environment
- Cleanup Standards – Land Used - Institutional controls are parts of a circle. They are interdependent. They need to be integrated.
- If cleaned up to industrial standards, but a developer wants to use the land for residences, institutional controls should kick in. The developer could do additional cleanup driven by the value of the land.
- Institutional controls get lost over time (e.g., currently people are ignoring the "no overnight" camping signs)
- Effectiveness of institutional controls is based on redundancy; redundancy needs to be based on risk
- No strip malls
- Failure of institutional controls drives one to consider greater cleanup.
- Does greater cleanup warrant the cost (cost-benefit issues)?
- No development activities, No Action alternative (inside and outside the 300 Area)

300 Area End State Workshop, May 19, 2005

Groundwater Remediation

Questions:

Groundwater Remediation Alternatives and Technologies

- Are the alternatives we are considering for the groundwater feasibility study appropriate?
- Are you aware of any other potential groundwater technologies which should be considered?
- Are there other considerations that should be evaluated?

Groundwater Remedy Selection Considerations

- Given the possible types of surface uses and the potential groundwater remediation alternatives, what considerations are important for groundwater remedy selection? (For example, what is an acceptable period of time to achieve groundwater goals, and under what surface end states would it make sense to continue with monitored natural attenuation or be necessary to pursue alternative approaches?)

Workshop input (Brainstorming Results):

Groundwater Remediation Alternatives and Technologies

- Install a grout curtain up gradient of the uranium plume. Allow river/groundwater interaction to clean out the uranium in groundwater
- Look at other sites with uranium contamination (for example Fernald) – what remedy did they choose and is it applicable (someone who had worked on the groundwater cleanup at Fernald was at the meeting and gave a brief description of the groundwater remediation approach used)
- In situ vitrification
- Don't allow development to preclude remedies that might be applied in the future.
- Alter the chemistry of the groundwater (by modifying the pH or redox potential) moving into the 300 Area so that uranium stays immobile.
- A golf course or a water park could be part of the remedy to drive uranium out of the groundwater for treatment.
- Flush the contaminant from the aquifer and capture it in pumping wells along the shoreline - willing to accept a short tem pulse to the river from flushing the deep vadose zone and aquifer

Groundwater Remedy Selection Considerations

- Uranium has a very long half life.
- Need to determine the effects of uranium on aquatic organisms
- Can we protect aquatic organisms by denying them access to uranium at the shoreline (with riprap or other access barrier)?
- Need to look at the total load of contaminants in the river effecting aquatic organisms – not just the 300 Area contributions
- Need to think long term – the land use will change with time.
- Natural attenuation did not reduce uranium concentrations to the drinking water standard in 10 years. Some questions need to be answered about this approach.
    - How long will it take?

    - So how long do institutional controls need to work to protect people from using water that is above the standard?
    - How long can we wait?
- Need a phased approach. First characterize; then identify remedies.
- Is technology the problem or is implementation the problem?
- Characterization of groundwater contamination should be done in parallel with facility D&D.
- D&D and groundwater RI/FS schedules are not well integrated.
- Life-cycle cost estimates must include the costs of surveillance and maintenance and institutional controls.
- Balance the cost of long term institutional controls vs dealing with the contaminant once and for all by digging it up and moving it to ERDF
- Use combination of alternatives
- Integrate soil and groundwater decisions
- Consider tribal cleanup standards and consumption by Native Americans
- Institute controls to address sensitive populations (children, pregnant women)
- If there is a change in the planned land use after cleanup – then natural attenuation is not sufficient.
- Recognize other contaminants – not just uranium.

300 Area End State Workshop, May 19, 2005

Groundwater Remediation

Questions:

Groundwater Remediation Alternatives and Technologies

- Are the alternatives we are considering for the groundwater feasibility study appropriate?
- Are you aware of any other potential groundwater technologies which should be considered?
- Are there other considerations that should be evaluated?

Groundwater Remedy Selection Considerations

- Given the possible types of surface uses and the potential groundwater remediation alternatives, what considerations are important for groundwater remedy selection? (For example, what is an acceptable period of time to achieve groundwater goals, and under what surface end states would it make sense to continue with monitored natural attenuation or be necessary to pursue alternative approaches?)

Group 1 – Facilitator - Shelley Cimon

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    - How long will it take?
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    - How long can we wait?

Group 2 – Facilitator - Gariann Gelston

- Pump and treat is not successful at reducing the concentration of uranium in the groundwater, but we may be able to use it to keep the plume from reaching the river (i.e., hydraulic control), although it would be difficult.
- May be able to stop uranium transfer from the vadose zone to the groundwater.
- Can't destroy uranium, but can change its form and stabilize it.
- Need to understand source of uranium to understand groundwater treatment options. Multiple release sites (e.g., 321 building tank), all commingled.
- Net loss of groundwater to the river is low.
- Need a phased approach. First characterize; then identify remedial approach.
- Influence of facility and piping D&D on vadose zone and groundwater contamination is unknown.
- Is technology really the problem, or is it implementation?
- Maybe we just need to clean up the deep vadose zone contamination.
- Could use "bugs" (i.e., bioremediation) to aggregate uranium into clumps, and then use in situ vitrification to immobilize the clumps.
- Characterization of groundwater contamination can be done in parallel with facility D&D. Sometimes old records are missing, so we need to verify assumptions about contamination as D&D progresses.
- Excavation results in worker exposures and transportation of large volumes of soil to ERDF.
- There is a schedule issue between D&D activities and the groundwater RI/FS process.
- Can't do a cost estimate to show the difference between industrial and residential cleanup levels until we characterize where the areas of contamination are. Use a relevant time frame and don't over-inflate the costs.
- Where D&D stops depends on the definition of "clean". The D&D Program hands off the cleanup responsibility to the Remedial Action Program for the soil 15 feet below the structures.
- Groundwater focus now includes the deep vadose zone.
- There are conflicting opinions on what sources are contaminating the groundwater.
- It is scary for workers being pushed to exceed the baseline schedule.
- Cost estimates must use life-cycle costs and include institutional controls and surveillance and maintenance costs.
- Don't rely on old data. Take baby steps to keep the workers safe.
- Consider relative risks of technologies to workers and the public.
- Understand contingency management in cost estimates.
- Hauling contaminated soil to ERDF doesn't resolve the uranium concentration issue.
- Stabilization of uranium isn't seriously considered.
- Need to look at uranium treatment technologies (e.g., vitrification).
- We could develop a decision tree showing which technologies impact the effectiveness of other technologies.
- Cryogenics (freeze wall)
- Schedule should be driven by what technology will allow and not by the arbitrary 2012 cleanup milestone for the River Corridor. Throw out accelerated cleanup.
- Use a golf course as part of the remedy to drive uranium out of the groundwater and treat it.
- "Bugs" are already in the aquifer, but the conditions aren't right (e.g., nutrients). Is there a fear factor about bioremediation (i.e., injecting something into the aquifer)?
- We need a better understanding of the limitations of the technologies.
- Be careful about altering the waste form. We could create more problems.
- Water conservation technology could be used with the golf course to manage water use.
- Could build a water park to flush the uranium out of the vadose zone.
- K_d values are variable.

- Buildings should act as a barrier to keep water out of the vadose zone, but underground pipes and sewer lines leak water into the ground, especially the old 300-Area infrastructure.
- Uranium is not just under the building footprints.
- The "no action" alternative should be considered.
- Scientists are currently studying how uranium chemistry changes over time to improve groundwater models.
- Research documents should be provided to a broader audience.
- The groundwater flow pattern in the 300 Area is complex (South and East).
- It is very likely that monitored natural attenuation could work in the foreseeable future.
- Dams have a 50-year design life and won't exist forever.

Group 3 – Facilitator – Susan Leckband

- Combination of alternatives (new alternative) e.g., hydraulic containment (tunnel) and flushing to capture
- Barrier, pump and treat then capture
- Vadose Zone has a longer list of contaminants; want area below 15' and groundwater frozen e.g., in situ, fix in place
- Keep digging. Do not stop at 15'. Dig until you hit groundwater (35'). Dig until groundwater is not hitting contaminated soil.
- Consideration: health of the hyporeic zone (bugs ecosystem). Consider the impact to this zone. This zone has high tribal importance.
- Would not a significant pump and treat system capture most of the contaminants? Could do areas at a time.
- Tried unsuccessful sheet metal barrier; what about a freeze barrier to freeze the aquifer?
- Length of technology usage – how long are we willing to wait to use the land
- Uranium flushing (big flush) – would consider. Want an accountable agency in place. Would be willing to get to source term sooner. (Ecology did not believe a major problem; could not do without institutional controls)
- Stabilize forever by 2018; no risk to the public
- What proportion of the uranium comes from 300 Area vs. total natural uranium sources?
- Consider cesium, strontium and other contaminants in the 300 Area. Stabilize forever or cleanup. Are there contaminants with levels of concern? Many are close to the surface and could be removed.
- Consider mobility of contaminants in the feasibility study.
- Are there specific list/combination of possible technologies? Need to address groundwater and soils as an integrated system.
- Children and pregnant women are the most susceptible. Institutional controls need to address this sensitive population.
- Cleanup standards need to address tribal consumption standards.
- Do waste sites outside of the 300 Area contribute to groundwater contamination? Yes, tritium. It will be dug up.
- After the majority of sources are cleaned up and if monitored natural attenuation data show decrease to acceptable levels, cleanup could take longer.
- Concentration and pathways are the two major factors of consideration. If data show reduced harm, what is the hurry to clean it up. The only real driver would be desire for the land.
- Consider the cumulative/synergistic effects of all contaminants.
- Remedy/institutional control failure – need to go back and revisit the remedy.
- If there is a change in the planned land use, need to look at something other than monitored natural attenuation.

- Cost is very large to get from one land use to another.
- Where is the future land use decision made – interim or final RODs?

LESSONS LEARNED – 300 AREA END STATES WORKSHOP

Participant Comments – May 19, 2005

COMMENT SUMMARY

In addition to notes and comments made throughout the workshop, comments were solicited at the end of the one day session. Twenty-three comments from 19 individual respondents were received. The 300 Area End States Workshop – the last of three Hanford End-States workshops -- was conducted in Richland May 19, 2005.

The comments were sorted into four topic categories. Neither the comments nor categories are prioritized. Although some comments touched on a variety of issues, each comment was assigned to only one category.

The following table summarizes the number of responses within each category.

CATEGORY	COMMENTS
Technical / Issues-Based Comments	13
Meeting Format, Facilitation & Process	4
Kudos	3
Miscellaneous	3
TOTAL	23

Response to the third and final workshop of the series was highly favorable with respondents again noting improvements over the first two workshops.

The majority of comments focused on issues related to ground water remediation and 300 Area land use considerations.

LESSONS LEARNED – 300 AREA END STATES WORKSHOP

Participant Comments – May 19, 2005

TECHNICAL / ISSUES-BASED COMMENTS

1. Better communication among the various players and organizations conducting D&D and environmental restoration is needed. For example, organizations that do GW monitoring need to know the schedules of D&D activities and/or facilities services activates like hydrant flushing, etc.

2. I heard no support for an industrial standard, the future is too uncertain. Please keep being open, and then include the ideas.

3. Realistic, flexible schedules and TPA, and Milestone timelines.

4. Current USDOE schedules will not provide the necessary technical information on the feasibility of application of technologies by 2007. No detailed field scale, pilot scale demonstrations are planned. They usually take 4 to 5 years to complete. PIO, EPA & Ecology should take appropriate steps to develop demonstrations of technologies. The current plain seems to follow the steps of the application of MNA which has proven to be unsuccessful. Wake up EPA, wake up USDOE!!

5. Need to recognize impacts of remedy implementation, (e.g. installation of grout curtain, slurry walk, etc. vs. cultural resource preservation and riparian zone preservation.)
   - No outcomes apparent on existing regulatory docs.
   - Questions were useless and vague.
   - Info sharing was good (EPA)!
   - Need insight into contract interfaces (groundwater vs. surface water and how remedies are related.
   - We need clean up requirements soon so clean up can progress.
   - Facilitators were good!

6. Seriously consider flushing the soil column with enough water to drop ground water plane to DW standards and do this until 300 Area is cleaned up. Place rip/rap along shore to ensure cone along shore is below DW, but it should be because the

7. Do not defrag the newer & usable buildings that have potential industrial uses, (eg. 337, 338, 339.) I do not believe confinements under these building constitute a risk to users or the public.

8. Just start pumping water and wash out the contamination into and down the river. That way we get it done. It is better to have a peak for a few years or one big marina.

9. The stuff has been in the ground already for 60 years. It's obvious; we don't have the technology now to make a big difference. People are not concerned about (Drantom) into

the river, upstream from city of Richland water intake. To me the risk is small. Fence it off, we can't stop it, and wait until the technology exists to make a difference. Use limited funding on activities that can make a difference.

10. The CLUP EIS was mentioned as the source for future land use plans, changes in land use were mentioned (618-10, 3216-4, 618-7) plus 3 other sites from "Industrial" to "Unrestricted". I also heard that no changes would be made without amending the CLUP EIS. It was stated by Tom Ferns that the EIS would be reviewed every 5 years and revised if needed. The ROD was 1999 and 5 years would be 2004, it's now 2005. Why hasn't the CLUP EIS been revised?

11. Start some technology trials now.

12. Use a variety of clean up ideas. Don't use only one for the entire 300 area.

13. Don't push too hard on accelerated clean up. Soil surface cleanup is closely related to underground water contamination, i.e. surface cleanup must be tied in with ground water remediation.

MEETING FORMAT, FACILITATION, AND PROCESS

14. How is the information from this workshop actually going to be used?

15. Thanks for all the effort needed to put the workshop together. I really appreciate hearing all the different views. It helps me with the big picture. The workshop was very encouraging for me.

16. Format of workshops worked well. Susan L. was a great facilitator. Need to differentiate between land-use along the river vs. other areas. Good mix of people in group, technical experts and general public dialogue was very insightful.

17. Useful meeting, good exchange of information. Varying view points with no clear path forward. Inadequate technology and site info to resolve issue. No clear path forward. Land use planning doesn't always get accepted. Risk-cost analysis and trade off story needed.
    - Excellent format and facilitators
    - Great exchange of information and ideas.

KUDOS

18. Congratulations, if it is adequate it will facilitate logical, sustainable decisions.

19. Good Job!!

20. Give Shirley a bonus

MISCELLANEOUS

21. Need more public education about all the issues, not just political ones.

22. Current Energy Bill promotes Nuclear Power expansion. Sighting is underway in IL, PA, and GA. Offer the 300 area for a new power plant site. Fed, incentive for construction required. Fixed use.

23. More cookies! I didn't get one.