

Appendix to the Report of the Exposure Scenarios Task Force

Sponsored by the
Hanford Advisory Board, U.S. Department of Energy,
U.S. Environmental Protection Agency, and Washington
Department of Ecology



Submitted to:
U.S. Department of Energy
U.S. Environmental Protection Agency
Washington Department of Ecology

December 2002

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Appendix I – Notes from Central Plateau Workshops

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HAB Exposure Scenarios Task Force
“Detailed Bullets” from Tuesday March 12, 2002

Assumptions (Who is making them? On what are they based?)

- Not infinite \$ for cleanup
- Someday cleanup will be “done”
- There will be barriers in the 200 Area
- Institutional Controls don’t substitute for clean up
- Institutional Controls work and drive exposure scenarios formulation
- LTS – on-going nuclear activities?
- Core is sacrificed

Definitions

- Buffer zone
- Core zone
- Default assumptions
- Relationship: risk assessment, land use and exposure scenarios
- “maximum reasonable exposure scenario”
- “maximum reasonably foreseeable use”
- Long Term Stewardship
- Remediation
- “Industrial” and “unrestricted” use
- Native American subsistence scenario

Stuff to Talk About (questions and open issues)

Groundwater

- Contamination of groundwater – applicability of state law, cleanup standards.
- Mechanism for keeping groundwater from migrating
- What is the acceptable standard?
- Do you consider plants related to the groundwater problem? (e.g. deep-rooted plants bringing up groundwater)

Policy Issues

- Future Site Uses Working Group (FSUWG) is a starting point
- Are there policies already in place for Plateau end states?
- CERCLA/state law boundaries
- How will Task Force work be included in C3T work?
- How will tank closure decisions be made? (What is the process, timeframe, etc.)
- Out year funding
- Out-of-the-model comments e.g. Ice Age flood, Trillions of \$ for cleanup (i.e. the non-continuous event)

Science Issues

“Big” picture:

- Do we have an accurate picture of the totality of the waste?
- What type of contamination are we dealing with?
- Are we looking at the right range of contaminants or only the “big” ones?
- What triggers a “re-look” at new technology; future mitigation?
- Add state today?
- Activities will not cut cleanly with timeline
- Regions should be drawn by where hazardous materials are
- Scenario development will rely on data confidence/quality (Exposure scenarios should drive data confidence)

“Small” picture:

- Depth and extent of vadose zone contamination?
- Data gaps
 - Extent of radionuclide contamination (type, risk characteristics, half life)
 - Extent of hazardous materials brought to and buried on Central Plateau (characteristics, impact, etc.)
- Baselines
- Should we be looking at max. exposed individual?
- Standards must address number of exposed populations (i.e. how many people will live the scenario)
- Preferred pathways are different consideration than plumes and contamination depth

Trust Responsibility/Tribal Issues

- Fiscal responsibility: all tribal resources
- If government is not meeting its responsibilities, what is the remedy?
- Conflicts between agency responsibilities and agendas and trust responsibilities
- For Ecology sites, which regulator (EPA or Ecology) is responsible for the tribal trust responsibility?
- Native American subsistence scenario – if you clean it up to this level, it’s probably good enough for other things

Additional Environmental Issues

- Link between land use and exposure scenarios
- Secret waste (U-233, Pu)
- Dumping in the Reach
- Will Institutional Controls be in place forever?
- Who should be the “stewardship czar”?
- What about seeps/springs along the river? Will they be restricted?
- What about the animals?
- Central Plateau in context with the rest of the world
- What about flooding activities?

Interests (I want attention paid to...)

City interests

Drinking water

Get a good strategy

Perspective of hands-on people

Change the way we dialogue

Need to connect data to reality. Need to connect to public values & beliefs

Amount of \$ does not have to define what's possible

Stewardship remains a technical task

Fence doesn't stop soil exposures (Rocky Flats lessons)

Consider what is adjacent to the fence line – “piecemealing” risks can be problematic

Core should include everything that requires remediation

Deal with groundwater now

Take responsibility for more than one issue at a time (don't be too single-minded)

Values (I care most about...)

People who live downstream

Cleaned up as much as possible

Protect citizens (all)

Kids/grandkids in area

Neighbors. Track cleanup progress

Live close to River & Groundwater plumes

Health of Columbia River & everything that lives near it

Healthy communities

Public needs to be attached to policy

Oregonians

Hanford Work Force

Represent aging workforce

Make sure cleanup commitment is fulfilled

Protect humans and environment

I don't want Hanford to give me cancer

Industrial clean-up standards only under limited circumstances

Treaty rights are property rights

Food chain is the key (bioaccumulated contaminants)

Plumes (groundwater, soil, etc.) are all connected

Want protection for future generations

Need to do best job you can

What is cost of not being able to use the groundwater?

Respect for traditional Native American culture and lifestyle

At some point, there will be no control over the area

Humans are not the only impacted entity

Want to do the best we possibly can to ensure the future

Go back and remember where we've been

Remember that this site is part of a complex

Equity across generations

**HAB Exposure Scenario Task Force
March Workshop – Tuesday Values Configuration (“Fish Diagram”)**

Desire to Work For Hanford Cleanup

Cleanup Progress

Connect Cleanup to Values
Want a Good Cleanup Strategy
Continue and Tack Progress
Clean up as much as Possible
Ensure Cleanup commitment is fulfilled
Tank Cleanup
Long-Term Legacy

Site Workers

Employee Perspectives Input
Aging workforce
Risks to workers
Do work safely

Risk Assessment

Focus where we need to go
Use Risk Assessment to define what
needs to be done/not done
Contribute to public understanding of risk
assessment and exposure scenarios

Information Sharing

Gathering Information
Understanding broad views,
values and thoughts
Connect information to reality
Contribute to public understanding

Feedback/Input

Fresh start – change way we dialogue
Translate more abstract values into
more tangible values
Connect public values to cleanup policy
Oversight and insight into cleanup
Input to regulators to set exposure
scenarios reflective of NW values

Protect Environment

Health of the Columbia River
and everything that lives near it
Downstream, including Oregon

Cleanup Completion

Identify what “done” is and looks like
Ask for what you want, not for what you
think you can get

Protect People

Protect all citizens
Don’t want Hanford to cause cancer
Healthy communities
Safe Drinking water
Emergency Management

We Live Here

Farmers
Families
Multiple Generations
Children & Grandchildren
Communities adjacent to the
Site
Downstream residents,
including Oregon
Citizens of the Northwest

What We Want in the End

Our Body of Work

Where We Live

HAB Exposure Scenarios Task Force
“Detailed Bullets” from Wednesday March 13, 2002

Assumptions (identify & justify)

- Don't assume the site has to be sacrificed
- Unlined disposal & caps are future exposure (assume failure) – remove & treat is cleanup
- “Just do something” is a troubling concept
- Are we thinking unrealistically for total unrestricted use in long run?
- Don't assume that our children are or will be smarter than we are
- Risk assessment will be imperfect – do the best you can.
- Probably can't completely eliminate exposure for workers
- May have some small areas we can't give back

Definitions

- Inadvertent intruder: 1 person 1 time – 100% likelihood of repeat? Spreading contamination to others? Should also focus on ecosystem (i.e. non-humans)
- Core Zone: Mounds are attractive nuisances (fences, too)
- What do we really mean by “unrestricted”? Are there limits to “unrestricted”?
- “Remediation” does not mean caps
- Point of compliance is at the source term
- Near-term – technology drives scenarios; Long-term – exposure drives cleanup

Stuff to Talk About (questions & open issues)

Risk Topics

- Level of conservatism in a risk assessment should be clear, consistent to the reader – allows for comparison with stakeholder values
- Need metric to assign value to risks
- Barriers failing & buffer zone is part of total accumulated risk from the site (including intruders, wind, rain, spreading waste from core zone)

Science Issues

- Groundwater zone be based on plumes not dates
- Burial ground issues – risk of waste leaking to groundwater
- Since we don't know cumulative risk for current sites, should not add more burden to the soil
- How do we communicate long term, beyond current language (i.e. signs)?
- Design of Institutional Controls should consider impacts of geological events (e.g. floods)

Technology Considerations

- MRS philosophy – waste that is stored can be retrieved if/when the technology allows
- Push investment in technology
- When will remediation be complete? Call out need for technology in each step
- Don't use technology limitations as an excuse for not doing something now
- Technology limitations also drive scenario development
- We don't currently have the technology to render the waste harmless

Regulatory Issues

- Does proposed scenario meet current requirements, e.g. Atomic Energy Act, environmental requirements?
- Want to understand realities of meeting today's requirements. Is there a need for changing requirements?
- Regulatory approach should be streamlined & efficient
- RCRA and MTCA points of compliance are different and not being met by the proposal

Uses/Users

- Develop Central Plateau as storage so that the rest of Hanford can be safe
- Treaty rights – full use of resources when an area is free from DOE activities
- Farmers in Columbia Basin:
 - Chemical analysis of water
 - Changing irrigation practices – amount of water used.
 - Want to get info on what contamination really is – need to know where we stand
- Develop Native American scenarios
- Critters
- Concept of waste storage as a use
- Core to be zero
- Buffer to be zero

The Big Picture

- Where is the best place for the waste? (Big, national picture) “Everything gone” still means you have to put it somewhere – Hanford is part of the DOE complex
- When we lose control of the site, who are we protecting? If stuff is there forever, need to talk about how to protect people
- When is the transition from the unreasonable (under current conditions) to the reasonable (under future conditions)?
- Central Plateau not a monolith
- Agencies need to help task force identify information and options to reduce the core area
- What are next step questions that need to be answered? How can task force help?

Interests (I want attention paid to...)

- Want something we can do NOW: stabilize now/contain, find answers to unanswered questions
- Keep contribution of contamination from the site in context with contribution from agriculture (i.e. there will always be some pollution)
- Urgency to clean up before an economic depression
- Most OR population lives along River & Willamette Valley
- Torn between “get it done now” vs. continually looking at new technology and ideas to do better in future
- Don’t want Central Plateau waste spreading to Nat’l Monument
- Minimize long-term impacts – look at whole country re: what we do with waste (a cost of civilization)
- Near-term, don’t lose sight of TPA to guide cleanup
- Focus on high-risk sites for cleanup
- Hanford as a part of the larger Columbia Basin watershed
- Think about air in addition to water
- Headed to “unrestricted” as soon as possible
- Find least risky, most cost effective path from here to there
- Have an opportunity to keep the area as parkland

Values (I care most about...)

- Cleanup and costs driven by real risk reduction
- Problem definition should drive action (don’t do something just for the sake of doing something)
- Our responsibility goes on forever – manage risks into the future
- Don’t sell future generations short (because of economics, technological limits, etc.)
- Clean up in such a way that we could stand to lose track of historical records and not worry about harm
- All life is to be respected and treated equally, so that when we leave, we’ve done the best job of protection possible
- No sacrifice zones
- Shrink core zone/Want buffer zone to go away as soon as possible
- Do no harm or at least do more good than harm (what we accomplish is worth more than what it costs)
- Protecting workers – use technology so as not to expose workers
- Want cleanup decisions to always keep in mind quality of water in Columbia River
- Protect Columbia River
- Pacific NW life is not more important than other lives in world – compare risks from Hanford sources with other societal risks
- Need to break secrecy to make cleanup work
- Stewardship of all resources – cultural, natural, economic
- Get on with it
- Do the worst stuff first
- Unrestricted as soon as we can for all Hanford
- I don’t want to put people at risk – costs to individuals and their families not always included

Additional Comments on the Proposed Timeline

2002-2010

- Integrated cleanup plan for the 200 Area, including interim end states
- Comprehensive groundwater strategy for remediation in 2050
- List of technological challenges & what it will take to develop the technology
- Launch program to develop technology to preclude future need for IC's
- 200 Area Vadose Zone Remediation Plan in place by 2007
- Need plan developed to eliminate the need for institutional controls
- Ice Age Flood predicted in 60,000 years; decide what waste can stay & what must be taken off site
- Hanford Reach National Monument needs to be safe for unrestricted public use by 2012
- Groundwater cleaned up by 2012/2018 – set a deadline and enforce

2050-2150

- All TRU treated by 2020
- Buffer zone only controlled access
- Buffer zone eliminated when tank waste risk is gone
- Buffer zone unrestricted by 2050
- Human use of land & water by 2100
- No buffer zone for groundwater because groundwater/vadose zone remediated by 2050
- Time factors at Hanford are important – contamination still there 150 years will decay by 300 years

2150

- Remedies may still be going on
- “Controlled” public access – does it mean that people who end up in there are safe?
- Technology review re: possible removal of remediated waste
- Groundwater should not be dangerous, even to intruders

2151

- Hanford is forgotten
- Industrial standard is not adequate
- Uncertainty about what kind of wastes will be in the environment – exposure scenarios will have to be revisited along with technology
- No controls in buffer zone
- Would like unrestricted use

Post-2151

- How will people be in 200 Area in 2151?

Workshop Notes -- Exercise output – “What are your three most important values?”

Below are the participants’ responses, grouped together. (Groupings and titles of groupings done by Mike Goddu, workshop facilitator)

“No new harm or risk”

No new net risk
Stop adding waste to the soil
No new waste (except de-fueled Navy reactors)
Do more good than harm; provide net positive societal value
Do no further harm

Long-term view – Treaty Rights

Equity across generations
Fulfill our treaties with Tribes – Save this land for everyone’s future
Clean up responsibility time span: forever
Consider possibility of ice age floods predicted in 60,000 years
Native American Treaty guaranteed rights protected
Follow Treaty rights – Indian and Columbia River Treaty
Treaty rights to sustenance and cultural resources without excess health risk for all areas when exclusive use ends

Look at larger-than-Hanford picture:

Site contamination in context of agriculture contamination contribution
Consider site in context of DOE complex

Act now; Address groundwater:

Protect human and environmental health NOW, not later
Clean-up the G/W NOW, not later – invest in this
Unrestricted Groundwater after 2018
G/W unrestricted use by 2040
Address G/W now
G/W should be dealt with via a comprehensive strategy with a bias for remediation action
Report on G/W composition for long period of time above and below projects
Sustained Tri-Cities economy
Ability to draw water for drinking from the river
Columbia River purity
Protect the Columbia River; It should always meet drinking water standards

Actively characterize and remediate the 200 Area plumes (other than Trit.) Eliminate source terms
Immediate focus on G/W now
Get on with it
Clean up is a high priority
There is no “they” or “later”, only us and now. Resources we have should be brought to bear now.
Public exposures (river contamination)

Values guiding the clean-up:

Drive Clean-up by real risk-reduction and on sound science (not regulations or politics)
A definition for cleanup completion and a plan to get there is a good thing
Decisions science-based
Clean up once – the right way
Total ecosystem protection
Protect public, the workers, environmental resources
Clean up Hanford Site now to the level necessary to protect the health of workers, my family, and the environment
Protect human and ecological health and safety
Goal to eventually have site available for any use while protecting health of all – including Core Area
Base decisions on good stewardship of all resources, i.e., natural, cultural, etc.
Clean air; Clean water, Clean earth
Unrestricted use for all life forms
Core and Buffer = zero. Native and unrestricted use everywhere.
Make decisions that protect all life forms
Safe for family
Consider people first
Prevention of cancer is the bottom line, not specific pieces of the clean up process
Base decisions on science, not emotions or politics
Use a system engineering approach
Systematic integrated management
Clean up in accordance with laws
200 Area to be designated for waste storage and management for the foreseeable future
Develop the Central Plateau for safe storage of Rad materials so rest of Hanford and other sites may be cleaned up to non-restrictive use
Remove and Treat equals clean-up; unlined disposal or caps equals pollution and eventual exposure
Intelligent common sense approach to clean-up and transition site
Site returned over time to original
Health of population and environment
Worker exposures and safety

Regarding “Cost”:

Taxpayer money is finite and should be used to save as many lives as possible. A Spokane life is as valuable as a Tri-Cities life as is a child in Africa or Appalachia
Cost effective alternatives
Cost should be a secondary consideration – do it right should be the first consideration
Get the money for unrestricted use
Money should not control clean up
No monetary restrictions

Re: Technology:

Develop technology to serve the whole world
Technology development

More Specified Input to Clean-up:

Use Industrial Standard in the 200 Area; Start with new proposed boundary
Clean up to a level that would cause no risk greater than .1% of existing acceptable societal risks
Do not tear down Canyon Facilities – use them for waste management and storage
No offsite waste unless we have a comprehensive clean up plan
Plan to alleviate need for all/any institutional controls
Clean up Carbon Tet plume
Take into account possible economic depressions that would lead to inability to maintain institutional controls
Take into account possible loss of historic records of the wastes and waste sites
Maintain some facilities as historical museum site

Other:

DOE out of Hanford – bomb builders are not good at clean up

Amber Waldref

Hanford Site Land Uses



- Unrestricted use
- buffer zone (for 50 years) → then ^{unrestricted} remediate groundwater during this time →
- industrial use (for 100 years - then, insti. controls will not be ^{restricted} effective) (clean up to industrial use - buffer zone is gone - effective)
- monitor for any further releases - barriers that last as long as needed to protect from contamination - plan for failure

removing waste from tanks. (removing source of contamination) -
vitrifying + disposing of "safe" waste. Cleanup soil sites
• continue developing technology to use for groundwater
cleanup + cleanup ^(next 15 years) core area. Cleanup w/ species
habitat in mind. — "ecological thinking."

Hanford Site Land Uses



ART
TRICKETT
Franklin Co.


Hanford Site

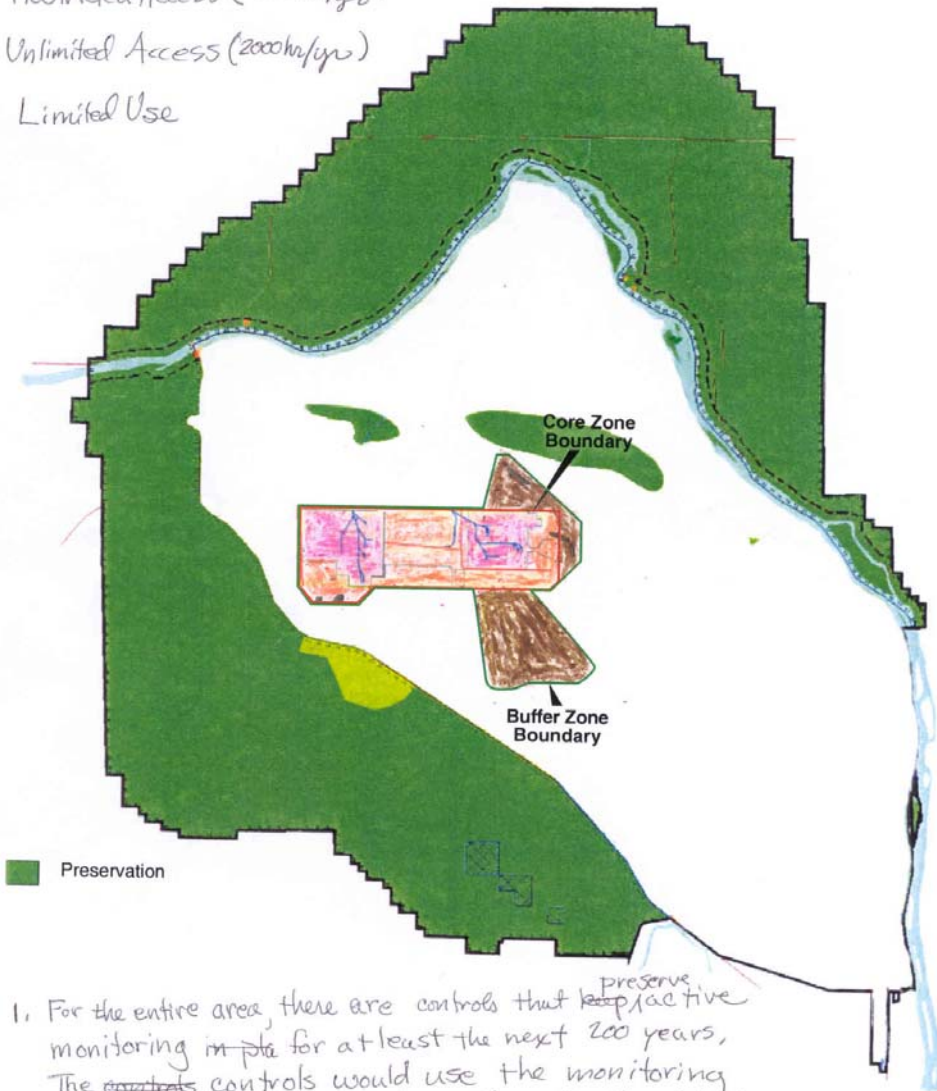
Land Uses

AE 200 years

 Restricted Access (500 m/yr)

 Unlimited Access (2000 m/yr)

 Limited Use



 Preservation

1. For the entire area, there are controls that ^{preserve} keep active monitoring in place for at least the next 200 years. The ~~controls~~ controls would use the monitoring to adjust boundaries to either further limit access or open areas. Also the controls would provide for future remediation if the monitoring indicated there was unanticipated movement of contaminants that threatened humans or the ecology of the site


Charles E. Wernick P52
"Spruce" group


Hanford Site

Land Uses ~100y → ~500y

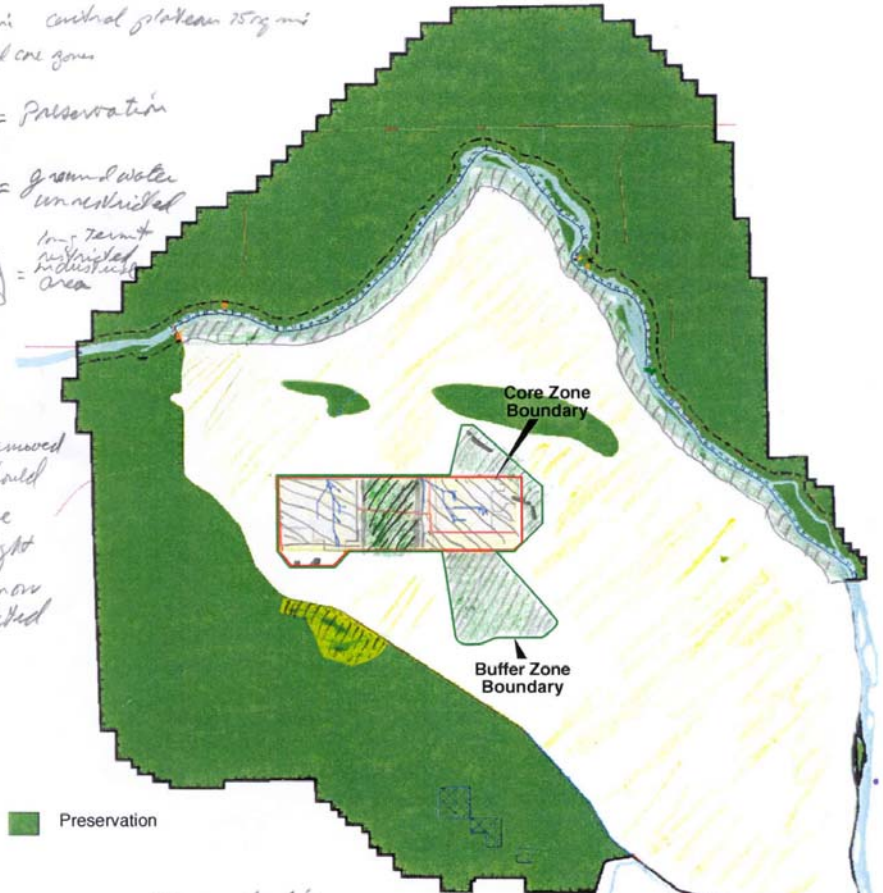
580y mi central plateau 75y mi
Expanded core zone

 = Preservation

 = ground water
unrestricted

 = 10-70y
restricted
industrial
area

* Should
TRU be removed
as it should
then these
areas might
become more
restricted

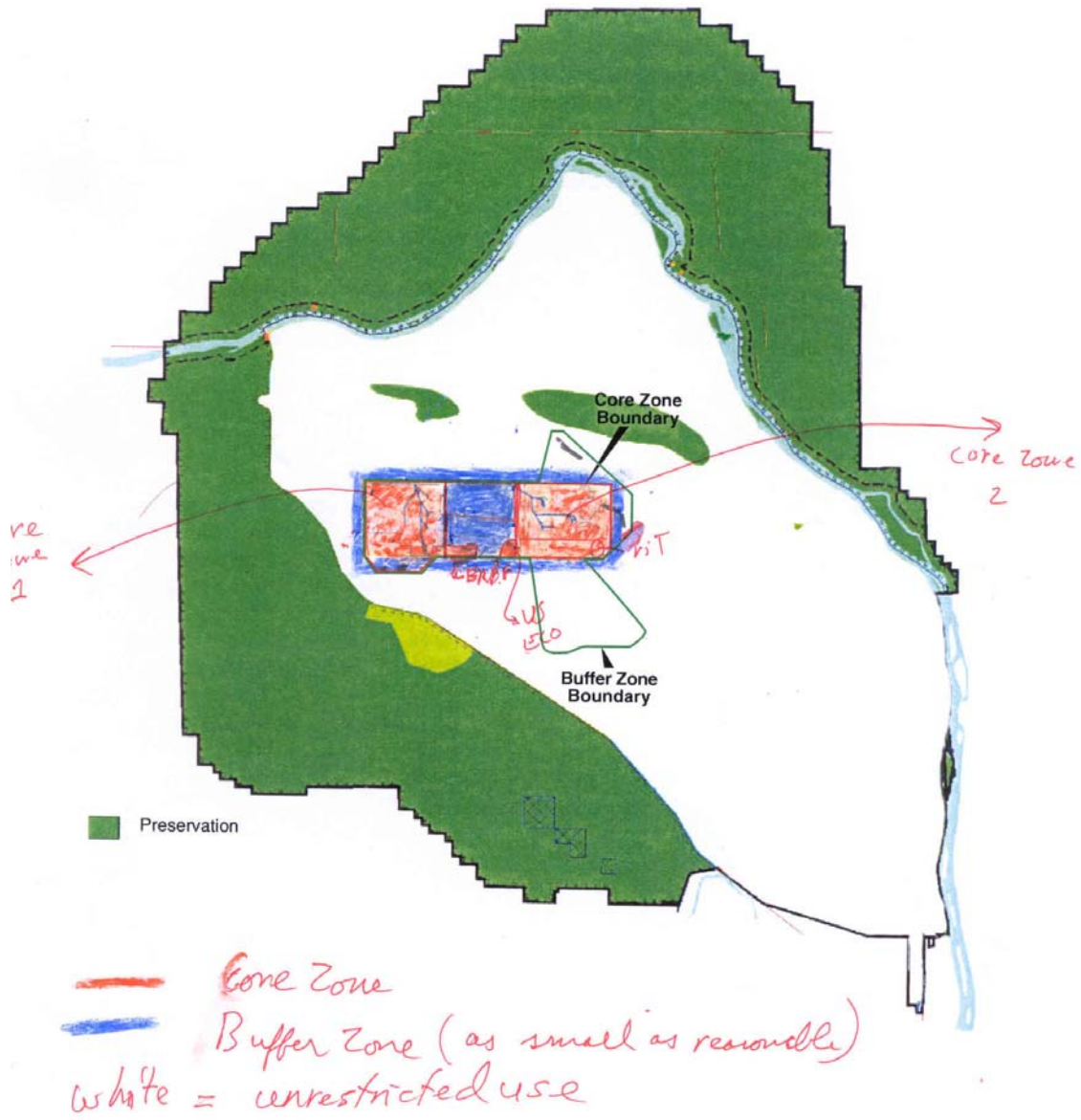


 Preservation

1. Long term Stewardship must be more than restriction of use but continued monitoring and active remediation as needed
2. Long term stewardship means record maintenance - long term

Doug Huston

Hanford Site Land Uses



Dirk Dunning

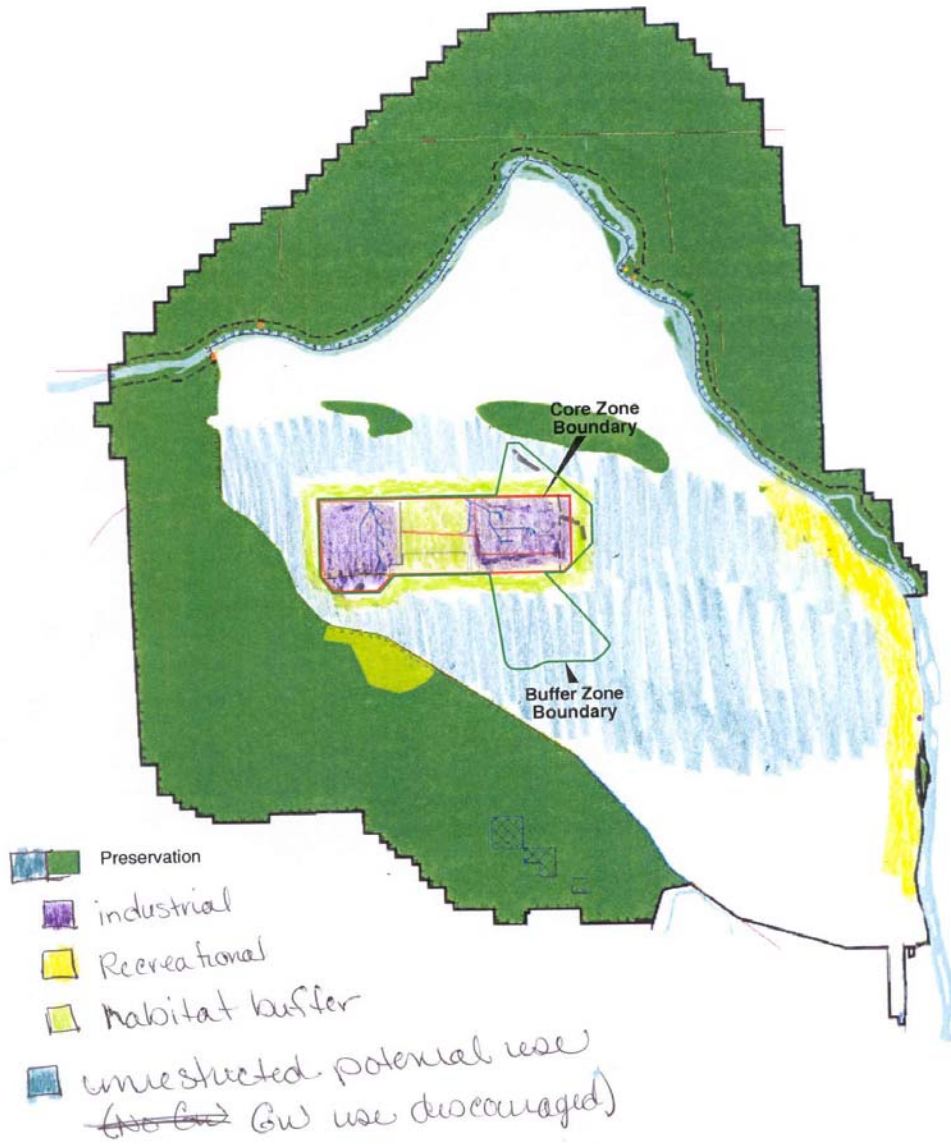
Hanford Site Land Uses

(See reverse)



- 10) Map in detail the subsurface elastic dikes & historic flood ways. Combine these with detailed mapping of vadose zone water movement on fine boundaries.
- 11) Buffer goes away and reverts to preservation/unrestricted at conclusion of cleanup (2028).
- 1) The western 40% of 200w is unconfined and should be excluded from the core & buffer & included in the general site preservation.
- 2) Endangered Species considerations need to be identified & included in all planning from the earliest stages.
- 3) The I^{29} plume is currently untreatable. GW use must be restricted for all lands at all times that it may exceed the drinking water standards.
- 4) The 200 B/C core unconfined area is prime habitat. Preservation of habitat may necessitate confining cleanup to the cores & immediate surrounding areas, leaving decay & access & control (<100 yrs) to deal with the remainder.
- 5) Fire suppression & control to protect habitat & species is vital.
- 6) Confine core area to smallest possible footprint.
- 7) Use remote equipment to allow retrieval & cleanup of cross-site transfer line.
- 8) Confine buffer areas to smallest possible footprint.
- 9) Limit surface water use/addition to prevent recreation of the groundwater mound and/or driving waste plume movement.

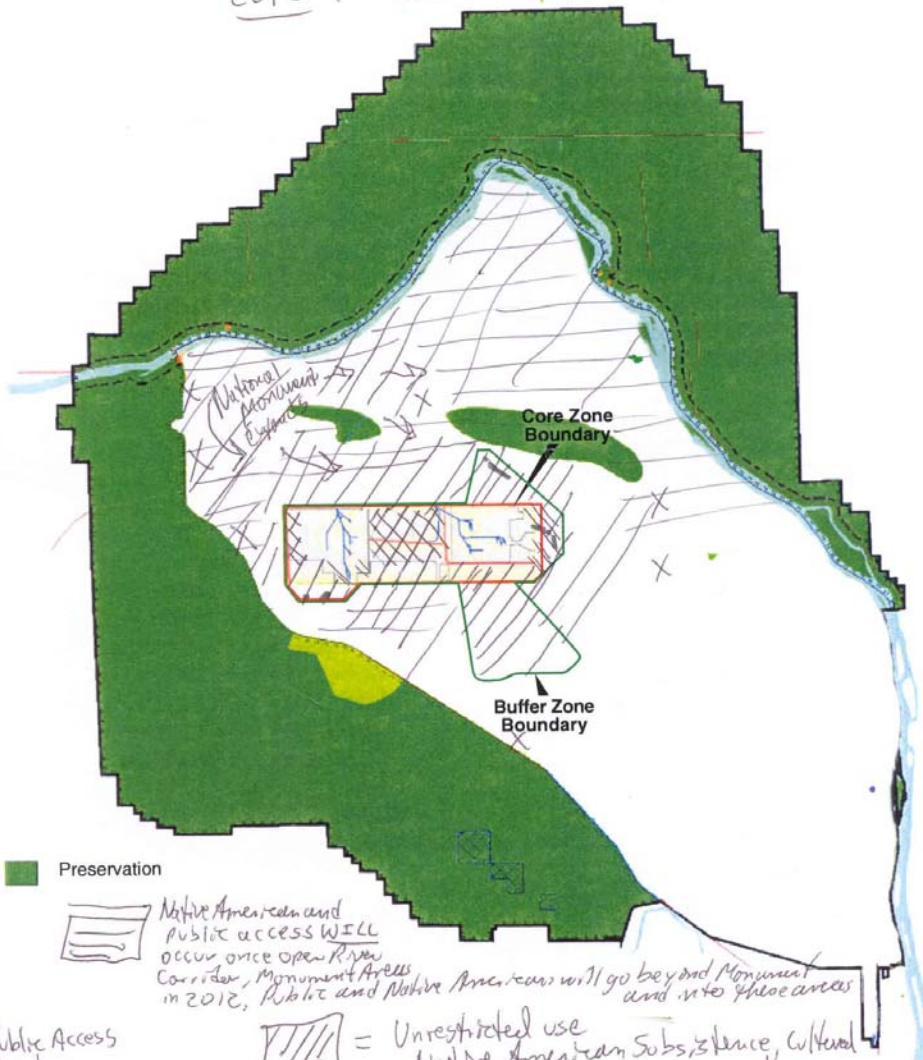
Hanford Site Land Uses



□ habitat buffer - buffer of habitat control to discourage bugs + burmies from accessing the core zone

Hanford Site Land Uses

2012 & 2018



■ Preservation



Native American and public access WILL occur once Open River Corridor, Monument Areas in 2012, Public and Native American will go beyond Monument and into these areas

X = Public Access Points To Monument; and From Monument Areas into Central Plateau and Buffer Zones



= Unrestricted use Native American Subsistence, Cultural uses & Monument recreation as of 2018; Groundwater Unrestricted Core Zone shrunk to within fences with excep from:
a) Vit Plants
b) ERDF



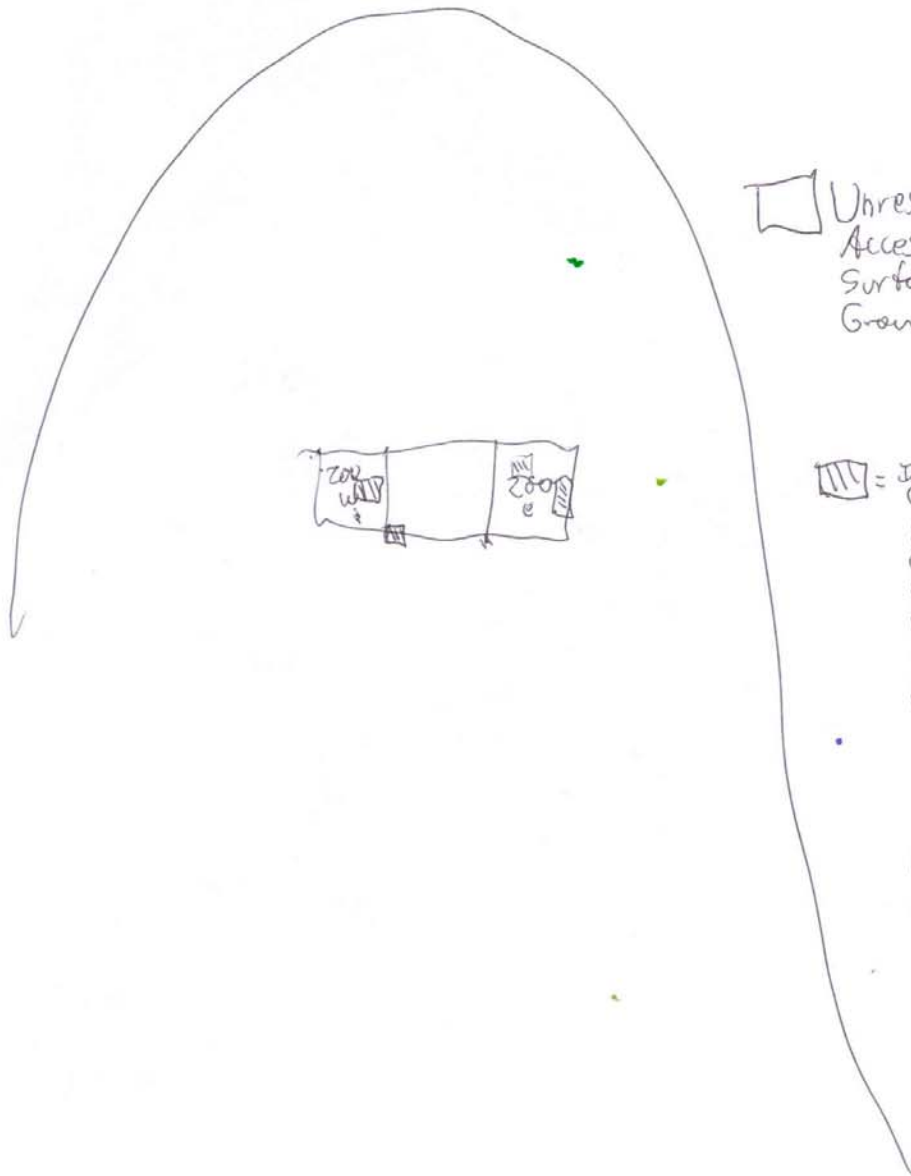
= Temporary Safety Buffer between 2018 and 2028

Gerry Pollock, Hunt of America

Hanford Site Land Uses



To
100 Years



□ Unrestricted
Access
Surface and
Groundwater

▨ = Industrial
Clean Va
Access
for
Canister
Storage
and
~~Control~~
Institutional
control
for very
limited
areas
of Core Zone
Facilities.
Assume
No Inst
Control
After
100 Years.

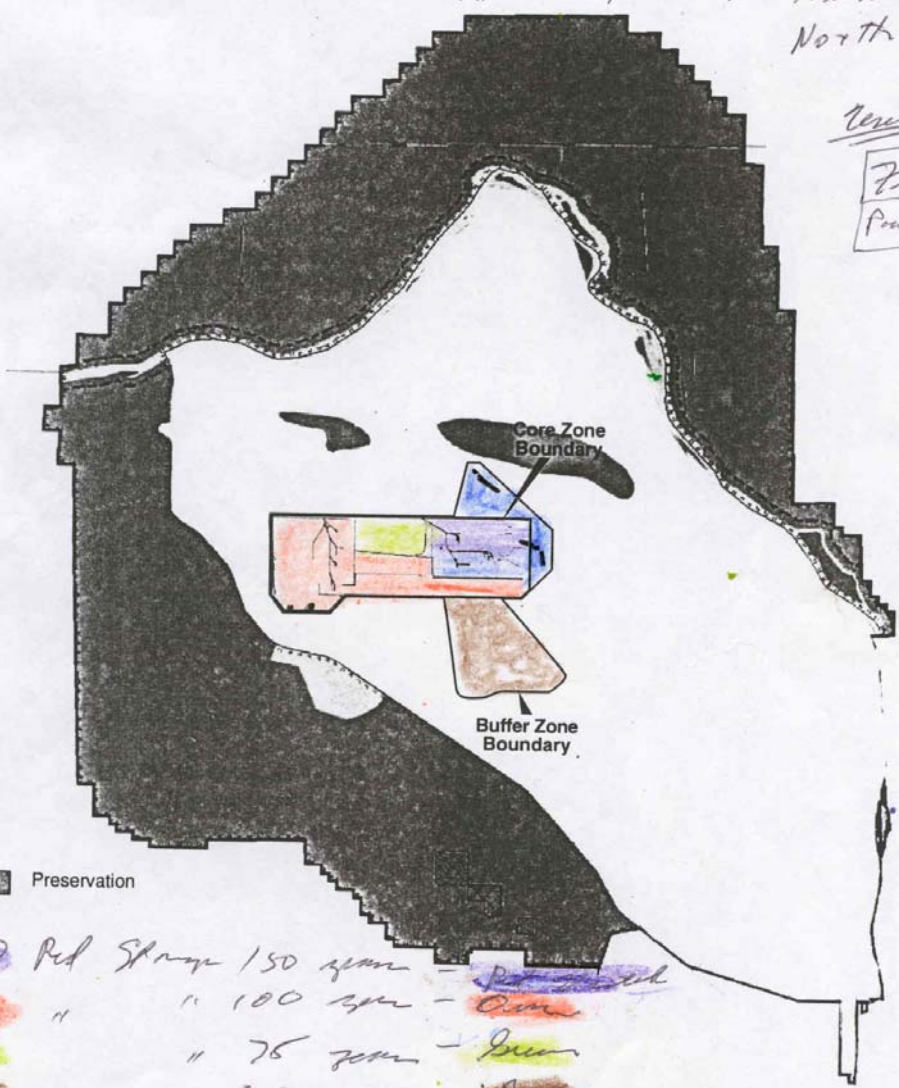
Hanford Site Land Uses


Jim Curtis






*All PRE-PLANNED
North River*

Urban

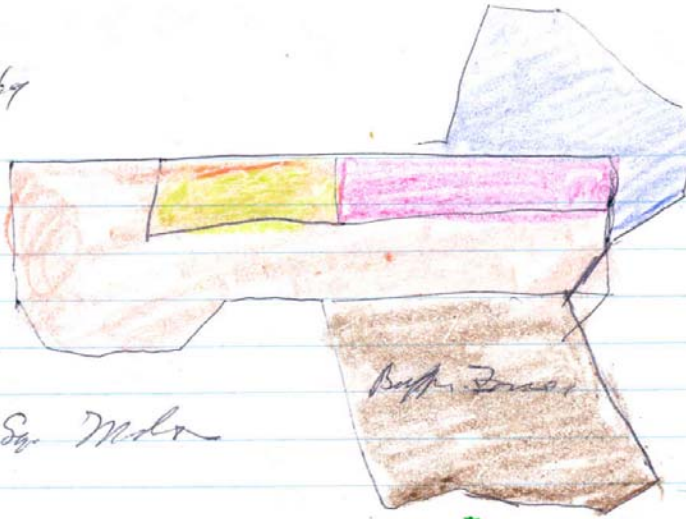
Facility
Power








 Preservation

-  Red Storage 150 years - *Preserved*
-  " " 100 years - *Open*
-  " " 75 years - *Open*
-  " " 50 years - *Open*
-  " " 10 years - *Open*

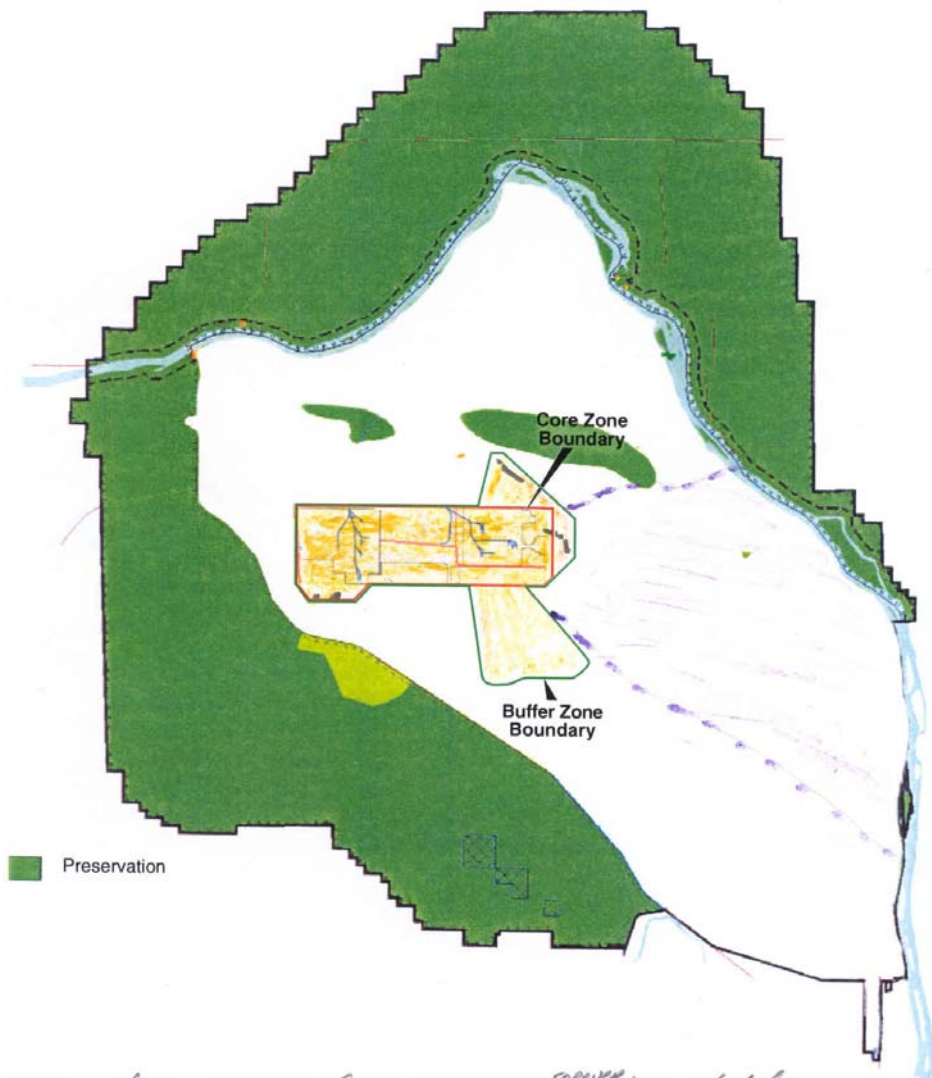
J. Curby



75 Sq. Mils

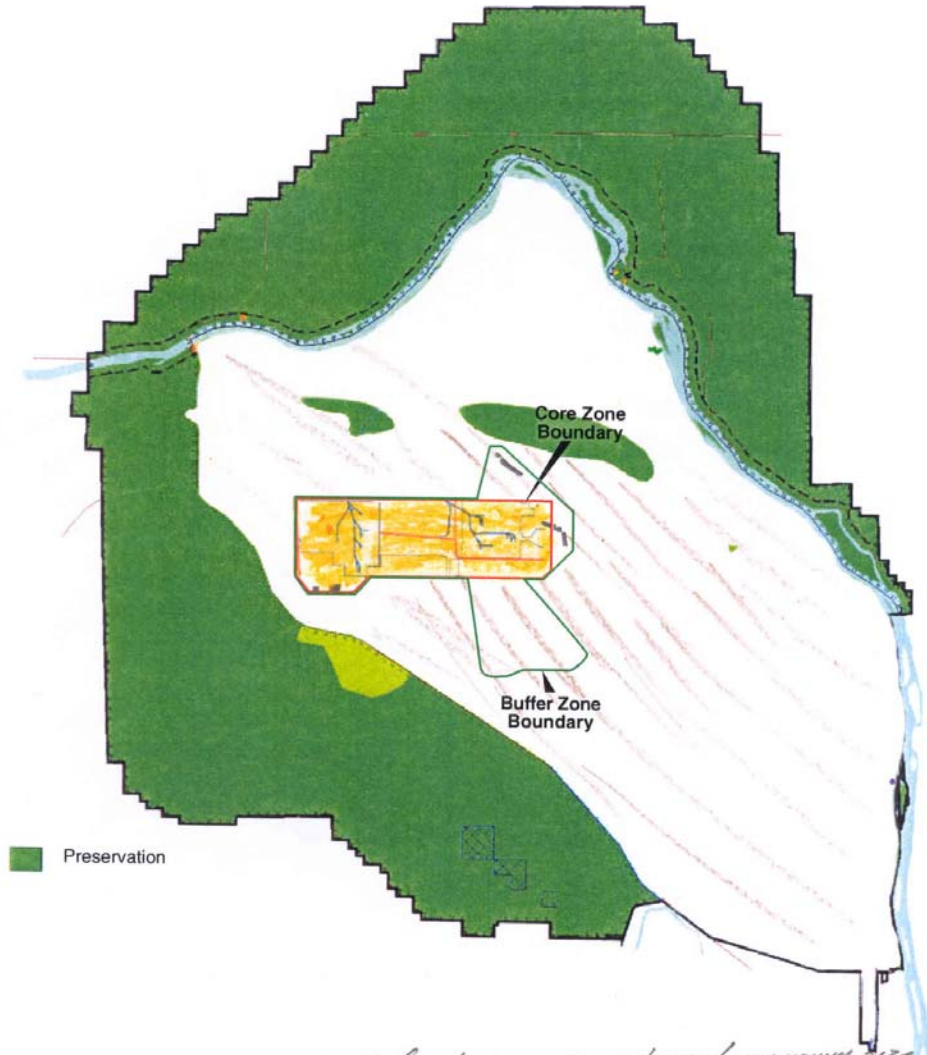
| | | | |
|---|--------------------|------------|-------------|
|  | Red. - Storage | 150 grains | Red water |
|  | Amalgam | 100 grains | Orange |
|  | Blue | 75 grains | Blue |
|  | Brown | 75 grains | Brown |
|  | Black | 10 grains | Blue 2 dots |

Hanford Site Land Uses



*Industrial use - Restricted use - core zone - forever.
- Buffer zone - UNTIL remediated.
- Ground H2O plums - Restricted use UNTIL meets DAME H2O stds. - Remediation ongoing.*

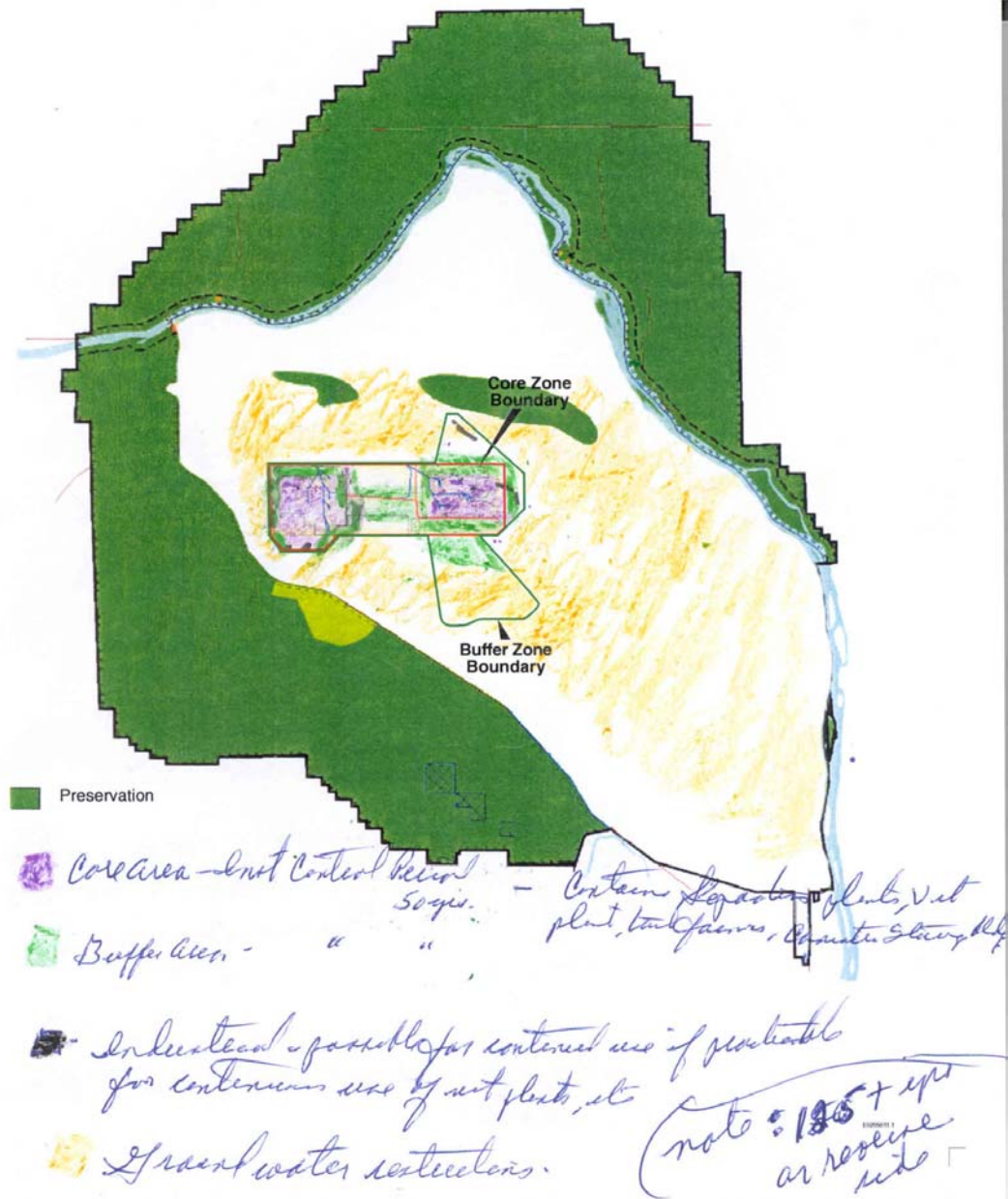
Hanford Site Land Uses



Industrial use - Restricted entry - core zone shrink to minimum size.
Unrestricted use - buffer zone - does not exist
Groundwater - restricted until fiscal or technologically responsive solution occurs problem to drinking H₂O stays.

Magyard Plaquemine

Hanford Site Land Uses



Research farm part
hill





Soil Cont.
Cow Area


Research farm part side



Soil Cont.
Cow Area

 - Cow Area - 125+ years

 - Buffer - 125+ years

 - Soil Cont. - Maximum to reasonable
Cow area would contain the farmer, ~~planted~~
separation blocks and tank farms,
not plant,

Buffer contain the ERDF and N.S Ecology
Sites.

Question #2:
Assumptions/Values

1. The cultural use of the buffer zone areas should be acceptable to all stakeholders (Tribunal, public, industry, etc.) for unrestricted use by 50 yrs and after cleanup is done.
2. The cultural use of the core zone should be acceptable to all stakeholders (as above) for as much unrestricted use as possible after the 300 years of institutional control.

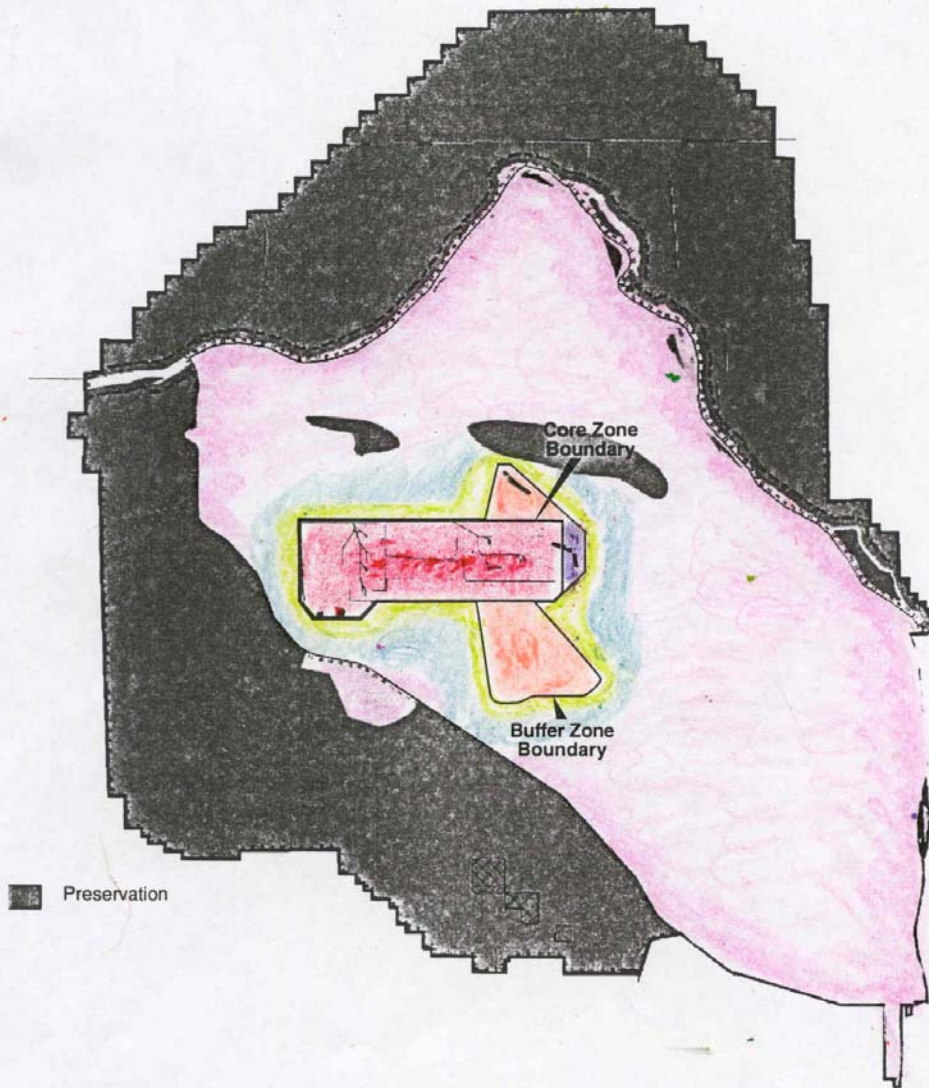
Question #3 - Assumption/Values

1. For first 50 yrs - both core and buffer zones (on map) would have restricted access with responsible control by the entity with jurisdictional assignment.
2. For 50 yrs - 300 yrs. - Buffer zone has unrestricted access. Core zone ~~whoa~~ would have restricted access control as noted in #1.
3. With TRU removal from core zone, unrestricted access beyond 300 yrs. should be possible for core zone.

Question #5:

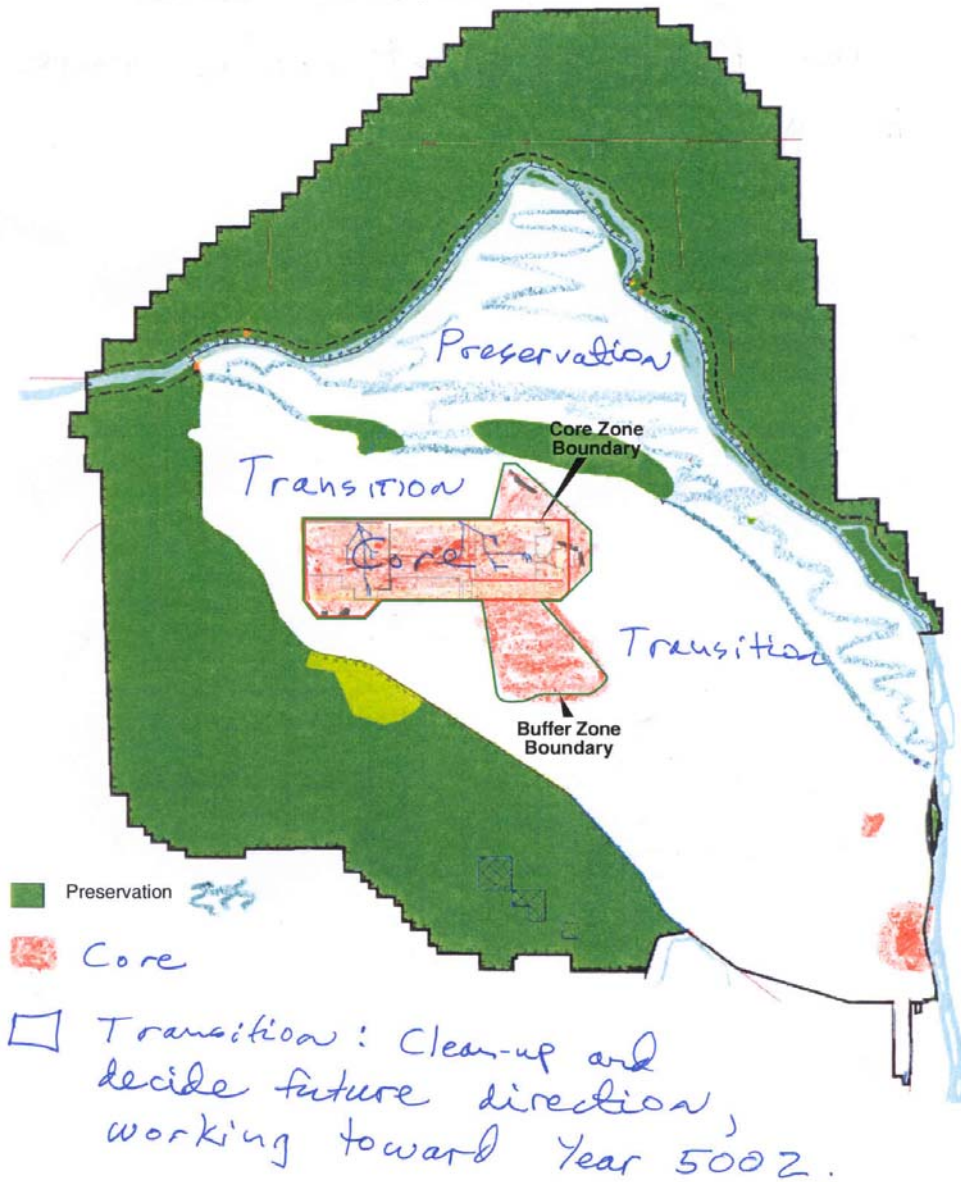
1. ~~Does not~~ ^P protection for ~~health~~ human health should provide adequate protection for the environment. This must be controlled or disputed for the significant pollutants.

Hanford Site Land Uses



Norm Buske
1 of 3
See note #1

Hanford Site Land Uses for 2022 year

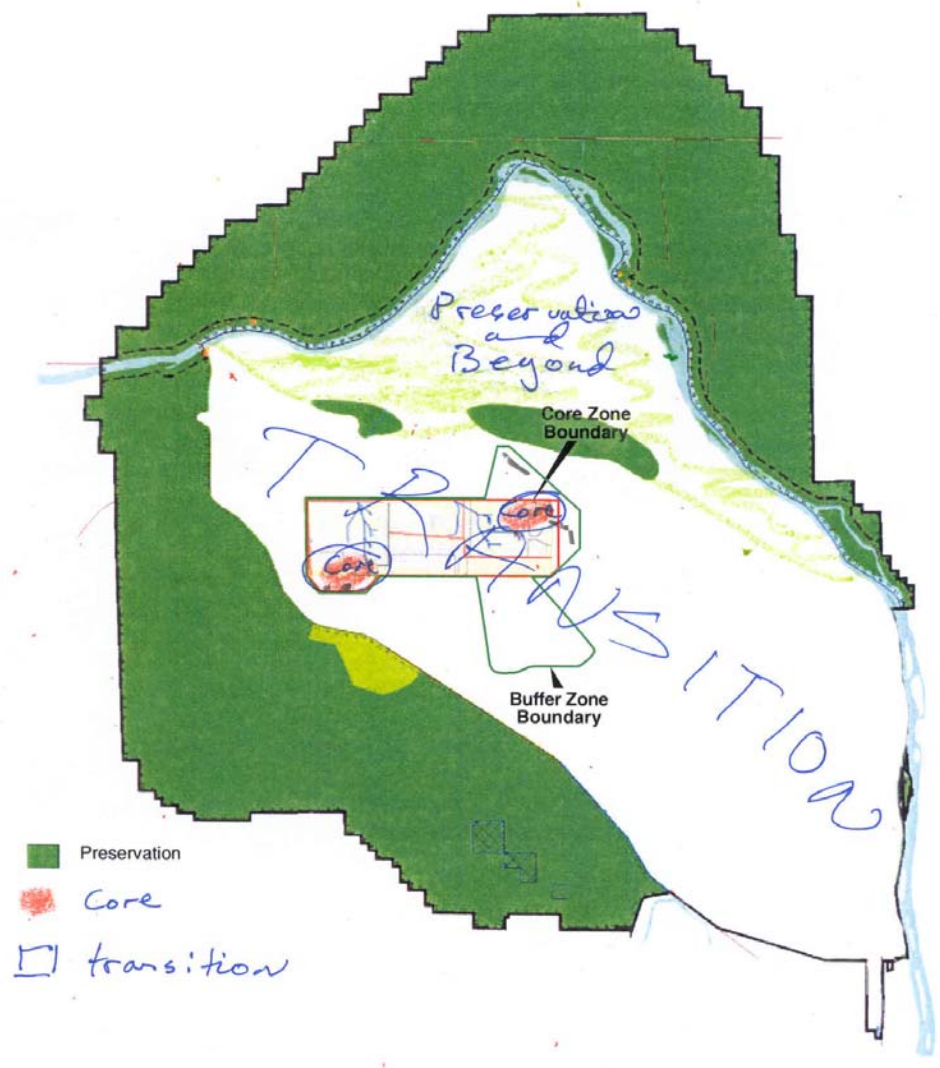


Note 1. If improvement over time is considered, there is no need for a "buffer zone" ... because it will vanish anyway. It is really a "transient zone".

So see Page 3 first ... as where this is going ...

Hanford Site Land Uses for year 2152

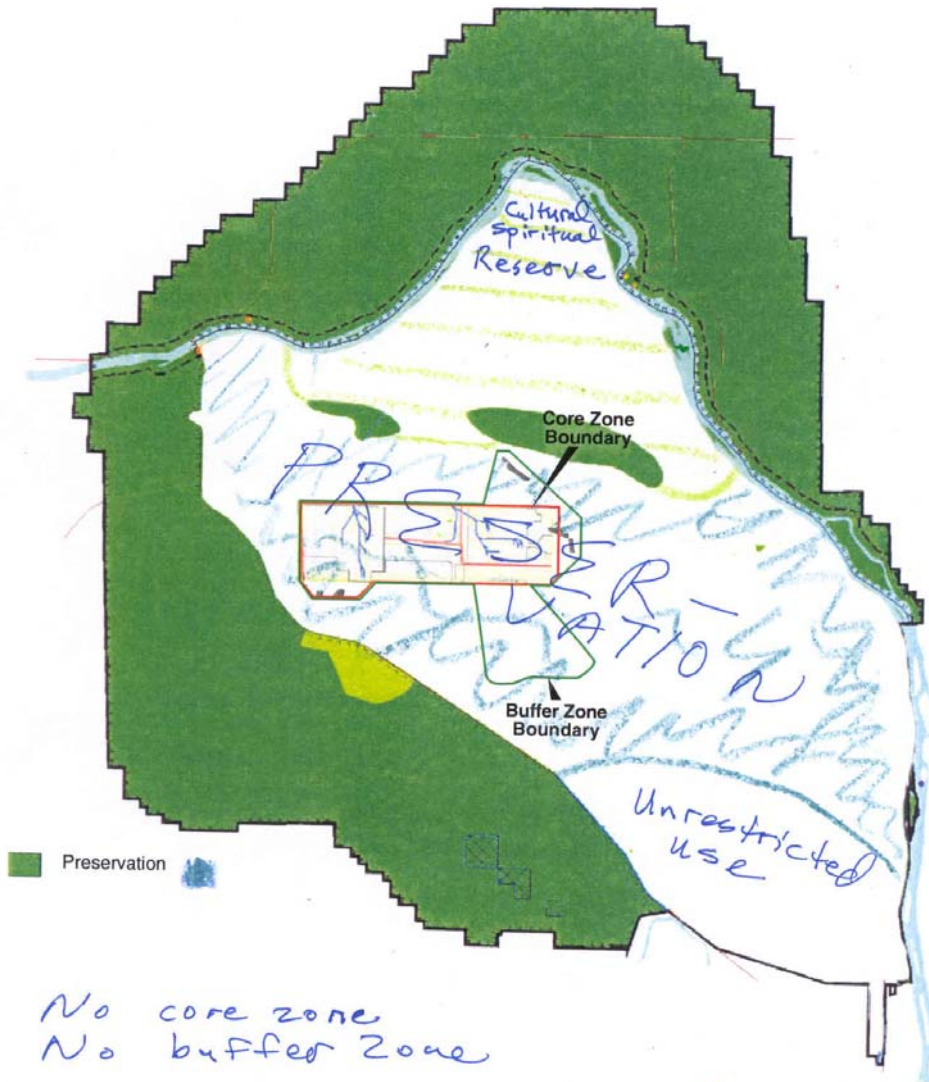
Norm Buske
2 of 3
See Note #1
on page 1



**Hanford Site
Land Uses**

for year 5002

Norm Buske
3 of 3
See Note #1
on page 1



No core zone
No buffer zone

"This is a positive 'image' sent forward, inviting future generations to ponder their values..."

Hanford Site Land Uses



Norm Dyer | Question #1 |

- Assumptions: *plus 100 blocks of support*
- A. 200 Core area as defined on this map.
 - B. 200 Core area will be 30 yr Storage of Waste (Rad Chemical, from other areas -
 - C. 200 Core area will not be storage area for TRU so that containment will be minimal in \approx 300yrs (had
 - D. 200 Core area storage will be designed such that GW will not be a dispersor of hazard contamination outside core area, i.e. GW is to DWS by 50 years.
 - E. All Buffer zones outside Core area will become to unrestricted use by 50 years.

Summary:

- 1. 200 Core area will require restricted access for 300yrs with institutional controls
- 2. ~~Buffer~~ Buffer Zone as shown on map will be cleaned to unrestricted use.
- 3. GW outside 200 Core area will be at DWS by 50 after 50yrs

Info from Moses;

New Buffer Zone \approx 50% smaller than FSCWG Buffer Zone

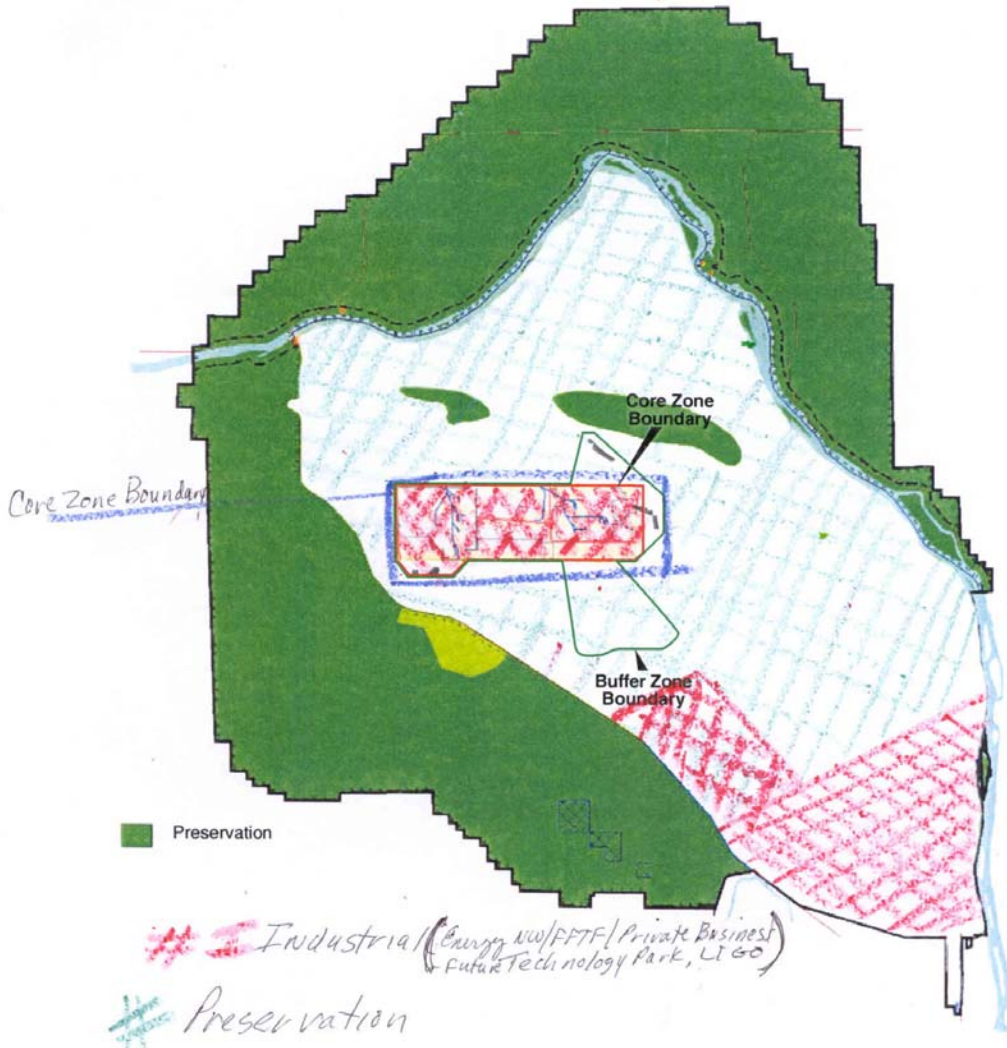
Central Plateau \approx 75 sq miles which is larger than Core/Buffer noted above -

Question #2 on Back
Question #3 on Back
Question #5 on Back

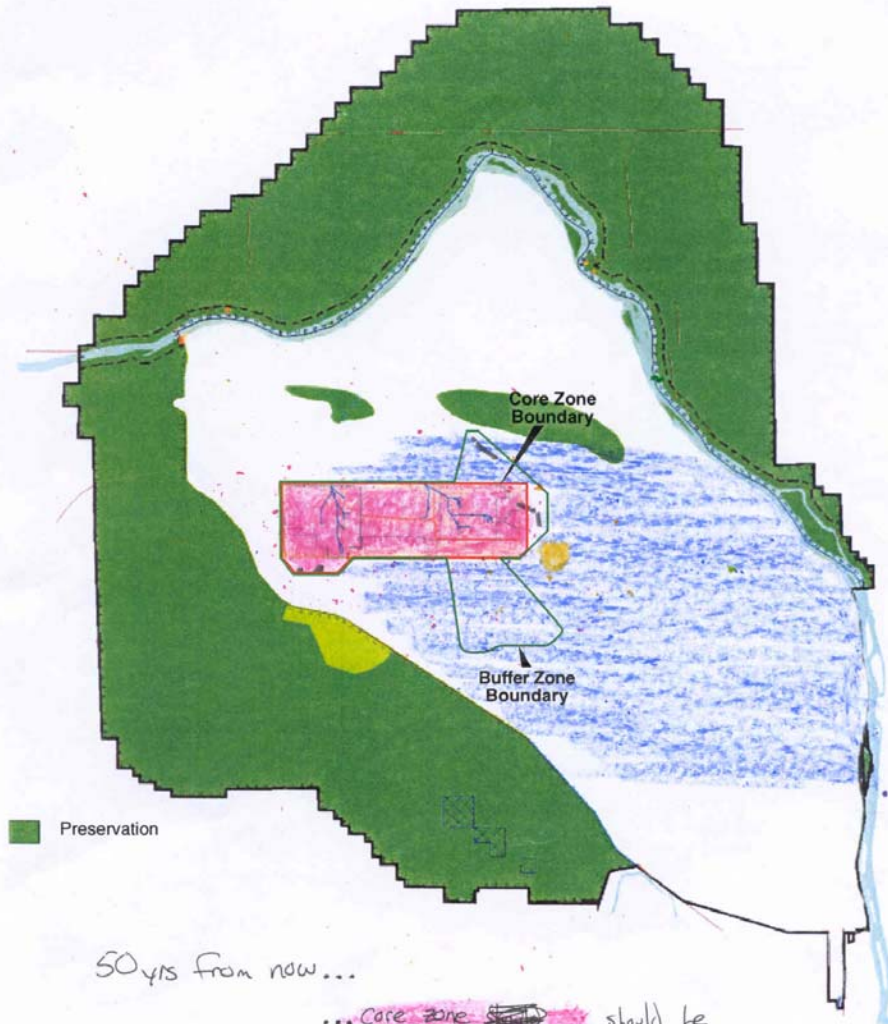
Susan Rickhard

Hanford Site Land Uses

Time Line **5**
Now → 50 years



Hanford Site Land Uses



50 yrs from now...

- ... Core zone ~~should~~ should be safe for inadvertent intruder but marked/delineated up to provide significant barriers to intrusion. Waste left in core zone should be stabilized such that it is reasonable to assume it will never leave.
- ... all other areas (groundwater) should be available for unrestricted use (residential development, high intensity recreation, etc.).
- ... Dennis Faulk's retirement home should be here

Tom Leschine

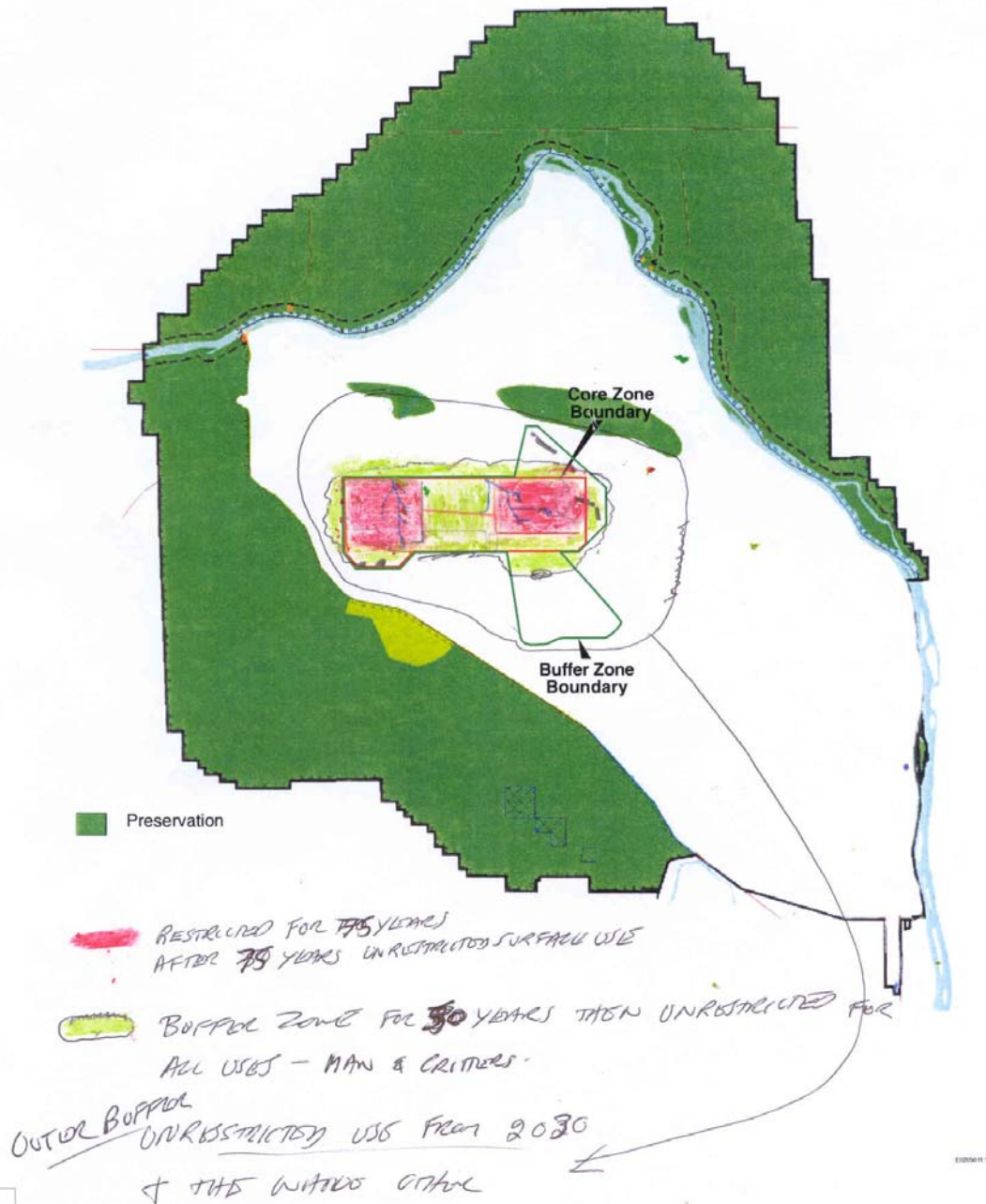
Hanford Site Land Uses



last wkshp: (John Price
Ecology)

- GW - GW & source remediation
need to be integrated
- return gw to beneficial use
where practical on
appropriate time frames
 - Emph. seq. process & points of
emphasis (no. gw better than
→ integrate source control & gw
actions

Hanford Site Land Uses



**Cedar Group Flip Chart Notes
May 7-8**

- Agencies are already marching down a road with assumptions

- Important to tell agy's what they don't want to hear
- Values don't always fit into quantitative risk assessment
- Time for risk assessment is forever
- When is maximum risk?
- Core zone life is determined by point at which risk is gone
- Hard enough to see 100 yrs., let alone 1000
- Assume 50-100 yrs – compare threat of Hanford waste to other threats
- Core zone is long-term
- Can't come up with permanent solution in the foreseeable future
- How to balance deferred cost to future generations with current realities
- One opinion: the only value of interest is risk
- Stuff will stay in the core zone –
- Industrial use
- What's right outside the buffer zone?
- Drives resources, point of compliance
- Conceptually, buffer zone is meaningless over time – we are striving for shrinking the core
- Buffer zone gets from where there's risk to where there's not
- Value: nuclear power has more potential than we currently know about
- Settle the waste, protect it, make it available for research
- Hanford site is a valuable resource – don't assume there's no use for it
- Define who has access and in what time frame, so regulator's can plan why do people need access? What is distinctive about this site that requires access
- Can't know what things are going to look like in 60 years
- Two thought: - have to do it now – we'll never have a better chance
 - we don't know enough; if we protect thru IC's and keep records.
 - stay on top of it, we might be able to wait
- Maintaining use that brings people into the core over time is important? Vs. only monitoring, control to keep receptors out?
- (may not be different clean up req's)

Value (consensus)

- Can't today come up with permanent solution for core zone. (not nec direction)
- Is the assumption that some of the waste will stay in the core? Yes – consensus
- Dennis can only do today what he can do today....
- So.... Who has access and when?
- 50-100 years there will be people utilizing the core (what about tribal uses?) we know who is not in there, thought there are scenarios to envision

Consensus:

- Encouraging (specific) use (not discouraging use) as protection , or for building knowledge, etc

- Encouraged uses will change over time
- Continue what you have now (controlled access), can provide protection
- Time frame?
- “encouraging use” is not a mechanism for reduced clean up (opposite of sacrifice zone conceptually)
- Radiobnuclide burden will be diminishing over time
- Encouraged use takes some pressure off decision –making today

Clean-up focuses on:

- Remediating waste & containing it in the core – maximizing, breathing & depth of potential uses
- Fences “invite” cleanup uses – will drive funding

Dennis

- Unrestricted use for buffer zone- incl. glw – over time, buffer zone goes away
- Current – 100 yrs – 250 yrs also looking at conservation, recreation, industrial will look at ecosystem

Groundwater

- Who uses it? When?
- 150 yrs. – groundwater will be used
- g/w is returning to pre – Hanford condition
- Use g/w under core zone for processing? – reduces uses of other sources – incentive for pump & treat (further cleanup)
- No uses of CP g/w outside the core, except what’s needed for core work (showed the agencies consider a potential user? In what time frame?)
- Unrestricted use for buffer zone includes g/w? Incentivizing use of the g/w is a good thing
- But, do we make cleanup decisions to protect a user
- When is the shift from regulating for active IC, to protecting the unanticipated?

Value:

- Agencies should analyze g/w use for residents on CP in the future (100 yrs) (want the scenarios run & info presented for further decision – making)
- Would a “future risk” map be useful? (not just a “future use”) – can only map what’s in the g/w now and analyze risk from those assumptions) 1st assump: g/w is not going to get worse)
- Then, ask if that g/w condition is acceptable
- Need bounding risk for analysis

#3 – gov’t controls

e.g. Port Authority (regional) DOE out of Hanford (not necessarily...) keep PNNL

Need regulators for our safety

Roles: ownership/mgmt

Regulators – safety, cleanup, environmental protection

What is the county's role?

Local gov't – based / DOE (mound model) Model for Hanford?
dev. authority

How long should we assume we need to gov't authority?

Don't let the fed. Gov't off the hook (by turning over control to local/regional)

Beyond 50 yrs – some gov't authority that maintains resources, maximizes potential

Redundancy & overlap in authority is important. Esp. in risk map

Shift away from thinking DOE is the only source of \$

Liability – asset

Maintain inst. Memory & activity for continuity

Tear down vit plant? It's a potential resource

Haven't followed – thru on plans for spent fuel rods around the world

Unacceptable risks now may dissipate over time, changing risk scenarios

Create environment that encourages/accepts building on CP (e.g. ATG)

Can we be smart enough? (so we don't have to rely on our children being smarter than we are)

“Sacrifice zone” precluded other uses in its implications

DOE's response to “beneficial use”?

Have heard from DOE that waste site is waste site in perpetuity (inflexible) – need process for parsing down issues

Doesn't change remedy selection, but may ensure that remedies are monitored

Solution has to be credible

How to build sense of appropriateness

How to move bureaucracy from “sacrifice zone” to “asset” thinking

Build new laboratory

Asset thinking has been 300 area and it didn't work – haven't thought of 200 area this way – try to learn from 300 area experience

DANGER:

If we call it an “asset”, does that mean we don't have to clean it up?

Income assoc with CP clean up is an “asset”

ASSET:

Approach does not change what will happen today – does not lesson cleanup commitment

1. Gov't control as long as possible

How long? - look at risk profile

Figure out how to adapt controls

2. Don't head in a direction that relies on perpetual inst. Controls – cleanup heads toward maximizing beneficial use

3. We aren't going to find the perfect solution today

System of IC's protects users & uses

IC's create stakeholders (does change how we look at IC's row) - makes it easier

QUESTION 4 - - If we do it right, choose the right direction, equity will fall into place
These discussion questions written in the vein of: these will fail, so what do we do?

Direction & how we organize to do it will drive the time frame
Control doesn't necessarily mean gov't management (gov't provides the \$)
Paradigm shift from negative to positive has to drive funding
Community is also responsible for \$ assets thru commercial development
What is it env./ecol. At Hanford that we want to protect?
Tribal concerns is starting point
Is there a significant positive value in env. Restoration?
How do we measure restoration in order to determine its value?

05-08-02 TF – Cedar

“Stored” vs. “disposed of”

Managed – leave open the possibility at future change

Beneficial re-use for the entire Central Plateau

Full range of potential risks communicated?

Geographic, pictorial depiction of risk over time

KEY MESSAGES

- Need metric for calculating risk (quantitative or quality)
- Need to clarify risk terminology (currently there are layers of arbitrary language about risk)
- Send a positive message to future generations
- * There are advanced technologies developed to be developed at Hanford that can point to future use (we haven't started looking...)

DIVERISTY OF OPINION:

- Keep the waste here – find constructive avenues (bring in \$) – use waste
- Plateau is more of a resource than just waste
- Codify what we've done here (esp. let the Board know what's happened)

HAB Exposure Scenario Task Force Workshop
May 7-8, 2002
Flip Chart Notes

“FIR” Breakout Group

Tuesday Morning Discussion

Question 1

- Groundwater: plot preferred pathways (It isn't that difficult.)
- Remove groundwater source terms
- Retrieve what can be retrieved and prevent contamination from moving toward the River ASAP (need technology) - groundwater
- Groundwater modeling is not reliable
- No technology exists to treat the tritium (East)
- The groundwater monitoring program needs a goal, e.g., need to reduce within x% within x years; tell where plumes will be in 50 years
- Ensure source treatment does protect groundwater and prevents deep vadose transport; if not, do something
- Consider future site hydrology variables (e.g., dams, climatic changes, land uses – farming)
- Endangered Species Act could/may impede cleanup (know where species of concern habitat is today)
- Creating buffers needs to consider ecological framework (landscape an ecological approach)
 - What is the inventory of species? What are the habitat requirements for those species?
 - Do the inventory now.
 - Protect resources as an activity
- DOE needs to consider/consult with future agencies (e.g., U.S. Fish and Wildlife); DOE actions should not eliminate future options for other agencies; Is there collaboration with other agencies in 200 Area decisions? DOE and U.S. Fish and Wildlife need to be talking on the 200 Area now.
- Want groundwater cleaned up; would like it done as soon as possible, but see limitations as long as waste is in the tanks
- Not know state of groundwater in next 100 years
- Core: goal is industrial use; 100 years – not see institutional controls as effective
- Technology investments must be made by DOE; cannot walk away; within the next 15 years we want GW technology developed and applied
- Core
 - There are no technology magic bullets
 - Protect in perpetuity
 - Not see the effectiveness of institutional controls past 50 years
 - It is easy to protect the “positive” memory and forget the bad

- We fear DOE will not develop the technology. Must develop the technology and demonstrate the ability to treat long-lived mobile nuclides (iodine, uranium, neptunium, americium, carbon tet) in 25 years or remove the source
- Core: Highly restricted access for the next 500+ years. The area near PFP must be restricted for all time (guards)
- Barriers become attractors on which to build; barriers/buffers need to work for the time identified
- Barriers do fail; plan for that failure
- Building house in the 200 Area is not realistic.
- The core will be the core forever; support land use restrictions
- Buffer zone will be there for 500 years.
- Institutional controls are more effective when people believe in them, accept them; institutional controls should be valued vs. imposed
- Buffer Zone
 - Avoid Rocky Flats. Define in advance 're-open' levels and then the mechanism to cleanup
 - Will need perpetual surveillance (pay attention to the surface)
- Institutional controls will fail in 100 years. Decay for most materials will occur in 50 years. Long-term stewardship should be in cleanup and operations; should be in the RODs
- Need integration across cleanup, institutional controls and long-term stewardship
- Actively remediate to lower long-term stewardship costs
- Core:
 - After 75 years – 200 East and West (operable units)
 - After 75 years –need an open buffer zone where unrestricted use is expected (not build homes but run 4-wheelers)
 - There is critical habitat in the buffer zone (need access for all habitat; all remediation must be protective of habitat)
- Groundwater technology needs to be developed and implemented in the next 15 years to remediate all groundwater in the next 30 years (groundwater plumes)
- The point of compliance is at the base of the main source term (RCRA for point of compliance).
- Broad buffer zone – unrestricted in 30 years.
- Deep vadose zone contamination
 - Develop and implement technology within 15 years
 - 200 Area source terms must be remediated for long-term protection within 35 years
 - Vadose zone contamination under the tanks needs to be dealt with (remove/contain)
 - Existing models of vadose zone do not fit existing data
 - Create validated conceptual models within 5 years (have actual characterization data)

Question 2

- Decision makers (DOE) need ongoing, active input into the ecological survey process from habitat and cultural resource experts; consultation is needed, also. Need to involve the Trustee Council/Tribes early in the process.
- Cultural Sensitivity Training is needed; needs to be a mechanism to sensitize DOE (especially in looking at the whole eco-system not just a single element)
- Minimize the disturbance of undisturbed land.
- Factoring ecological risk in CERCLA and RCRA is deficient. Broaden ecological risk assessment.
- Ecological protection starts today. It is immediate and ongoing.
- There needs to be a holistic ecological management system developed.
- Give consideration to tribal sensitivities. Uphold treaty law.
- Environmental restoration of resources is another facet of the issue.

Tuesday Afternoon Discussion

- Cleanup decisions should be based on the broadest realistic possible consideration of trade-offs (human health, ecological, cost) now and in the future
- Changing decisions now can affect future contamination/cleanup
- Institutional Controls
 - Question of ownership – government (should not divest its responsibility), institutions, trusts and trustees create a cultural ownership
 - Stewardship begins today.
- Need a comprehensive database (waste inventory data) that will survive time.
- Core
 - Ensure the most dangerous materials are identified and disposed of (remove and secured protection); need to prevent access to plutonium (physical controls, e.g., guards are preferred over institutional controls)
 - Surface use of the core zone –
 - Clean so contamination does not come up to the surface
 - If the surface is not cleaned up, how is the habitat protected?
 - Disposal trenches – leave in place or dig up?
 - Industrial users may be reluctant to ever use the core area due to liabilities associated with potential use, e.g., movement of existing waste.
 - Do not presuppose a use when you do not understand the inventory of wastes and/or constituent movement through the soil (e.g., bringing additional water through irrigation)
- Equity Issues
 - Take care of it (waste) now; do not leave it for future generations
 - Must factor in cost and diminishing return; how does one define the “last curie”
 - How will ecological assets be balanced with diminishing returns
 - General questions to consider
 - How much does it/will it cost to do the work?
 - What is the dose to the worker?
 - Does cost to do the work, increase or decrease over time?
 - A viable cost argument could be to get rid of tank liquids and not remediate groundwater plumes – this needs to be addressed

- Equity across generations is not limited to humans but applies to ecological aspects (critters, habitats). Put into practice by cleaning up now.
- “Do it now” has subjective interpretation; how is it defined in terms of cost and worker exposure; even “do it now” has tradeoffs.
- Cost: is it a factor in cleanup? What are the other factors?
 - What are the tradeoffs of costs to future generations?
 - Do we benefit now but pass off greater costs to future generations?
 - What is the relationship of cost to protection of the worker?
 - Consider full life-cycle costs and impacts including resource costs
 - Balance/tradeoff available funds with priorities (allocate funds on the basis of risk reduction)
- Cleanup in the past was based on the perception of risk. What is needed is a sound, validated (more certainty) approach on assessing risks

Wednesday Morning

Common Themes from Group’s Discussion

- Lack of information; no valid models
- Reduce core size
 - Make it inaccessible to people and critters
 - Concern: reuse of the core should not invite waste importation (differing opinions on importing waste; some members felt importation of some waste was appropriate while others felt no offsite waste should come to Hanford.
- Need to validate inventory and models; model development should be an open process and ensure continuous improvement

What is Missing

- Minimize the core area (as small as possible)
- Minimize disturbance to undisturbed land to the extent feasible
- Recognize what has/has not worked with barriers and other things and design to prevent such failures
- Need aggressive technology development and implementation to address groundwater remediation
- The ecological component of cleanup needs to include”
 - Inventory of resources
 - Consult with affected interests
 - Minimize habitat destruction
 - Isolate contamination from the biosphere
- The Cleanup mission requires the maintenance of an adequate infrastructure
- Consider impacts from offsite conditions (human use, farming, dams) and changes in environmental conditions on site hydrology
- Groundwater should be remediated at the same time as site cleanup is completed
- Non enumerated costs (e.g., habitats, workers, public) and impacts must be considered and addressed by decision makers in consultation with affected parties
- Need an institutional process to ensure that institutional controls do not fail

- Avoid Rocky Flats, develop a process by which to address “surprises” found anywhere on the site
- Accelerate cleanup (e.g., tanks) to the degree practicable to remove or eliminate future year mortgage costs.

Timeframes

- Technology must be implemented to address long-lived mobile nuclides within 25 years
- Core should have highly restricted access for the 500+ years
- The area within the Buffer Zone on the DOE map should be cleaned up by 2028. The core zone should contain a buffer zone around discrete waste sites to protect the public

HAB Exposure Scenario Task Force
200 Area Workshop

May 7-8, 2002

Report from “Pine Group”

Question #1

- The Nez Perce has an official land use plan – DOE should look at it.
- Cleanup to “industrial standards” – preserve land through occupancy – turn into preservation, where possible cleanup to “unrestricted use.” It is hard to think past 50 years.
- Values of the site in the future – hard to know because of everything changing. Industrial controls could be human use.
- The area between 200 East and 200 West has to be a buffer zone. Industrial zone should include that area.
- Nez Perce recognize the land will not be returned pristine, but they do want it as clean as possible. Groundwater has to be cleaned up – not concerned with the buffer zone. Believe it can be cleaned to “unrestricted” or very close (including everything surrounding the 200 Area).
- GOAL – to make the footprint of the 200 Area as small as possible.
- Struggle between practical and realistic. The radionuclides should be bound up to the extent possible. Core zone in 200 Area will be “restricted use” forever. Not sure about the term “industrial use.” No buffer zone----need to clean up to the core zone. A lot of competing interest for other areas. Groundwater should be cleaned or remain unrestricted until clean. Controlled use of groundwater until the plume is contained. Intruders in a controlled area are responsible for their own actions.
- Long-term climate effect changes should be considered. Could be scouring or piling.
- Low –level waste prime area for disposal—where does it stop. Land use and cleanup standards are totally separate. The 200 Area may be the right place for disposal.
- Must take care that the intent of the decisions will be interpreted correctly.
- Unrestricted use means we do not have to worry about future generations.
- Waste management areas like the ERDF are safe on the surface, but no facilities can be constructed.
- What would the 200 Area look like---what barriers would be in place?
 - whole design process that includes signage, barriers, fences, etc.
 - most important is a presence, such as the Tribes as a cultural area or a Board of Trustees for management of the area.
- If properly designed may allow restricted activities. Also, new technologies may be used for additional cleanup.
- Part of the “Institutional Control Plan” should be a review for new cleanup technologies, however, must have confines. Need a very good reason to go back and disturb areas and cause risk. Need to consider resources---interest may be lost along the way.

- The “risk level” of the 200 Area will never be brought down to “unrestricted use.” New technologies that can reduce the risk may be looked at, but most look at the cost benefit and risk reduction benefit (the risk may be too high).
- There needs to be a common risk standard across the Central Plateau.

Question #2

- The Nez Perce would rather sacrifice 200 Area and save the rest of the site for Natural Resources. Do not place a numerical value on resource. All is important. No definitions/restrictions should be placed on land use. Decrease the footprint of the 200 Area as much as possible.
- Push more cleanup in the 300 Area because of the 200 Area being a sacrifice area.
- The goal should be to eliminate the source terms and then manage the waste.
- The Nez Perce considers the whole site “sacred.” Engineered barriers need to consider habitat connectivity.
- Cultural/Natural Resources –
 - Ignoring the history of the site---is it worthwhile to preserve the area?
 - Hard to get hands around question.
 - Other resources that are not Native American, esp. how dedicated these people were to their country. Patriotism. **Note:** This is another way to engage a human presence on the site.

Question #3

- Equity across the generations needs to be foremost in the decisions we make.
- Exposure Scenarios
 - **National Monument** – public access
 - **Native American Scenario**
 - Ownership? Government will own the site through some entity? It is a presumption that the government will own the site, it could revert back into private ownership.
 - 200 Area will remain in government control for quite a while.
 - Institutional controls will fail. Multiple layers of control may be initiated that will change through the generations.
 - Since institutional controls will fail, we need more cleanup now. Need incentives to maintain the institutional controls. Why should DOE be the only entity involved in institutional controls? Other entities are built in and it becomes a partnership.
 - Stewardship enables entities over time to evolve institutional controls.
 - New definition of stewardship is to be “stewards of the land and the resources around it – within laws and protective of human health and the environment.”
 - **Seasonal Use Scenario** – people who are in and out of the area. Need to consider what portion of the resources they use. How do you capture this in an exposure scenario? Through assumptions in the land use plan—then calculate the risk by determining what activities will take place.

- Use the **Agricultural Scenario**. It has components of each scenario (Cultural, Native American, etc.). Try to get to risk and dose rate.
- The regulators drive cleanup standards, then they evaluate for exposure scenarios.
- Institutional controls are a part of the remedy. Need to know the failure rates as it is part of stewardship. Need assumptions of when institutional controls will fail. Government control/Partnership should be involved.

Question #4

- The county would like the land released after it is cleaned up. The government goes through a specific procedure to sell land.
 - 1) other federal agencies through GSA
 - 2) state and local governments
 - 3) bid process for
- Cost Benefit – Risk Reduction issue. Cost benefit – what is the future; we cannot determine. We are doing the best we can today; what the standards require for future generations. We need to be assured we are doing the best of our ability for equitability across generations. Cost is an issue. We need to endow future generations with knowledge of what has been completed and the risk.

Question #5

- Vegetation process during mitigation from cleanup and disasters, such as fires.
- Depends on who is in control of the land – if the land is under federal control, we can be more specific.
- Personally – what would you like to see 200 Area look like? Do not damage the land anymore and take care of the waste.
- After cleanup (pristine shrub steppe habitat) it should not matter what the land use is. There should be “no additional concerns.” Only the 200 Area is under waste management.
- How do you protect indigenous plants, etc? Protection of the environment and human health? Will need to cleanup the groundwater.
- Use of land in “core zone” while being remediated will be “restricted groundwater use” to protect the ecosystem and humans; after remediation it will be “unrestricted.” Cleanup of the groundwater drives the need for a buffer zone and how long it will require “restricted use.”
- There are two types of plumes: 1) those we have that will eventually go away, and 2) those we anticipate and we do not know the concentrations and extent of the plumes.
- Continue on groundwater cleanup as long as necessary.
- Institutional memory may be lost in the future. Economic use of parts of the site will assist with institutional memory. Economic use will enhance historical events/memory.
- The land is quite pristine due to Hanford’s mission; and is ultimately protective of the Native American’s interests.

Handout Questions – 2nd Day

1. The “Core Zone” should be as small as possible.
2. Activities in the “Core Zone” should be limited to active stewardship of waste present at the end of cleanup. This active stewardship should include a long-term presence by an organization(s) responsible for maintaining institutional knowledge of “Core Zone” activities.
3. Need to add: “When groundwater cleanup is complete, the only groundwater restrictions should be within the “Core Zone.” However, if possible, groundwater restrictions should not even be within the “Core Zone.”
4. O.K. as is.
5. Need to add: “The agencies should produce a risk map as soon as possible.”

Key Messages

- Continue human presence to maintain long-term institutional knowledge (example: National Historical Park that includes the Central Plateau beyond the “Core Zone” in the National Monument).
- Stewardship should be responsibility of a coalition with the Tribes a major member.
- UNIQUE IDEA. Flush the vadose zone to drive out contaminants.

Spruce Flip Chart Notes

Uses (Core, All, Buffer, GW)

- Drinking water standards outside individual W.U. boundaries by 2018 per law
- Land use between 200 E& W different than FSUWG
- Surface available for nondisturbance outside industrial zone
- Ecology fully protected/not necessarily unrestricted
- Maintain buffer for useful facilities (vit 50 yrs) canyons fenced
- Don't disturb habitat surface to clean up. Let time work.
- Must remediate B, C, and S to have unrestricted use in adjoining areas
- Health of ecosystem?
- Natural spread of contamination: wind, fire, wildlife
- What are the levels of ecological contamination?
- Assume capped area closed to public
- Assume institutional controls failure

Questions 1 of 1

Which political jurisdiction for land control?

Does industrial mean federally owned?

- Risks to be in perspective with other health risks
- Risk assessments need to consider cumulative effects
- Keep people out of (site) 100 years (good for research) (close it, clean it, use as laboratory)
- What are life expectancy of contaminants?
- Need indefinite monitoring system/feedback moveable boundaries
- Need to preserve knowledge of what is on the site
- Need plan for controls failure
- Reevaluate as data comes in (materials and risks)
- How do you keep public from breeching controls? (National monument – pressure to expand)
- Concern that fences don't work
- “Unrestricted” needs to be defined by stakeholders for regulators
- Time frame is key to “unrestricted”
- Maintain our goals – continually
- Is stewardship enough?

Activities: Monitoring – needs human activity

- Will initial cleanup be adequate? – Danger of proposing monitoring as an excuse for less cleanup
- Increasing requests for public access from and into National monument
- No way to keep public from going beyond public areas
- Core – storage of contaminants 300 year
- TRU will be moved out – to WIPP during 50 yr cleanup. During 50 yr buffer and QW cleaned to unrestricted outside

- After 300 yrs core radioactivity will not require restricted access. Material will be buried, but radioactivity gone.

Question #2

- What's the path of the jurisdiction?
- What are the cultural aspects beyond native American?
- There is high quality habitat to the south – protect the area instead of cleaning B/C crib. Let time work.
- Land use between 200 E and 200W should be considered as habitat.
- Important to expand Elk herd to river (hunting/preservation)
- What we revegetate in remediated areas may harm surrounding habitat.
- Revegetation schemes are not specific to surrounding habitats (ecology)
- Obligation and opportunity to restore natural habitat in Central Plateau
- Ground water in Central Plateau is valuable state resource.
- Columbia River withdrawal should not be assumed
- How much groundwater is there and can it be pumped for off site use?
- Access to groundwater is western cultural value.
- Is restriction of groundwater restriction of confined aquifer systems? (Cross contamination?)

Report out

- Jurisdiction 0 location and time
- Habitat between zoo areas
- Need to define by stakeholders activities – unrestricted
- Ensure active monitoring in place, but not as substitute for clean-up
- GW is resource
- S forced waste should be retrievable for future treatment, use, etc.
- Assumption in that area in preservation “green” won't need institutional controls
- How do other entities do institutional control; BLM, Reservations, etc.
- Who has jurisdiction?
- What kind of controls do you envision? Access; resource; deed
- *Stewardship doesn't begin in 150 yrs; it begins now If there are limitations/demands, they should be included in LT-Stewardship
- *Stewardship is much more than institutional controls
- What re the components of LT-Stewardship? Remediation, Monitoring, Site knowledge – data, Put knowledge in communicable form, transparency, *right to know AND understand, *education
- *Risk assessments need to be comprehensive for all elements and account for cumulative effects
- Communication of risks lies with government to be clear. (responsibility for)
- The obligation goes beyond DOE to agencies to justify their decisions to lay people
- Need internal criticism – checks and balances

Institutional Controls

- Assume general access – what is necessary?, What further controls are needed for groundwater beyond what other entities do? – Beyond permits to drill well.
- Need alternative water supply to avoid need to drill (water system)
- Have responsible party to maintain controls.
- Track record for controls not good.
- Jurisdiction's choice to enforce.
- Active monitoring - system of education
- Assess for worst case. Versus expectation of use.
- Clarity of current water system plans
- Look at potential usage of areas outside Hanford, Trade-offs of areas for activities.
- Political pressure: farming, water rights, damage to ecosystem
- Keep animals from carrying contamination off-site.
- Big use of herbicides and pesticides on site.

Questions #4 - Cross-generation

- Retrievable waste – hope for new technology
- Risks passed on through exposure/heredity
- Weigh risks of cleanup/exposure: workers, public, ecology, residents, transients
- Moral imperatives of passing on the risks
- Communicating the risks to younger generations (perspective?)
- Risks of doing nothing.
- Keep people well informed 0 overcoming prejudice, bias
- Cost of losing trust – based on accuracy and accessibility of information (gout, press, etc.) (scientific community)
- Corporate memory and continuity of responsibility – passing land to other agencies. (criteria for it) Seamless transition with conflicting missions.
- Who is willing to pay to maintain a control system (trust fund?)
- In 2012 when public access to Hanford Reach naturally encourages encroachment into other areas.

Question #5 – Human Health/Environment

- How is human health and environment different?
- Ecological system interaction is complex.
- Cleanup may cause harm.
- System harm versus individual harm.
- Try to assess ecological integrity.
- Many media should be considered beyond ecology.
- What is an environment? (living versus air, land, water) – All need protection as a pathway.
- Don't differentiate between the above. Keep holistic view.
- Cross influences on decision making (need common understandings)
- Public – regulations – scientists – manager (cycle)
- How do you build trust
- Openness - Transparency
- Willingness to understand
- Willingness to take risks

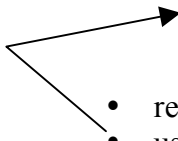
- Give credit to public
- Plan for generational baggage
- Pressure to answer every question
- Scientific arrogance

Mitigating for harm

- Mitigation not included in budget process
- Time sensitivity
- ROD enforcement
- Can mitigation be applied to human values in life (decision to use different standards at different sites) (moving the problem around)
- Payoffs for harmful situations and ramifications to future generations
- Risk acceptance

Wed am

- Is it possible to assume “immobile” waste?
- stewardship isn’t represented
- core zone should be as small as possible
- buffer zone should shrink and disappear
- have continuous monitoring & remediation correction/maintenance (go together)
- what does “immobile” mean?
- retrievability and monitoring isn’t mentioned
- communication
- stewardship is active, not passive
 - monitoring communication
 - correction institutional controls
 - record keeping
- reuse investment
- use & encouragements of advancing technologies
- beneficial use of land and waste, facilities, materials
- GW bullet ok



last bullet

- include risk combinations (living onsite & working in different zone onsite)
- to expand understanding – create maps for these ↗
- more risk knowledge is needed for us to analyze scenarios (use comparisons to other risk scenarios) (compare zones)
- communicate in lay terms
- explain assumptions (large, foundational)

Important Messages

- clarification of jurisdiction
- trust – see questions earlier
 - gov’t, public & media

- additional pathways should continue to be evaluated
 - wind
 - fire
 - wildlife
- ~~support better characterization through monitoring~~
- need to communicate the significance of the parameters that may lack characterization
- continuing need to evaluate and apply new technologies
- optimize measurement to support realistic characterization
- define “unrestricted”
- communicate limitations of the models
- stewardship starts now
- right to understand as well as know

GROUP REPORTS

DOUG

Core zone as small as possible
Disagreement re: whether there should be buffer zone
Clean up standard & land use
Need continued human presence to pass on knowledge

GARIANN

Need explanation of jurisdictions: geography and time frames
Value of habitat between 200E & W
Stakeholders define “unrestricted”
Ensure active monitoring, but not in place of cleanup
Consider g/w as a resource
Monument access crosses 200 area

GREG

Remove g/w source terms
Get realistic re: where plumes are moving (50 yrs)
Prevent deep V.Z. – transport
Consult with future responsible agencies
DOE make technology development investment
We know IC’s will fail
Barriers attract people
Core is forever (not consensus) – how big?
Expect to find migrating contamination
LTS part of process now
5 yrs – create & validate conceptual models

TODD

Core zone is useful area: research tribal uses, etc.
Maximize use flexibility (not an excuse for less clean up)
Buffer zone is transient – want agencies to analyze for unrestricted use & come back to stakeholders for decisions
Incentivize g/w use in core zone
“Risk map” does assume cleanup continues
Will not make permanent / perfect solution today
What did we leave?
Why did we leave it?
What can we do about it?
Different approach from current programs

#2

DOUG

Tribes consider entire site sacred
There are potential historical sites for preservation

GARIANN

Revegetation planning sensitive to surrounds
G/w as resource goes beyond the site (western cultural resource)
More active decision – making processes
What is "ecosystem"
Look at whole ecosystem, not discrete pieces
Protection of the ecology starts today

#3

GARIANN

Stewardship goes beyond IC begins today
Right to understand, not just know (education can be a form of IC)
More wholistic assessments
Where's the guarantee someone will pay for the controls (maybe a trust)

GREG

Who's the owner?
Assume inst. Controls will fail
Should be ownership from trustees

TODD

Desire for on-going gov't entity as long as possible
"Risk map" approach- range of assessments, ind. maximum exp. Over time periods
Core zone exp. Is probably non-residential
Paradigm shift in thinking about 200 area: sacrifice zone – asset

DOUG:

Needs to be continued human presence on site
Coalition of groups resp. for IC's (most durable method)

#4

TODD:

If we are going in the right directions & making the right decisions, we can create institutions to protect future generations & by default. Provide equity across generations

DOUG

If we do the right thing now, we automatically guild in equity across generations

GARIANN

"Mitigation" can be considered for humans as well as for the environment

GREG

Cleanup decisions should be based on the broadest realistic considerations
Take care of it now & don't leave it for future gens – factor costs
“Equity across gen's” also applies to critters, ecosys, etc

#5

DOUG

If you clean up to the point of original condition, flexibility will ensue

GARIANN

Why is “human health” different from “environment”?
Reflect the complexity of the site- look at harm to the system
System impact each other by proximity

GREG

Validating models, understanding inventory
Clean up so waste doesn't resurface
Don't presuppose uses
Need comprehensive database
Cost trade – offs now v. later

Appendix II – Notes from River Corridor Workshops

| | |
|-----------------------------|----------|
| Notes From June 10-11, 2002 | 67 – 96 |
| Notes From July 16-17, 2002 | 97 – 115 |

APPLE GROUP

- What are the beneficial uses of groundwater?
- Definition of groundwater?
- Drinking water standards
- Don't release anything in 2012 (until g/w is cleaned up)
- Never knew use was restricted (teenager)
- Drunk teenagers (swimming, camping, drinking from g/w seeps, boating)
- Children/families in the National Monument
- Active recreational use available
- Development on the Reach?
- Shouldn't limit scenarios to government definition of monument
- Contaminated land in River Corridor outside monument
- Proxy-level cleanup to protect eco adjacent to the monument
- Reduce novel perturbations to natural systems
- Stay within natural variations, e.g. less constrained river
- Riparian zone is wrong constraints: too limited – should be hyporheic zone
 - Mixing of g/w and surface water effending out to flood plains (literally “below the flow of water”)
 - Biological instead of engineering definition: EPA: “transition zone” – between river water and groundwater
 - Entire food web included
- More heterogeneity in assumptions (i.e. dams are gone)
- Use: Conservation of biodiversity
- River manipulation is a way to restore biodiversity and habitat
- Time frames:
 - 2035: Restoration Complete
 - 2028: Full use
 - 50 years: recreational use (because of g/w contaminant) (match clean up to this reality)
- G/w is high priority
- Protection for wide variety of uses
- Riparian zone: What ecological assessments?
 - Human component
 - Eco component
- Food web study

TUESDAY - APPLE GROUP

- Bring in USFWS and NMFS and other experts regarding how to do credible eco-risk assessment; include them in any development forward
- Want to see: groundwater
- “Comprehensive” may not be specific enough
- Significance of deep vadose zone contamination (below 15’)
- (All contamination masses assessed)
- Assess existing waste left in place
- What were original standards?
- When did contaminants in groundwater begin to show?
- Want to see: Report on changes in contamination levels
- Trace elements (ppb) and levels (ppm)
- Assume changes in river dynamics (e.g. floods, loss of dams, terrorism) – uncertainties (distinguish between reasonable and catastrophic)
- Segment assessment into specific time frames that get broader, include consideration of decay
- Should all Hanford risk assessments be phased? Yes, and chance assumptions, parameters based on changes over time
- HSRAM should change!
- Outlier events determine clean-up and therefore \$\$
- How to credit IC’s in risk assessments? How to factor in their risk of failure?
- More than one scenario should be evaluated – look at range of values
- Preferential pathways need to be accounted for (standard models like RESRAD don’t do it)
- Include off site sources’ pathways
- Cannot look at because use only discrete area (look at influences from other waste sites)
- Conceptual site models must incorporate upgradient sources and interactions between multiple waste sites
- Sediment (quality, contamination) considered, riverbed
- Multiple points of compliance? Do they dilute risk by broadening assessment parameters?
- Where to measure input to exp. sc? Point of compliance is tied to exp. sc.
- BC pilot: Riparian zone included
- Groundwater under the waste sites must be available for beneficial use → what does this mean for time frame?
- Different exp. sc. For different time frames
- LOEL’s must include genetic alterations for chemicals beyond just radiation
- What about inorganics?
- Must include existing river risk with fugure off site risk → look at cumulative risk and additional incremental Hanford risk
- Look at offsite risk 2 ways:
 - Upgradient 200 area
 - Current river risk from non-Hanford sources

- Impacts in food web/biota → bioconcentrations across species
- Consider risks for species populations
- Rationale for choices based on food web, implications for populations → based on ecosystem understanding
- Consumption assumptions based on range of users
- Use both: maximum exp. ind and maximum exp population
- Identify differences between RME and MEI and if they shift over time
- What is “reasonable” now may changes (including climatic change, rainfall stats and snowpack)
- Keep risk assessment separate from risk management
- What about cleaning up less to protect endangered species? (Is the cure worse than the disease?)
- B/c how similar can this assessment be to previous assessments: is there other work going on that could be valuable?
- Bring lessons forward from previous studies
- Analyze on different scales:
 - O.U.
 - Larger area
- Include discussion of how statistics, averages will be included
- What contaminant concentration will be used in risk assessment?
- Define how contaminant concentration inputs will be defined
- P.I.: How will B/C pilot affect other decisions?
- How will other groups be identified for involvement?

TUESDAY PM

- 2028 for groundwater clean-up for TPA (groundwater is available for beneficial use)
- Need to specify standards for today
- Don't “back load” – current groundwater clean-up continues while decisions are being made
- When is it reasonable to assume I.C.'s will fail
- If long-term remedies are in place, what is the system for managing them?
- What are the consequences of failure?
- Look at I.C.'s that have failed to date for strategies for the future
- “Reasonable” time frame may be site specific based on plume contents
- Time frame matters as groundwater contamination affects the river – time frame dictated by river user's exposure
- What is the time frame for IC's to be in place?
- 50 years is reasonable frame (based on Nature article)
- IC's are good as long as they are maintained
- 100 area, 300 area, river corridor, groundwater cleaned up in 50 years, Central Plateau (esp. as it affects river corridor water), IC's, monitoring in place in 50 years

- Riparian zone: do not assume current levels will still be the same as time goes by
- Driving force will change as river levels change (i.e. sometimes groundwater → river, sometimes river → groundwater)
- BIG pump and treat
- Maintain riparian zone biodiversity
- Protecting humans protects biota and vice versa
- What about Native American and recreational scenario? Call them “riparian use scenarios”, include tribes, recreation, sportsmen, shoreline users, river users, campers, esp. children every year. (Rich set of scenarios)

300 Area

- Is there actually a reasonable future industrial use? (Is this the right assumption)
 - What industry is permissible (or likely) adjacent to a national monument?
 - Industrial assumes not remediating under current active facilities
 - Scrutinize “industrial use” as a form of IC – e.g. strict monitoring of worker exposure for life of site
 - How can we assume industrial standard protects groundwater and riparian zone?
 - Industrial use is not appropriate because this is not a typical industrial place
 - This industrial area will be highly subject to inadvertent intruders (both human and animal) but don’t use only intruder scenario as driver
 - “Current industrial use” standard based on obsolete model
 - Update assessments – for example, urban res. exp. scenario in ~30 years may be appropriate (*note: this scenario needs to be defined)
 - Don’t restrict scenarios too tightly
 - Fence is arbitrary boundary, should not dictate a different cleanup standard
 - According to EPA, currently, 300 area is all considered “brownfield development”
 - Urban residential scenario:
 - City water/sewer
 - Garden down to 24”
 - Golf course/grass watering
 - Basement?
 - Children present
 - What should drive clean up?
 - Listen to values and principles
 - Credible assessments
 - Public involvement
 - What scenarios take precedence?
 - Factor in realism regarding resources, money, risk reduction/cost, risk management
 - Risk reduction versus cost:
 - resource value/real estate value
 - NRDA natural resource damage assessment
 - riparian value
- *Now

*10 years

*30 years

- Need credible risk analyses in order to make trade off decisions
- River corridor uses:
 - Don't forget eco without humans (e.g. Chinook, Steelhead, other species)
 - Sturgeon, ecological receptors/sensitive indicator species, birds
 - Animals that live here, pass through
- Need comprehensive Columbia River eco survey study
- Public involvement:
 - Early involvement of interested stakeholders
 - Public comment on project execution plan
- DQO should go out to the public
- Decision transparency – put things out where people can see and understand them

Common Themes

- Be comprehensive – include groundwater, river dynamics, floods, off-site risk as well as on-site risk
- Bring in outside expertise on eco-risk assessment
- No existing exp scenarios should be taken for granted as “right”
- We need comprehensive, time-phased risk assessments that look at multiple exp scenarios
- Need to figure out how to factor IC's into assessments

Divergent ideas/Key thoughts

- Freeze the groundwater
- Check decisions against innovative technology
- Risk assessments separate from risk management
- Respect cost of clean up on biota (maybe you don't clean up)
- Both MEI and population studies drive decisions
- Empirically verify what's driving risk assessments (show me the data!)
- Make Hanford a wind/solar farm
- 300 Area ind. scenario is not the responsible scenario
- “Urban residential” scenario
- Include the riverbed
- Follow the contamination (clean it up where it is)

CEDAR GROUP

- What are beneficial uses when cleanup is complete?
- What is definition of River Corridor?
- Goes downstream as far as contamination does
- DOE needs to remember what contaminants it has and where they end up
- Those uses are independent of DOE control
- Riverbed is part of the game
 - Hatchlings and salmon – allow them to hatch
- Include islands
- State owns the riverbed and land up to the high water. State interested in public access

Beneficial Uses

- Salmon spawning in riverbed.
- Access
- Shoreline seeps as springs for drinking water
- Recreation – of groundwater
- Shoreline pools are used by kids
- Camping
- Vegetation – food sources (campers, tribal)
- Business/Commercial
 - At south end
 - At B Reactor Museum
 - At boat launch at Vernita

- Levels safe for consumption of game and fish
- Shoreline seeps are a scientific window on Hanford management
- Definition of g/w clean up being completed:
 - When efforts to clean up end
 - MCL standard
 - Clean to regulatory limit across the site
- Bike and cross country trails along shoreline
- River water and sediments below toxic or adverse effect levels

Timeframe

- Put priority on things we can do something about
- 2011 has been promised for unrestricted use in Hanford Reach
- (We have uncontrolled use today because there are not controls present)
- Warning signs at N. Springs today
- Track off problem at N. Springs

Beneficial uses of fish and wildlife/vegetation

- Intrinsic value – no impact
 - Maintain maximum carrying capacity
 - Enjoy watching them
-
- There will be a lot of development of business and residential in next 50 years. Include it in 300 area. That is why the Reach is important for preservation.

Groundwater Priority

- High-Top (most common concern of public)
- Sources cleaned up first
 - Then groundwater
 - Then surface
- Pay attention to preferred pathways
- Reality Check
- Shoreline is the most attractive part of the site for public use
- At what point is river no longer usable?

**TUESDAY AM
CEDAR GROUP**

Question A:

- What are the assumptions? Do we know?
- Clean groundwater and river
- Can't piecemeal the soil units from groundwater and river
- Know eco-risk in upland, aquatic, and riparian
- Use shrub/steppe habitat assessments for uplands
- The public is going to heavily use this as northern entrance to national monument. Includes heavy use of shoreline and likely to include children camping.
- Include specific does response for children
- Use different exposure scenarios for children
- Use existing MTCA assumptions
- Use Native American scenario for children along the Reach
- 4 years is too long. Do RAs you can do now
- Use MTCA default parameters or better
- Use site specific Native American scenarios
- EPA says 25 millirems not protective at CRCLA sites. Use 1/100,000 risk per MTCA for all cancer risks
- See an assessment for salmonids and macroinvertebrates above, at, and below the site. Compare juveniles and returning adults as well as young. Impacts to varying size adults. Analyze sediments. (Do literature search. Have assessment of non-intermediate and impacted areas for comparison)
- Gaps in applying human use standards. Identify systematically.
- What are variations in contaminants downstream? Various susceptibility to settling

PI Expectations

- PI at every significant step-feedback to public on issues raised
- Involvement means two-way communication
- What feedback from this workshop? Not just response to HAB advice
- Communicate assumptions, purpose, and components of risk assessments.
- Need specific PI plan for all risk assessments
 - List inputs you will use
 - Institutionalize the plan and process
- Meet MTCA standard to explain any variable
- Notification process for continuing risks and restrictions
- Concern about risks ongoing prior to issuing RA (notice required to the public of these risks; signs, fences, literature) – need multiple communication methods
- Reports on groundwater quality regularly
- EPA studies on PCBs in river. Want this considered in BC pilot
- What is the current definition of the “riparian zone”?
- Make cleanup of entire river corridor to same standards
- Immediate priority on groundwater

Question B:

- What are the impacts of using pesticides/herbicides in riparian zone?
- Look at using alternatives
- The zone depends on various factors. Why have a static definition?
- There are seeps higher than 10' above the river
- Riparian zone should be a “properly functioning system” including all native plants and animals

Reasonable restoration time frames for groundwater:

- Can't complete until tanks are done: 30-35 years unless there is a barrier
- Need comprehensive plan to stop contamination flow while cleaning up what's already there. Legal date is 2018
- Develop adaptive management plan
- Need TPA requirement to develop technology and have demonstrations by specified dates
- Slow/effective is okay if the sources are being addressed. Adequate monitoring and annual report/full disclosure essential. But must meet standard for all shoreline use and eco-risk. Don't ignore new technology development
- Cut off spread of Central Plateau contamination

Question C: 300 Area

- 9-5 adult worker is not reasonable scenario for this area
- Public says it doesn't make sense to leave the 300 area industrial
- Public expects to be able to use thins part of the river and land. There is and will be pressure to use it
- 300 Area has very desirable areas for commercial, residential, and recreational us
- MTCA industrial is paved, fenced, no public access. No one foresees this use for this area. It should not be listed as industrial
- We need cost comparison of unrestricted versus industrial use. What are the trade-offs?
- Industrial is too restrictive. Need good reason for it
- Groundwater must be restored to drinking water standards
- Stretching out building removal and leaving some and leaving sewer lines, doesn't allow cleaning soil or groundwater (326 to remain, but sources of contamination)
- Lack of characterization in 300 Area
- Outside the fences makes no sense to be included in industrial use

Question D:

- Health, human safety, sustainably fisheries, and ecological functions
- River and groundwater
- Tribal use
- International treaties
- Cancer risk

Question E:

- Recheck for other contaminants: arsenic, mercury, PCB's
- What is reasonably foreseeable, not what is realistic
- Need good definition of monument and its purpose
- The river corridor should be unrestricted
- There will be a growing demand to use monument:
 - Hiking
 - Biking
 - Fishing
 - Camping
 - Birding
- How does monument compare to a park?

Possible Uses of the Monument:

- Off-road vehicles
- Tribal cultural activities
- Tribal cultural center
- What will happen to reactors after 75 years?
- Having reactors in a monument is inconsistent
- Public wants reactors to go eventually

Key Themes

- Public use of shoreline will increase
- Protect children
- Groundwater in BC Pilot
- Relook at 300 Area clean up and what constitutes 300 Area. Reassess use assumptions
- Public wants use of entire river and shoreline
- Health, sustainable fisheries, human safety, and health ecological function
- Need RA public involvement plan
- Effective monitoring and adaptive management
- Slower groundwater clean-up is okay if meets standards for shoreline use in 2018
- Emphasize early life stages of fish and macroinvertebrates above and below Hanford site

Divergent/Creative

- No clear idea on time frame for groundwater cleanup
- 2018 is goal for ending active cleanup to unrestricted
- Cut off groundwater contaminants before it reaches river pump and treat barriers cryogenic

Breakout Group: Fir

River Corridor/Groundwater (beneficial uses)

- Recreational uses – hiking, swimming, fishing, picnicking, and camping
- Commercial in support of recreational
- Subsistence – herbs, berries (food and medicine)
- Educational and historical
- Scientific research
- Industrial
- Farming

Timeframes

- Cleanup today for limited uses, e.g., boating, fishing
- GW needs to be clean (below drinking water standards) to allow unrestricted; today the riparian zone is restricted; access is restricted because the groundwater is restricted
- If want unrestricted use of shoreline and riparian zone, then the GW must be cleaned up
- Monitored natural attenuation of GW does not get to unrestricted use in a reasonable timeframe
- Out of the box: plant poplar trees to draw up contaminated GW (not sure what would do with poplar trees when grown)
- What is an acceptable timeframe – there are no criteria by which to define; acceptable timeframes may be different for different parts of the Site
- Criteria: cleanup is not done until groundwater is cleaned up
- Are cocooned reactors a threat to GW? Do not believe to be.
- What are the impacts (or impacted areas) to the riparian zone near the reactors? 200 Area?
- Groundwater in the River Corridor is linked to the Central Plateau
- How clean is clean
 - For some, any contaminant may mean it is not clean
 - Wide range of what is defined/considered clean
- Getting off the National Priority List is not a high priority
- Timeframe: as long as it takes to do it right
- Groundwater in the 200 Area must be cleaned up before the River Corridor can be considered cleaned up
- Need to consider herbicides, pesticides, fertilizers as non-Hanford contaminants, also

B/C Pilot

- What are the risks?
 - Cancer (one but not only risk)
 - Protection of human health and the environment for today and future generations - **trade off with**
 - Impact (harm) to workers during cleanup
- Pipelines: Is (will) more damage be done to riverbeds by removal of pipelines? How access damage/impacts?
- Need to address GW risk

- Can the use of GW be defined? Assumptions of use need to be identified. What are credible assumptions (scenarios)?
- Will standard scenarios be used for B/C pilot? Yes. Should include scenarios such as flooding (which could mobilize contaminants; erosion could result in exposure of contaminants), change in River route
Credible events should identify scenarios. Experts should identify credible events that are then taken to the public for feedback
- Timeframes: near future (150 years); mid future (to 500 years out); far future (beyond 500 years)
- The reference case should be defined by risk assessment
- What is missing in the B/C pilot? Not clear what was excluded.
- What are the 200 Area assumptions underlying the B/C pilot?
- Risk assessments should identify boundary conditions (parameters), including GW. Major impact of GW is at the shoreline.
- Riparian zone – how define?
 - Is the classic definition adequate?
 - Regulatory definition – what is it? Is it adequate?
 - What are the risk assessment scenarios?
- From monument boundary into the 300 Area should be protected (riparian zone or at least ¼ mile)
- Would like to identify variations on reference case
 - Analyze many cases (concentration and potential impacts from different scenarios)
 - Zoning will not last forever (long-term stewardship)
 - Balance (optimize tradeoffs) between cost, worker risk, long-term risk (is there enough information to make the best decision)
 - Recreational scenario should include the recreational worker (e.g., ranger)
- Public Involvement (B/C Pilot)
 - Review (public) expert-generated baseline case
 - Need early public input
 - Want to have early feedback on assumptions, scenarios and variations on scenarios
 - Update HSRAM
 - Relationship of public process to risk assessment – need an ongoing public process; public involvement opportunities need to be identified, meaningful, appropriate and timely
 - Need (DOE) institutional knowledge/cross project information on past values/input
 - What is successful P.I.? Complex and difficult vs. easy and joyful
 - Listen to issues; consider what was heard; provide feedback on input received.
 - What about outside peer reviews? Where do they fit into the process? Who chooses the composition of the group?
 - Scientific vs. value-driven approach. What is the role of perception in driving costly, less than optimal cleanup activities?
 - PI Plan vision – cross reference values and issues; identify where they fit into PI process
 - Components of a plan: what going to do; what are the methods, schedule, what are the impacts (provide the public with the opportunity to critique)
 - How broad should be the input (those affected; perceived affected)? What should be the techniques?
 - Values need to be elicited, available and factored by decision makers

300 Area

- Get riparian zone cleaned up as early as possible
- What are half lives (strontium, cobalt, uranium)
- Why were residential standards chosen over residential? CERCLA looks at land uses as a guide for cleanup
 - How marketable will (this area) be to industry? Private firms will not be attracted to “unclean” area
 - Cleaning up to unrestricted could attract industry
- Several uses of the 300 Area should be identified. (Are there pockets for certain use, e.g., residential for some areas and industrial for others?)
- Industrial standards would support government use, e.g., labs
- Sections of 300 Area: three sites will be cleaned up close to residential (not sure how to address 300 Area by section given the ROD)
- Compromise: look to see what could *reasonably* be cleaned up to residential
- Is GW the driver for not cleaning up to unrestricted? No, there appear to be a number of unknowns in the 300 Area, e.g., not dug a hole that has not resulted in a “find”
- Residential vs. industrial – major distinction is use of irrigation
- Recreational use might be a reasonable use, especially for part of the 300 Area (bicycle path)
- Recreational (needs to include a child scenario) can be less restrictive than industrial? What are the distinctions? Talk to U.S. Fish and Wildlife for the scenario recreational worker.
- Will be zoned industrial but what are the reasonable exposure scenarios?
- Does industrial use protect not only the worker but others? What will be the role of institutional controls? No intruder scenario in industrial use.
- Values
 - Look at scenarios other than industrial worker, e.g., young intruder
 - No agreement on protection of industrial use
 - Modify industrial use – be more selective in applying industrial use scenario in 300 Area (balance cost and worker exposure to long-term risks)

Reasonable Timeframe for GW cleanup

- GW must be cleaned up by the time institutional controls fail.
 - What are the stats on when people begin to violate land use/zoning restrictions? (Indicant for institutional control failure.)
 - Creative institutional control – supply cheap sources of water, thus people will not drill wells
- No reasonable timeframe because no reasonable cleanup solutions (e.g., uranium) Is there a way to lock uranium into the soil? Dilution is the solution (which is unacceptable to Oregon).
- If uranium can be cleaned up, then cleanup of groundwater could be done by the end of (Hanford) cleanup.
- Need an active effort to find ways to cleanup the uranium (new technologies)

Riparian

- Need scenario for recreational worker
- Need scenario for children
- Riparian zone needs to include that area and a quarter of a mile into the Site
- Should be defined as recreational use.
- Should it be called the riparian zone or riparian receptors? What is the best way to define or what is the most appropriate terminology?

River Corridor

- Realistic beneficial use – recreational use (e.g., bicycle path)
- Realistic: balance technology costs, worker risk and long-term risk
 - What is legal, what is possible from technology, what is reasonable from cost, worker exposure and long-term risk

Common Themes

- Address GW (includes B/C 5)
- Public Involvement: need a plan, an ongoing process
- Need to state boundary assumptions including 200 Area GW assumptions
- Analyze many scenarios, e.g., industrial use, intruder, recreational worker, child, Native Americans
- Balance cost, worker risk, long-term risk tradeoffs
- Riparian Zone cleanup: important to the group
- Cleanup sections of the 300 Area where feasible to unrestricted or use industrial (ensure balance of variables)

Strong Messages

- Extend into the Site a quarter of a mile zone from River to South bound area of the Site (into 300 Area)
- No reasonable timeframe for GW cleanup in the 300 Area

HAB Exposure Scenario Task Force – River Corridor

PINE GROUP – Discussion Notes

June 10, 2002 (Monday afternoon)

Uses for Groundwater

- Wells
- Seeps
- Irrigation
- Drinking water

Riparian Zone

- Landing zone for recreation
- Remediation (filter) zone
- Dilution of plumes
- Shrubs
- Wildlife refuge

River

- Swimming
- Fishing
- Salmon spawning/fingerling nests
- Drinking water
- Boating
- Industrial use
- Irrigation
- Wildlife zone
- Energy use

Land Use

- Outside the riparian zone may be unrestricted for residential and agricultural
- 100 Area – residential and farming; 300 Area – industrial
 - More likely uses:
 - National Monument
 - Subsistence living
 - Providing safe drinking water
 - Historical museum
- Hunting and gathering
- Energy uses

National Monument

- Tourists
- Hunting, fishing, boating, camping
- Not likely residential
- Can't accept contaminated land (unless approved by Secretary)
- Nearby resort area

Riparian Zone

- Hunting and gathering
- Wildlife observation
- Wildlife and plant life monitoring

Timeframes

- Phased releases – high risk areas when cleanup is complete
- Release low-risk areas as soon as possible – when monument uses are defined
- Out year phased released
- River uses – TODAY

PINE GROUP – Discussion Notes June 11, 2002 (Tuesday morning)

Question A – What elements would you like to see included in the BC Pilot? What approach to the pilot do you think is appropriate?

Preferred pathways (lateral---not horizontal)

River bed – template (pore water)

Ecological risk assessments (common definition) – valued species or all species?

1. Ecological characterization - identify habitat, species, pathways
 - Review of existing data
 - Identify data gaps
 - Identify a sub-set of species
 - Timing and scale
 - Public concern (example – alluvia salmon)
2. Exposure profile – identify sources and locations; calculate exposure to species
 - More experimental information – data gaps and uncertainties
 - Models that are used need to be validated
 - Identify potential contaminants of concern
 - Limited data in the river bed
 - Take into account background (for example – upstream)
 - Available funding
 - Should this be funded by other agencies? Should not be dependent on DOE (technical independence)
 - Contaminant concentrations all along the pathway --- and over time
 - Back calculations

3. Ecological effects characterization – collect site specific data to determine effects to species on site
 - Uptake of plants, vertebrates, mammals, birds
 - Collect site specific contaminants effects on survival and reproduction
 - Dose response curve
 - Cleanup levels
 - Parallel process to human health
 - What have we missed?
U233?
4. Determine values, benefits and cost

General B/C Pilot Project

- Future natural events – floods, fires, earthquakes
- Conclusion should be in risks in addition to regulatory compliance
- Assess the soil sites, the groundwater, riparian zone and the river as an integrated set--how it integrates into the full site.

Public Participation

- Standard TPA procedure – beyond if possible (when?)
- Information – how does this affect you? Should be interesting and useful with good visuals and the use of sound bites
- Identify points for public involvement
- Define the process (Tri-Parties) incorporating public values
- Actively identify the lessons learned (holes and data gaps)
- Public input up front when you are establishing parameters that will guide sampling (if additional sampling is required)
- Public input on existing data is enough
- Need to validate the public input
- Need to evaluate public input for its validity
- Formal feedback on how input is used
- Understanding final process may require compromises

**PINE GROUP – Discussion Notes
June 11, 2002 (Tuesday afternoon)**

**Question B – Riparian Zone (e.g., How would you suggest the agencies define it?
What uses do you see?)**

Definition – plant types (upland and river) depending on the terrain. Area nearest the river where the plant life needs water.

Uses

- Squatters
- Wilderness area – access controlled (to protect the river from further harm)
 - ecological value
 - fishing, clam digging, berry picking, general food gathering
- State law on wetlands?
- Let National Monument Plan define uses
- Minimum integrated risks – let time frame be dictated by risks

Groundwater Effect

- Interface between groundwater and river (at certain locations)
- Seeps as a potential drinking water source
- Protecting the salmon redds and other wildlife
- If you can keep contaminated groundwater from getting to the riparian zone, it would be protective of the ecology of the riparian zone

Questions C – 300 Area (e.g., Is the “industrial use” scenario protective enough? How would you modify it?)

- Define a purely industrial zone by fencing. Outside of the fence should be “unrestricted” – same as 100 Area. Shrink the size of the industrial zone cleanup area as much as possible (similar to the 200 Area “core zone”)
- Land use scenario needs to be integrated with cleanup requirements as well as the groundwater and the river
- Integrated risk assessment (land use, groundwater, river and cost) – all ecological receptors. Cost = sediments, impacts, cost, etc.
- 100 and 300 Areas should have consistent scenarios. The “industrial scenario” is not acceptable for either area.
- Need to consider surface run-offs in the 300 Area
- There should not be “industrial islands” in the 300 Area (example: 618-10 and 618-11 burial grounds)
- Islands can be controlled by permitting, i.e., institutional controls
- Monitoring insuring cleanup standards

Question D – What should drive cleanup?

- Tribes treaty rights to fish and resident fish (insure quantity and quality of fish)
- TPA and all referenced laws and regulations, including federal and state
- Human health and ecological risk assessments
- Decisions based on an integrated risk assessment; expanded beyond traditional assessments (example, fish consumption)
- Values – present and equity values

- Sufficient funds
- Maximize the benefits to humans and ecology
- Public perception on use of tax dollars

**Question E – What do you see as the realistic beneficial uses for the River Corridor?
(What is your definition of realistic?)**

- Wild salmon spawning ground (as an indicator)
- Recreational boaters and fisherman and hunters
- Subsistence fishing, hunting and food gathering
- National Monument use
- B Reactor, White Bluffs, and old Hanford Site tourism
- 300 Area “Industrial” use
 - industrial power plant
 - wind farm
 - research
 - wildlife refuge
 - residential use along river
 - tourism
 - flood control
 - barges/transportation
 - access from side
 - ecological
 - power source

River Corridor definition. What is southern boundary?
 Border of Hanford Site – upriver and down river
 Driven by contamination

Questions F. Over the course of the day’s discussion, what common themes and/or strong messages have emerged? What divergent, creative messages are important to preserve?

Common Themes

- Integrated Risk Assessment
 - Input from interested parties to parameter development
 - Integrating soil, groundwater, riparian zone, river bed and river
 - Integrate the individual sites of the Hanford cleanup goal
- Define B/C Pilot project process (as a template) incorporating public values
- River and riparian zone scenarios should be consistent between 100 and 300 Area
- Formal feedback to public input, including lessons learned
- Understand that the final process will require compromises

- There is a need to go beyond the minimum legal requirements
- Identify points for public involvement
- “Industrial” scenario (yes/no)

Creative Messages

- Ecological risk assessments (common definition) – valued species or all species?
 - 1) ecological characterization - identify habitat, species, pathways
 - 2) exposure profile – identify sources and locations; calculate exposure to species
 - 3) ecological effects characterization – collect site specific data to determine effects to species on site
 - 4) determine values, benefits and cost

Additional Questions (Notecards)

- Would like to see more detailed development of how wildlife figure into risk scenarios. Are they just receptors or agents that generate potential exposure via burrowing, consuming contaminants, etc.? (Tom Leschine – CRESP)
- What effect does source elimination have on groundwater contamination? (Keith Smith)
- Does Sr₉₀ really dissipate or are we talking about dilution? Is the standard only for the radiological concern? (Keith Smith)
- Regardless of radiological considerations, what are the chemically related hazards in groundwater and how serious? (Keith Smith)
- What is groundwater strategy? (Dan Simpson)
 - Minimize groundwater flow, maximize groundwater retention in Hanford site?
 - Optimize/maximize groundwater flow to river; minimize on-site retention?
 - Collect groundwater; treat/purify before release to river?
 - Other?
- Why is the riparian zone used as the frame of scrutiny when the hyporheic zone is much more indicative of riverine ecology? (Betsy Blanfield – Nature Conservancy)
- What is the “value” of not being a NPL listing site? (Stoops)
- Why isn’t there more of a focus on cleaning up the 618-10 and 618-11 burial grounds since they have a high exposure risk and potential for future groundwater contamination? (Steve Saulter or Sautler)
- What are the ramifications of final “cleanup” of the reactors on use of the river corridor? (Steve Sautler)
- Place a high priority on the value of the Hanford riverbed as a spawning ground and then “incubator” for wild salmon stocks. Treat the alevin as an indicator population. (Norm Buske)
- Build a database of riverbed pore water quality, both toxics and radiological (Norm Buske)

- Reduce the sizes of “islands of exception” to cleanup goals. For example: the 300 area “industrial” exception and 618-10 and 618-11 exceptions. (Norm Buske)
- In the long-term, how will DOE/EPA/Ecology deal with the contaminants that remain in the vadose zone after cleanup is complete, i.e. continued slow migration to groundwater and animal intrusion (Steve Sautter??)
- Please Provide the risk assessment calculations and equations along with a tabulation of input values, to provide specific information to critique (No name signed)
- Please define how contaminant concentration inputs are generated? Average, kriged, 95% UCL (Same no name)
- Please compare the MOTCA 100x rule, with the inverse modeling performed, to define disconnects between the 2 predictive methods. (Same no name)
- Please define bias for action using a limited risk assessment. Is it risk $>10^{-6}$ or HQ >0.1 ? (Same no name)
- How will the variability of numerical inputs be quantified in the uncertainty analysis? (Same no name)
- If data collection to support the BC Area risk assessment is being collected as we meet, why aren't we looking at the planned risk assessment, so we know what the inputs? (Same no name)
- How are stakeholders involved in the DQO process? If DOE contractors have already written the DQO, how willing will DOE be to revise? i.e. they have spent money already. (Same no name)
- Ecological receptors need to be looked at more broadly than just critters we're trying to protect with cleanup. Cleanup itself can be a stressor through habitat disruption and a fully developed ERA would also consider those effects and risk managers should be prepared to make tradeoffs. Endangered species protection doesn't automatically imply more cleanup, sometimes less in the name of habitat protection (Tom Leschine)
- 100 B/C Pilot – Needs to include groundwater OU in the assessment. River and riverbed and organisms as receptors. Riparian zones should be looked at as potential areas of indication of groundwater and biota, including seeps and spring areas on the banks higher than normal riparian zone. Also, depending on time frame, future dam operations might dictate broader consideration at potentially attended bank area. (Tom Leschine)
- Transition from CVP's to final QRA: Need to take into account that, based on test pits dug during soils remediation, lots of contamination was left below the end of digging (below 15'). What is the significance of contamination at depth over a broad area? Are there particular places where possible fast path migration exists that make this contamination available? RESRAD model used to evaluate interim action assumes fast paths away, but does show risk is low if its assumptions are correct. (Tom Leschine)
- Long discussion around Pam Doctor's presentation (AM of day 2) suggests that the problem is a failure to consider a reasonable range of alternative values in parameterizing risk assessments. This is a standard good practice for risk analysis, though not a requirement of CERCLA base-line risk assessment. You'll never get it right if you think there is one best number for a risk analysis to sue.

MTCA default values might be useful bounding assumptions at one end of the range of values that should be considered. (Tom Leschine)

- 100 Area – While residential use has driven cleanup, not reasonable to use it as a basis for developing exposure scenarios. Recreational and subsistence use, biodiversity protecting open space preservation should be the goals for estimating future exposures. Realistic modeling of groundwater necessary and will show groundwater quality important to these uses as well. (Tom Leschine)
- Pam D. – Want to see convincing bounding assumptions in the form of scenarios that lay out the expectations for both natural variability and human-induced change that inform risk assessments. These need to be systematically developed so that they convincingly carry a reasonably foreseeable range of possible futures. (Tom Leschine)
- How will the risk (probability times consequence) be differentiated between “a maximally exposed individual” and some larger population group representative of heavy users, i.e. how do we factor in the number of individuals at risk and when? (Leon Swenson)
- In site risks versus downstream users – appropriate exposure levels for 2 situations consumption? (Harold Heacock)
- Do the fluxes of contaminants predicted (modeled) to enter the river use a constant or variable flux boundary at the river that mimics actual operational (river stage) information? (Stoops)
- Other Discussion Groups/Questions: (T. Stoops)
 - What data is needed to define the food web?
 - How will the dynamic nature of the Columbia River be included?
 - Since the river influences the entire Columbia Gorge, what should the reasonable span of the Comprehensive Eco Risk Study?
- Is it assumed that contamination remaining below 15’ will be a source of continuing contaminates for groundwater? Or is it assumed that the effects are negligible following interim remedial action? (No name)
- How are you going to make estimates on uptake of different chemicals of radionuclides on the various organisms? (Illegible signature)
- Suggest we look at 300 area and southern approach of Reach (i.e. 300 area units) – is industrial worker likely to be maximum reasonable exposure scenario? What about areas: Shoreline, outside fence line, Current 300 area. (Gerry Pollet)
- Eco Risk – (Gerry Pollet)
 - Falcons/Hawks/Eagles – prevent any harm to population
 - Do we look at PCB’s?
 - Shrub Steppe habitat potential surrounding 300 area
- Where site specific risk assessments were used for interim actions, how will required public review of assumptions and scenarios be gathered for revisiting cleanup plans before final feasibility study? Will the risk assessment be redone? (Gerry Pollet)
- The tri-parties are using a “traditional” industrial reuse scenario in the 300 area, similar to many Brownfield sites. Is the acceptable? (Mike Goldstein)
- It is not clear how the risk assessments for the reactor areas will fit into the process of accepting the final ROD. (Bill Griffith)

- What steps of the CERCLA do the data quality objectives apply to? What does it mean to not meet an objective? (Bill Griffith)
- Pam D. – How do institutional controls and assumptions about their durability figure into risk assessments? Should credit be given and for how much? How are risks of failure factored in? (Tom Leschine)
- If the Sr₉₀ plume is in “equilibrium” and the plume is static, then is the mass entering the system equaling the mass leaving the system? If yes, is the annual flux to the river 11Ci as 10 Ci decayed and ~1 Ci was diluted: if no, what is the Sr₉₀ Ci flux into the river? (Stoops)
- How are you assessing protection of the ecosystem – River corridor? (Greg deBruler)
- Does the rural residential scenario protect Native Americans? (Greg deBruler)
- 300 area is not protective of groundwater, how is it protective of species? (Greg deBruler)
- Why are you not including flooding and major climatic changes? (Greg deBruler)
- USDOE made a formal commitment wo use CRCIA as the template for a comprehensive assessment. Why are you even considering doing a risk assessment by 1 reactor at a time? (Greg deBruler)
- Why are you not considering dams being removed in 50-100 years and a major flood occurring? (Greg deBruler)
- What eco receptors did ecology and USDOE to assess? (Greg deBruler)
- The agencies are planning to support unrestricted future human use of the surface (1) in the 100 area, but restrictions on access to deeper soil. Is the restriction acceptable? – Surface = Top 15’ (Larry Gadbois)
- Are the assumptions used for soil/direct exposure suitable? i.e. do they meet or exceed MTCa (Method B), do they meet Native American scenario, and are they reasonable maximums for children (resident)? (No name signed)
- How are you going to address multiple waste sites and the combined potential impacts on critters? (Greg deBruler)
- If you are not using unrestricted, what are the default assumptions you are going to use? (Greg deBruler)
- If you have not assessed eco protection, how do you know that your correct remediation is protective? (Greg deBruler)
- Are you going to consider genetic damage, trans-generation? (Greg deBruler)
- Ecological effects data collection is necessary to tie to the site contaminants information and effects to biota. Decision needs to be made if the biomass/toxicity test data is collected on an O.U. basis per for site wide conditions. Data needed includes:
 - Plants: growth, survival, productivity
 - Invertebrates: growth, reproduction, survival, diversity
 - Fish: growth, reproduction, abundance, survival, diversity
 - Mammals: growth, reproduction, abundance, survival, diversity (Don Steffeck)
- 300 Area – Teenage intrusion scenario - develop number of hours, etc. (No name signed)

- Wide spectrum of waste radiological and chemical – not have good history on inventory – in 300 Area (Same no name)
- Study (Portland budgeted) 0 inter tribal joint study on PCB's (Says EPA in the corner of the card)
- EPA (CRITFC) – working for 10 years, started with dioxin, mercury, PCB's, DDT, from Canada to Ocean (looked at consumption of fish match ration) → tribal scenarios beginning to surface. (Same EPA card)
- Ecological monitoring – ongoing status – what does this mean? Report available – next 2-3 months – evaluate what is missing. N. area (3 years from now) looking at what is needed under CERCLA and MTCA. (Same EPA card)
- Did you do a wide screen for all possible contaminants? Yes, everything is monitored. (Same EPA card handwriting)
- Do you have info on how many contaminants released into the river? Yes (Dib). (Same EPA card handwriting)
- What about climatic impact (e.g. dams could be gone) and what would be impacts? Nest 100, 150 years. Not analyzed. (Same EPA card handwriting)
- Where is U233 for riverbed? Where in published data? (Same EPA card handwriting)
- Preferred pathways (going start in 100 area) – Where are they? Believed preferred pathways was a workshop deliverable – disappointed. (Same EPA card handwriting)
- Are you going to take public input to design risk assessment, e.g. assumptions? Yes. (Same EPA card handwriting)
- (BC area) – How will input from the group and others be used to influence exposure scenarios prior to the milestone? (Same EPA card handwriting)
 - Cannot meet 2006 date (Dennis)
 - Not sign off on a deletion package in 2006
 - Public participation
- Is monitored natural attenuation an acceptable remedy for groundwater? (Doug Hurton)
- Can specific industries be identified that could be cited within a national monument or permitted adjacent to the Columbia River? (No name signed)
- Will all areas in the riparian zone (and along the river corridor) be cleaned up to the same levels? What is the impact of the national monument on potential uses? (Gariann Gelston)
- For national monument consideration... does the concept of contaminated land include groundwater contamination? (Gariann Gelston)
- Relationships of control of area 200 groundwater contamination to that of area 100/300 (Charles Weems)
- Why can't area 300 be "cleaned up" to unrestricted? (Charles Weems)
- What pressure is there on DOE to remove this site from the priority list? (Charles Weems)
- Soil contamination must be addressed in relation to "phytoremediation" eating herbs, fruits etc in area. (Charles Weems)

- How does this 100/300 cleanup compare in priority to the 200 area cleanup? (No name signed)
- Is cleanup of the riparian zone harder than going from the riparian zone? (Dave Johnson)
- If there will be increased recreation on top of the salmon spawning beds, how will the salmon be protected? (Dave Johnson)
- 300A – Map, tanks distance # feet from river. (Jim C.)
- Has any drilling been done between tank and river? Sr it a system. (Jim C.)
- Check on wells for contaminants of groundwater in ppm and in trace element in ppb. Say every year, 10 year, or some type of checking to show changes. (Jim C.)
- 300 A – you say treat-dispose. Treat what and how for each contaminant? Strength of contamination – Bob-238-235-are resurfacing why. (Jim C.)
- Contaminated land does it include groundwater? (Jim C.)
- To what extent have (legally protected by treaty) tribal fish and other harvest consumption rates (often 10x or greater than non-tribal consumption rates) been incorporated into risk assessment standards (or baselines?) (Legally protected tribal harvest and consumption includes not only salmon but also resident fish such as sturgeon and others and roots and other gathering). (Tom Miller, Columbia River Inter-Tribal Fish Commission)
- Appropriate stage to release to USFWS? (Robin K.)
- Consider loading contaminant on environment. Consider dilution as a cleanup approach. Is this appropriate? (Robin K.)
- Consideration of past operations “other” contaminants/wastes and preferential pathways. (Robin K.)
- Incorporation of riverbeds – how far downstream? Retrieval? (Robin K.)
- Should river corridor be released before groundwater remediation? (Robin K.)
- Early, comprehensive input on defining process of BC risk assessment (i.e. how long each part should take; what type of data to gather → for all possible (realistic) uses of the river corridor, what types of endangered species include). After public has input into process, then get input at specific intervals to allow public review and input (I cant say more about this until the process has been fully developed). I would suggest using small forums on meetings to gather input (or engage citizens who have attended this meeting (task force) to report back to their constituencies) into process and then identify specific places where certain groups (tribes, organizations, local interests_ can have input on certain subjects/areas. Call me with any questions! I always have ideas but don’t always have answers. (Amber – I think is what the name says, phone number: 206/382-1014)
- B Area – If B-Reactor is left and opened as a museum, risks will increase and need to be fully reviewed on risk assessment for B/C:
 - Must expect much more public/children usage of entire area if public access increased for a museum (i.e. road and services)
 - Expect groundwater usage for services and lawns; expect increased discharge
 - Expect public will be attracted to shoreline when visit museum

- Expect intrusions into currently contaminated areas of reactor as well as us expect long term failure of cement and structure
- Model radon/uranium exposures, including from reasonable foreseeable failures.
- Regulators and DOE: Should move up immediately timelines for doing all 100/300 Areas risk assessments with this input, tribal scenarios/CRCIA, 100 Area and past meetings (100 area workshops) and using or exceeding (based on input) MTCA default assumptions. It is wasteful to proceed with cleanups based on inadequate risk assessments (i.e. with cleanup action levels based on current site specific risk assessments) that do not use the existing record of public input or MTCA default values (for minimums). USDOE policy is that USDOE will not go back and redo cleanups. HAV and public have urged do it right the first time. Therefore, action levels and cleanup levels should be revisited as a high priority based on reusing all 100 and 300 area risk assessments – before completion of “interim” remedial actions. Doing risk assessments after IRA’s are complete appears wasteful and lacking support on law. Further, current risk assessments do not meet MTCA requirements (HSRAM used). (Gerry Pollet)
- If HSRAM is used, then HSRAM must as a matter of law be revised to incorporate:
 - MTCA default assumptions, or greater exposure assumptions based on tribal/public/regulator input (note: human factors cannot be varied to lower exposure)
 - These workshops, the prior 100 area workshops, public hearing records
 - Where MTCA default is not used or exceeded, USDOE must meet MTCA requirements for scientific basis to vary. (Gerry Pollet)
- There must be a response to comments and a record of how site-specific risk assessment variables were chosen and why. (Gerry Pollet)
 - Law requires notice of their use where resources is restricted – i.e. groundwater
 - Law requires a plan for how you will use and respond to comment on risk assessment
- Eco risk: (Gerry Pollet)
 - Need to use sensitive, threatened and endangered species
 - Should be using shrub steppe habitat (including where it will be restored), and riparian zones for terrestrial – rather than cheat grass habitat only
 - Need eco risk analysis for river-shore interface and near shore habitat and salmon
- 300 Area risk assessment need immediate revision to include reasonable foreseeable: (Gerry Pollet)
 - Recreational use of all shorelines, riparian areas and areas outside of current fences using exposure of camping with children of 30-60 days/year x 24 hours
 - Recreational use of areas to be freed up within 300 area
 - Native American use of shorelines, plants for ____ days a year x 24 hours
 - Commercial use, including the public and children, of 300 area
 - Groundwater use in the 300 area for all scenarios – including beginning use at end of TPA milestone of 2018

-Total cumulative risk including from river shoreline/groundwater and fish for all scenarios

- Risk assessment must stop piecemealing risk between artificial operable units, i.e. separation risk from groundwater units from soil units to arrive at action levels and determinations of whether standards are met. (Gerry Pollet)
- How much risk is OK? Human health, ecological... And when does cost of further cleanup become too much? (No name signed)
- Identify and have a common understanding of what is meant by ecological risk assessment both in methodology (ecological characterization, exposure profile, ecological effects) and final purpose – cleanup levels that are protective of natural resources. (Don Steffech)
- Ensure that industrial use areas are contained so they don't continue to be contaminant sources affecting the groundwater, riparian, and river reaches. Hence, surface water runoff and infiltration of water to groundwater must be controlled and monitored. (There is a drawing basically showing that the contaminants ought to stay locked into the 300 area cube) (Don Steffech)
- When the 100 B/C integrated risk assessment is done, will the rural residential scenarios be recalculated for the closeout verification packages to include preexisting groundwater contamination for 100 BC-5 OU, and other groundwater OU's? (Bill Griffith)
- Are there any scenarios that consider workers in recreational areas, such as rangers, lifeguards, and workers monitoring contaminant levels? (Bill Griffith)
- Clarify whether concerns about U are due to its chemical toxicity, or radiotoxicity, or both. (Bill Griffith)
- Are there documents that detail how parameters are developed for the risk assessments? This includes values such as Kd values for the soil, and time spent at home, consumption values, etc. (Bill Griffith)
- Specifics on Assumptions: 100 area recreational scenario of just 7 days x 8 hours per year is FAR too low for reasonable exposure scenario. Many people already exceed this by many times. With monument status, we should expect increased usage, including camping. 300 shoreline should also use this scenario. Residential needs to use 100% exposure time, not 25 %. (Gerry Pollet)
- Risk evaluation or Compliance evaluation: Which process are we concerned about? They are not the same. (No name signed)
- Remediate the riverbed as well as the rest of Hanford. (Dave Johnson)
- Bring in an outside expert(s) in environmental risks to oversee Hanford efforts. (Dave Johnson)
- Please take the salmon alevin naturally living in riverbed pore water as a high priority! Identify and quantify radio nuclides and toxins in all salmon spawning grounds pore water. Treat "wild salmon alevin" as a risk scenario. (Norm Buske)
- The U-233 in the riverbed has been missed. Please prioritize contamination, of the riverbed and the islands, for characterization. (Norm Buske)
- The agencies are still missing reality on groundwater migration. What will it take to get preferred groundwater pathways into the picture??? Coming to reality NOW at Hanford needs to be a priority. (Norm Buske)

- Treat groundwater cleanup as a priority. Within this priority, treat realism (such as preferred pathway modeling) as the first priority. (Norm Buske)
- The agencies current groundwater actions in the 100 area are geared to protect the river, but are not geared to restore the aquifer. Is this okay? (Larry Gadbois)
- Residential, commercial or industrial use would wreck the monument. Do we really want to say that those uses are reasonably foreseeable? Wouldn't that encourage disassembly of the monument? (John Price)

The rest are notes from Greg deBruler:

- Clear description of exposure pathways
- Need to assess river flooding at least up the reactors!
- Dams coming out in 50-100 years
- BC assessment includes all waste sites and riparian, riverbed
- Food chain assessed on species threatened, endangered, and key species
- Recreation use not representative of and users, onsite and in river
- Industrial worker scenario should include off site exposure and fish consumption
- Sediment loading in river should be part of the assessment
- 200 groundwater needs to be part of river corridor assessment, assessing future migration
- Native American fish consumption numbers need to be used for all fish eaten – 224 grams to 448 grams
- How can we be assured that this information will be used?
- Do you decide what assumptions will be used
- When will all our questions be answered?
- BC area must be inclusive and in the long term, the river corridor
- HSRAM needs to be updated to reflect CRCLA part II
- LOEL's must include genetic impacts
- Do not use USDOE "a graded approach for evaluating radiation does to aquatic terrestrial biota" – it is not scientifically valid
- Must assess preferred pathways
- Need to assess the effects of waste mixing with other waste sites for increased impacts on desorbition
- Need to assess food chain, bioaccumulation, through plants, plankton, etc
- Population levels should not be the only driver critical species protection
- Qualitative versus quantitative risk assessment (Leon written in corner of card)
 - Feel there is more qualitative (gut level) assumptions guiding cleanup decisions, e.g., which site to cleanup first
- Agencies are challenged by how to aggregate discrete data points into a comprehensive assessment – have agencies done enough
- (Map) Preferred groundwater pathways, not plumes
- U-233 – riverbed (monitor for it)
- Major concern: are agencies wasting out time?
- Need feedback on information use
- Please use this information and update your methodology (HSRAM not updated)

-Hanford site risk assessment methodology 1995-last update

- Need to assess riverbed contaminants (Norm's study). U-233
- Address groundwater – model preferred pathways
- Use MTCA default assumptions (John Price is written in the corner of the card)
- Pay a lot attention to recreational exposure scenarios for 300 area
- Where did values/default assumptions come from? Where are assumptions for BC going to come from? 7 days a year, 25% of the time. (Gerry)
- Numbers appear to justify decision (Greg)
- Documentation needs to identify a plug in process
- How assume information from this workshop will be used (Greg written in corner of card)
 - How ensure (Greg) be considered in risk assessment
- Given detailed input in the past and it appears it was ignored (Gerry)
- How will information be used; where plugged in
- What is appropriate feedback mechanism – fact sheet, workshop
- Tell us once next 3 years, what feedback loop, public processes you want (John/Robin in corner)
 - What are standards working on now; can we comment on this
 - Want to review/comment on document, e.g. HSRAM
- Early in cleanup (most comprehensive assessment), 300 area – did more extensive analysis than today (100 area) where limited information obtained and accumulated. (Greg and Mike G. written in corner)
 - Have we done enough?
 - Are we done?
 - Uncertainty does need to be addressed
- Critical issues: (Gerry written in corner)
 - 300 area recreational, not done on site
 - Assumed never be recreational use
 - Assumed no fish consumption from that part of river
 - No child exposure scenario
 - Computation of hours per year (MTCA)
- Why was data ignored?
- Model dose is not a registered dose (e.g. food intake effect on organs)
- Tritium (22%) – what does it mean? John P. will find out.

- Ecological effects concentration – where is this information? It will be needed to identify cleanup criteria
- → How will you gather ecological data? In redundant piecemeal fashion or from a less redundant comprehensive/integrated/larger site perspective?

- Reference base rate – modeled dose rate identified how information is
- Source is not to be used. Need updated source (IAEA level currently used)
- Dose rate – level is inadequate
- MTCA has an eco-risk standard (focus on sensitive species); how will it be addressed?
- Have you looked at rare, endangered, threatened species/plants on Hanford site? No/generic seeming level

- PI Plan for Risk Assessments:
- What is plan for involving public in the risk assessment (MTCA) → need it in writing
 - What happens to comments – response required
 - How input will be considered
 - Approval mechanism for site specific variables
 - Notice of variables and resources restrictions (i.e. groundwater or shoreline) used
- What are guiding legal requirements for this?
 - Existing standards being used to not follow in MTCA
 - Evaluate existing assumptions or redo assumptions e.g. in closeout process – do it now.

River Shoreline: top of land surface down to River mark (150'). Low-level radioactive and chemical contamination; gigantic pipeline

- The River should be open for commerce (that is the law)
- Recreation: docking boats, human use, use of institutional controls to limit access; people will live there
- Timeframe
 - In definitively (future) – accommodate all *reasonable foreseeable uses*
 - Potential future (population) growth
 - Riparian – ‘sensitive’ to all uses
 - Native American perspective: legal, protected rights to hunt, fish (for subsistence); access the Riparian zone differently
 - Reasonable use – soon (decades)
 - Set up fishing platforms 4-6 months/year (foreseeable for Native Americans)
- River Corridors are important to all peoples (now and future)

300 Area

- Will there be fishing?
- Protect whole Reach or designated areas?
- Talk to tribes to identify *usual* and *accustomed* fishing areas
- Need to explain “inside” and “outside” the fence
- Do recreational uses preclude some industrial uses?
- Believe a reasonable scenario is residential uses in the near term; industrial cleanup standard is not a foreseeable use
- Given reasonable foreseeable population growth, why was the industrial use standard selected? Need a standard that reflects residential use.
- There are residential scenarios other than rural residential
- Need to identify exposure scenarios for both residential and industrial standards
- 300 Area Shoreline – not residential nor industrial but recreational (cannot preclude tribal fishing activities)
- Could different water management strategies impact the River? Do not have the data to answer that question.

Tribal Legal Use of Shoreline

- Fish, hunt, gather roots and berries, pasturing life style – what tribes did in 1855
- How are traditional uses interpreted?
- What are the plants and animals in Riparian Zone related to traditional uses?
- What is the relationship of the Columbia River Treaty to the Treaty of 1855?

Groundwater

- Look at exposure scenarios: access and work back to GW discharges and identify ideal level of drinking water
- Seeps: do something or make them inaccessible
- Reasonable traditional maximum use (live and recreate)
- How should GW be evaluated in the long-term? Does the Safe Drinking Water Act still apply or should there be a risk framework for groundwater?
- Will there be technology to cleanup groundwater? (current pump and treat contains)
- Residential use (how long can it be discouraged?) Look at using groundwater as drinking water as soon as possible; under what conditions could water be used for crops (not for human consumption); what is feasible? How will feasibility drive options?

- Active vs. Passive Groundwater Actions
 - Does passive preclude active actions?
 - Drinking water as soon as possible
 - Comes down to cost/benefit; if not drinking water, protect the eco-system
 - What about providing a clean drinking water system?
 - Look at drinking water currently used by the City of Richland for drinking water and project out (for future demand)
 - EPA believes it will have an active groundwater system in next 3 decades
- Assumption: Groundwater does not get worse
There will be Groundwater source term remediation
- GW in 100 years: 100 Area
 - Not use groundwater as drinking water
 - Protect human health and receptors at the Riparian Zone
 - Through natural attenuation believe GW will be usable in 150 years except for N-Springs, likely to be useable in 350 years)
- GW in 100 years: 300 Area
 - Assume groundwater will be returned to drinking water standards (based on natural attenuation; trend data will be examined in next 5-Year Review)
 - B/C (2007) will be making groundwater decisions integrated with other decisions; unless hear otherwise, will not return to drinking water standards
- There may be reasonable \$s and timeframe that could drive back timeline for GW cleanup – NEED THOSE ANALYSES
Expectation: if can return groundwater to drinking water standards within a foreseeable expense, do so, no matter whether people will drink the water

100 Area

- Regulators: base assumption – no residential use in 100 Area (no well digging)
- Assumption is based on the monument designation (is this a reasonable assumption?)
- Vision for 100 Area – national treasure
- B-reactor restored, Interpretative Center, Park (mobile homes, fish), platform fishing
- Vision for 300 Area – more problematic
- Reasonable scenarios need to be bounded: beyond 150 years, the National Monument may not exist thus condos could be built along the shoreline
- Believe will have access to 100 and 300 Areas for next 150 years
- Assumption: 100 Area needs to be isolated from 200 Area (contaminants)
- What is the relationship of 200 Area data in 100 Area decisions? Need a comprehensive, cumulative analysis
- **Data Gap:** What's in the soil column in the saturated zone and how long will it stay there?

Other Comments:

- Residual contamination exists below 15'; migrate down eventually to GW/River (Stuart Harris)

CRCIA

- What is the mechanism to determine depth of effort? Who is the decision maker? (There needs to be enough information for regulators to make decisions.)
 - Where does HAB/general public fit into consultation process regarding depth of effort?
 - Need HAB guidance/involvement early in “depth of effort” input on decisions (especially PIC committee)

- Can cleanup ever be done to satisfy all? Probably not. There are time, dollar and technology limitations. There is a Natural Resources Damages Assessment (NRDA).
- Big picture vs. operable unit? Operable units do not reflect biological or ecological framework
 - Receptor exposure is site specific
 - Bigger the area, the less conservative
 - Concern: taking slices/sections of Hanford, could one miss something “bad”?
 - Two part process: Slice into chunks and look at inter-relationship outside the chunks
 - *NEED TO DO A CUMULATIVE IMPACTS RISK ASSESSMENT (not in the HRA EIS as promised; NEED AN ACCURATE, CREDIBLE, CUMULATIVE RISK ASSESSMENT)*
 - Where are cumulative risks captured? EIS process? Superfund process?

Native American/Tribal Use Scenario

- Run the scenario so the information is available upon which to base decisions
 - Shoreline: Implement the Native American Scenario
 - 100 Area: Protect (not have consensus)
 - 300 Area: What are cost/benefits impacts of this scenario

300 Area – Exposure Scenarios

- Run an avid recreation scenario (not 7 days but couple of months exposure)
- Shoreline: Run Native American and recreational
- Uplands: Run Native American, recreational and residential

100 Area – Exposure Scenarios

- Shoreline, Riparian and Uplands: Run tribal and avid recreational

Public Participation Process (B/C Pilot)

- Come talk to us early and frequently
- Process (timeline) needs to better (more meaningfully) identify activities
- Better communication where going and how you got to where you are

Common Themes: Shoreline that includes Riparian

- Cleanup Hanford shoreline so safe for tribal use and all others
- Shoreline is defined as: River bank, Riparian, Seeps, River bed, and islands
- Integrate human and ecological risks, e.g., aquatic habitat, salmon Alvin
- Value: Shoreline seeps and upwelling are seen as key contaminant pathways
- Tribal use, recreational and residential risk assessment scenarios need to be run for the Upland (land above the River for 100/300 Areas). This information is needed to make transparent tradeoff decisions (Needed consensus from workshop participants)

ELM Group

Shoreline

- Whole shoreline is currently accessible by boat
- How big is the “zone” – area between uplands and river
- Beyond IC – residential dev.?
- Will it always be a monument?
- Contaminants are moving with the water – think outside fences at Hanford
- If we define scenarios, they will drive cleanup activities

Uses:

- Homes anywhere along the shoreline
- Parks
- “bounding” scenarios? Or most “credible”? (credible doesn’t mean high probability)
- residential, recreational uses (kids playing in the seeps)
- people who use the land assume it’s safe
- higher contaminant levels in fish and plants than in water – tribal scenario captures this
- cultural assumptions: water coming out of the ground is clean
- assumption: people will use the seeps, river water will used for drinking, edible vegetations: medicinal, ceremonial plants
- assumption: critters are consuming vegetation
- resident animals/fish versus visiting animals/fish (may be there at most sensitive time of their lives)
- hard to separate ecological from human risk
- cleaning up soil without cleaning up g/w = contaminant sources still moving toward the river
- unrestricted use of the shoreline
- not now, by 2018
- between now and 2018: recreational – boaters, samplers
- other side of river – bluffs make it less accessible
- islands? What is the level of contamination? What are current restrictions?
- Island uses: camping, swimming, drinking river water, tribal ceremonies, consumption of local natural resources (anything we say for shoreline applies to islands)
- Any agricultural uses? May be more economic than health risk related.
- Can drive decision-making around clean-up
- Perceived versus actual risk is an issue
- Downstream? Where are contaminants stopping? Where have they moved? How far?
- Dredging sediments behind McNary dam - increased radiological risk?
- After 2018, unrestricted use for the shoreline “unrestricted” means assume all aspects of shoreline will be used
- Agricultural would be downstream of Monument
- Do risk scenarios for downstream also (“verify zero”)
- Modeling and cleanup standards, cleanup action decisions are not our “turf”

Summary

- Agreed: assume unrestricted use after 2018, “unrestricted” means any usable resource would get some level of use (including islands) ex: building homes, agriculture, tribal use recreation
- Consider downstream effects
- Pre-2018 = assume current restricted use. Current uses (though not necessarily permitted): recreational boating, tribal uses, fishing, camping?, sampling, and small game hunting

Key Points: (not consensus)

- We’re not here to make modeling decisions
- Public does have input/influence on decision making
- Recognize link between ecological and human risk
- Human health and ecological risk are not the only drivers – other values

Question 2 – Groundwater

- Groundwater is dynamic, not static issue
- Uses: irrigation, drinking , industrial
- Carbon tet to wash to my car
- G/w is influencing ecology of the shoreline
- Need details of intrusion, transport from 200 Area
- Timeframes: natural attenuation means waiting 300-400 years
- Most work done to date has been to protect once it gets in the river\
- Some g/w contaminants will not attenuate – need to keep them from getting to the river
- If there is no technology intervention, g/w will have to be restricted for 300-400 years
- After 2018, would like unrestricted use of g/w in 100 and 300 Areas
- “done” isn’t done until standards are met
- inst. Memory will deteriorate over next 50 years
- goals is to keep contaminants from the river or to protect g/w for use. (i.e. what is the water source people would use – river or g/w)
- (different messages to the agencies re: expenses, actions)
- assuming well-drilling is more conservative
- at the least, keep contaminants from the river (means sacrifice zone?)
- how long is it going to be before 200 Area contaminants don’t pose a risk.
- Contaminants moving to river don’t just contaminate the water
- Assumption: want to prevent technecium from reaching the river
- Reasonably anticipated use: you can drill a well anywhere and use the water
- If cleanup doesn’t meet exp. Scenarios, it isn’t complete
- Well water in the river corridor available for all human uses by 2018
- Quantify “how much” contamination you want to prevent
- Hierarchy of desires: all ground water safe for drinking by 2018 (for river corridor), n contaminants entering the river that would have adverse effects on humans or ecology, ground water safe for other uses (industrial, agric.)
- (have to factor in 200 Area releases’) arrivals – could do this plume-specific
- now – 2018? G/w is restricted (?)

- may be some contaminants that don't matter going to the river
- focus on seeps? (use risk-based approach)
- now – look at current risks
- focus on active responses – passive won't get us there
- be done when you say you're done
- done means g/w as well as surface in Riv. Corridor (assumption)
- difference between “done” and “deletion”
- “done” means “done with active cleanup and it could be reopened” (monitoring may continue)
- disagreement: not saying “stop 100% of contaminants,” just “stop harm” (disagreements about what constitutes “harm”)
- need more data on interactions of contaminants

Risk Assessment – Wednesday pm

- V2/g/w is ignoring connected pieces
- Consistency in analysis of O.U.'s is important (minimize disconnects between OU's)
- Eco-risk: i.d. contaminants of concern site-wide; i.d. sources, i.d. pathways, look at intersects with biota
- Can do O.U. by O.U. with overarching framework nest, i.d. existing information systematically
- Find who has what groups of data
- I.d. data gaps within framework – will give info necessary to make decisions
- Meeting regulations is not the same thing as looking at big picture
- System has to be robust enough o capture both
- ARAR – applicable, relevant and appropriate
- Steering committee – broad participation/buy-in all along the way (also adds expertise)
- Peer review/technical advisory committees
- More intense early on
- Automatically incorporates some of the diverse elements
- Remember: Central Plateau isn't that far behind! (similar time frames for risk assessment)
- Although choices for cleanup between CP and River Corridor are different
- 2005-2007 implement lessons from pilot
- for 200 Area do pilot assessment also
- process is everything
- Native American – sacrifice zone is anathema to tribal values – how will this be considered?
- May not be possible, in the end, to satisfy tribes – can make sure to do the best job possible – try to balance health of clean areas with areas not completely cleaned up.
- “acceptable risk” is different for different people – need to ensure that everyone is working from the same data set (eco risk assessment can do this)
- this is an opportunity to think of new things
- keep the process flexible enough to absorb changes, surprises
- communicating the on-going flexibility is important
- real processes are never as linear as they are portrayed

Public Participation

- Pub. Inv. Needs to be continuous, beyond legal requirements
- Need pub. Inv. During the time the work's being done (don't leave long gaps with no p.i.)
- Workshops can provide the best input sometimes
- "traditional" public meeting is less effective
- "decide, announce, defend" – need to change perception that this is the process
- helps built trust when public gets to know individuals
- early involvement in the process is key, but don't forget on-going, "maintenance" involvement
- how to dispel assumption that "do loops" don't exist?
- Find new tools, esp. visual tools
- Can we create a crosswalk from Stuart's presentation to the wall diagram? If not that's a big problem with how we're presenting information

Groundwater

- Vision/goal is g/w clean to drinking standards and ambient water quality standards
- Riv. Corr. G/w can't be separated from 200 Area g/w – keep the 200 Area g/w problem in the 200 Area
- Need cumulative risk analysis to back up assumptions
- Need dialogue with agencies re: assumptions, impacts of different scenarios
- Deal with all upgradient Hanford Sources so there is no impact on Riv. Corr.
- Upgradient impact must be shown to have no impact; if there is impact, it must be considered.
- Key theme not to lose: be protective of tribal usual and customary needs
- Need for more aggressive technology and tech. Funding, development's deployment, specific to remediation at Hanford site.
- Need better than what we have now
- Bias for action
- Focus on seeps as one place to protect users (it is where groundwater is currently accessible)

Products

- Who it's going to: TPA, tribal nations, NRTC, public
- How to maximize influence on regulations?
- Readable, usable document for decision-makers
- Electronic/web-based (FSUWG had high-level sum. Then full app. 2 volumes)
- Cd-printable parts
- Have 2 levels available – sum. Should be easy to understand re: values integrate future p.i. opportunities what does planning look like and how do I get involved.
- Hyperlinked CD for the web
- Make hard copies of sum. For public who doesn't use internet (use info. repositories, too)
- Lists of notes are not useful
- Press statement

- Make sure it's well-organized, quality product (may not organize by 100, 200 Areas – think carefully)
- Cross-referencing index?
- Correlation N/PMP? (categories)
- Include board advice
- How to ensure agency response? (they will be part of design process) would like report back from agencies on influence of Task Force
- Action items for agencies to respond to (maybe in cover letter?)
- Recommend periodic responses to report

FIR GROUP

Shoreline

- Shoreline is the edge of the river and shoreward extension of the river bed
- Comprehensive assessment treat 100 and 300 Area shoreline as one
- Evaluate shoreline as well as river bed. (riparian zone, river bank)
- Monument – include ¼ mile inland
- Include islands
- Include farside of river (humans and critters)

Timeline

- A. present until target (2012-2016)
- B. When all g/w meets regulatory requirements
- When toliies and reds decay
- 500 years
- technology development/actively and aggressively pursue and fund population growth, example chromium lir. Strontium (Ecology Flyer), public perception of increased access and safety (inertial)

A. Present until Target – Usage

- salmon ailvin riverbed usage
- research – boats using river for sampling
- ongoing aggressive and active technology pursuit
- subsistence fishing
- drinking water for critters
- recreational boating and fishing
- irrigation
- water return – waste disposal
- temporary occupation of land – fishers, hunters, bird watchers
- public meetings will encourage increased use dramatically
- transfer fro DOE to F and W implies safety
- If people can boat etc. they will want to camp etc. tribal uses (gathering shells, plants)
- Some restrictions during cleanup
- Power line, pipeline, to their rights of way
- Nutrient return to the ecosystem in the form of return of salmon (death) return of nutrients
- Micro communities in shoreline seeps
- Critters are using land and water and river
- Other non Hanford waste in river – upstream uses of river
- Cleanup activities – shoreline and riverbed

B. Cleanup over – toxic decayed up to 300 years

- All from first time period items will continue – plus: permanent occupation goes up close to river (similar to Hampton Inn, visitors center) more likely in 300 Area
- 300-500 year storm event
- tribes will actively pursue their treaty rights

- after 2012/2016 use should be adequate and safe for usual and customary tribal uses
- Other polluters will be using river - this is reality
- G/q withdrawals will occur in ¼ mile area
- Water use will occur – public facilities with discharge of pollutants
- The Columbia Basin is Key to the N.W.
- “clean” should mean clean
- definition of “unrestricted”
- Unrestricted use of river
- 300 Area unrestricted – land valuable to city, residential
- uses of corridor will increase

Question 2 GW

- Present to 2012/2016
- Gw is riverbed pore water – effect on salmon. Specifically where Alvin are permanent residents that may bio accumulate, fresh mussels, river otter, shoreline seeps
- All species of fish and shellfish should be able to live healthy for whatever length of time they are there. Should be available for use in food chain.
- No additional gw wells for human consumption or irrigation, have monitoring/research wells
- Use gw as window on Hanford. Use as indicator-monitor it.
- Learn to use it as a tool., initially use seeps and then wells as needed.
- Good characterization and cleanup of what’s seeping out of 200 Area. 100 Area plumes are also affecting GW
- Consistency in monitoring system.
- Substantial increase in effect on gw driven by public facilities/business, recharging issue
- Users drive actions intentionally (also legal drivers)
- Deal with N. springs sooner – pursue technology
- Escalation of human activity may mean need to reprioritize cleanup activities and tech development
- Impact of 200 Area River Corridor: good characterization, cleanup activities, monitoring systems, realistic modeling of preferred pathways
- Assessment should be approached from the outside in (river-shoreline-inland) i.e. models, characterization

Middle period – up to 300 years

- Well water driven from beneath riverbed for human consumption – would conflict with potential monument use
- More consumptive use of water
- 300 Area dredging – based on potential industrial use re: seeps and buried elements and send them downstream (descending concerns on this item)
- water should be potable
- salmon ailvin using porewater
- drinking water usage downstream

- clean gw to drinking water standards even if specific scenarios don't depict a drinking water usage
 - assertive tribal uses – influence
- build models backward from seeps to express preferred pathways

Flow sheet for public participation

- looks holistic approach as defined by the cultural impacts, tribes and others
- Natural resources are cultural resources
- Source terms for cultural impacts are different than for human health
- Holistic thinking is nonlinear
- Is 2012 deadline realistic?
- When work is finished it has to be clean (meets all standards)
- Need independent evaluation of RA done for pilot study
- Data gathering needs to happen constantly you go to find problems
- DQO process is flawed
- Be comprehensive and holistic in data gathering
- There is resistance to looking outside the box.
- Public participation is usually too late
- Give the public reasons to get involved
- Public involvement is meaning less in the given time frame.
- Have an open process for pi and always have response
- Consider task force to monitor BC pilot

CRCIA Method Discussion

- Use variety of approaches – mix and match alternatives
- Narrow to broad – O.U. by O.U. with affected multiple recaptor approach
- Broad to narrow – area wide approach with affected individual species
- Aggressive failure mode detection – open mindedness
- Similar to MTCA marine approach
- What about historical species?
- Leave habitat for species that are gone to live in
- What are we trying to accomplish by the proposed study?
- Purpose to bring everyone out to find out interests and concerns
- To assure cleanup done is protective and meeting RODs
- Apply to other sites
- Efficiency of doing things twice?
- VCPs that are protective of human health are very narrow. Need to be protective broadly of human health and ecosystem. Expect BC pilot to provide info on riparian zone, river, and related receptors
- What is not being funded because of the pilot?
- What are impacts of bringing in dirt to fill holes and ap – disruption to other areas with digging and transport
- Put results in the context of a healthy regional picture
- What does it mean to be able to do piecemeal delisting?
- Need for sound science-based data for impacts of both chemical and radiological exposure to both human and ecological species.

Key themes

Part #1: Timelines

- Shoreline is the river banks, riverbed and river and islands. Address all of it. Shoreline includes, but is bigger than riparian zone.
- Shoreline cant' be viewed in isolated way.
- Look at river as if standing on the fore shore.
- (key analysis point) Salmon! Salmon! Salmon! (monitor health and stocks) monitor other species – they are indicators too (fresh water mussels)
- salmon bring nutrient base to river, its important, major piece of ecological system

Part #2:

- shoreline seeps and upwelling seem to be key contaminant pathways
- seeps window on significant expression of remaining contamination how we judge central Hanford

Part #3

- overtime new concerns increase without dropping old concerns: population along river, potability gw should meet drinking water standards, lose ability to predict over long periods

Part #4

- meet ambient water quality standards.
- Closure can't occur until all water quality standards are met
- Water isn't clean until it meets quality standards that have been agreed on.

Part #5

- Need technology development now
- Cleanup of R.C. will need new technology
- Fund it.

Part #1

- Key points on presentations RAs should be on CRCIA model conceptually, i.e. it is a baseline for judging other RAs
- We want a comprehensive and integrated assessments at all stages of analysis including ecological, natural, and cultural resources. "Big picture"
- The model of breadth in CRCIA should be the standard

Part #2

- Rapid increase of use of Hanford Reach for recreation and tourism needs to be taken into account

Part #3

- All the traditional tribal uses need to be addressed
- Protecting tribal health via health of all resources, interests and uses
- Tribal uses should be the standard for cleanup requirements
- Honor treaty commitments

Integrated group on CRCIA

1. Steering management committee with technical expertise to participate with the Triparties on the R.A process and closure process for BC pilot and Hanford site-wide closure process – HAB included
2. CRCIA nine modules should be used as minimum in all assessments using CRCIA part 2. requirements document which is a comprehensive and holistic approach
3. a) Tribal use scenario probably covers highest risk. Honoring treaty commitments and trust responsibilities protects all life. Tribal use could mean residential exposure (regular use – lots of time). Impact to individual species needs to be assessed. e.g. genetics. Protect for genetic damage or other injuries to any species and individuals.

Spruce Group Discussion

July 16, 2002

Shoreline Discussion

Group Questions:

- What is reasonable use? How do you maintain knowledge of contaminants over time? Can you?
- What is the equity between human use and animal use?
- What is the effect of human use along the shoreline?
- How clean should the shoreline be to protect humans as well as ecological species?
- How long will it be there; how long will “institutional controls” be required due to groundwater patterns?

Group Recommendations:

- The group recommended “0” population growth along the shoreline for preservation of the land.
- Have to use children as the very basic standard.
- By 2012 the drinking water standards will be met, and after that time they must be maintained.
- A National Wildlife Refuge would be more restrictive than a National Monument with the assumption that public access will be allowed.
- Native American Scenario – fishing and fulfilling their customs. The Tribes cannot separate human from ecological. Clean is the ability to use everything. Tribes deserve the respect – need to clean as best as we can.
- Need to look at cleanup as “holistic.”
- Five-year review is a good concept. Need to clean up to the best of their ability and then re-evaluate where the cleanup is. After the evaluation, look at the path forward and conduct more remediation if necessary.
- The group agreed that Tribal use (holistic) and children should be considered in risk assessments. The end goal – healthy children that use the resources. Ability to live there using the reeds; conducting religious rights, using natural and cultural resources (herbs, tulle reeds, clamshells, deer, fish, etc.).
- The struggle for “intensive use” of the land needs to be anticipated. How do you avoid destruction? How can we optimize for the best use and preservation. Need to put limitations on use of the land.
- Consider the River Corridor as one. Do not consider it as the 100 and 300 Areas.

Groundwater Discussion

- Need to consider 200 Area groundwater along with the shoreline during cleanup, then it needs to be maintained. The 200 Area needs to be cleaned up along with the 100/300 Areas because the methods of cutting off the flow through may not be fail proof.

- Beneficial use of groundwater is drinking water use. Is it realistic by 2018---or when (sooner or later)? One person's opinion was that groundwater should be cleaned up for non-human biological use only. The final result may be that you cannot use the groundwater in all areas.
- In N Area, the groundwater, soil and deep vadose zone need to be cleaned for future use.
- Timeframes: How would you achieve these various goals? The dollars available equal tradeoffs.
- Timeframe and cleanup standards: Do we go after the inland part or just protect the river? Where do the values lie?
- To preserve land, assume limited consumption of the groundwater. The land would become farmland, etc. Would need to rely on institutional controls.
- Need to eliminate source terms. One person recommended to move fast on carbon tetrachloride source terms.
- Need to cleanup site with best technology now – it is our obligation. The concern is that funding will diminish in the future.
- Cleanup the worst first.
- Refuge is the closest to preservation for Tribal use. For preservation – cleanup standards should meet Tribes needs, giving the Tribes full use of the land and resources. The Tribes live off the springs. The springs are very vital to their lifestyle and are used for drinking, sweat lodges, bathing, etc.

B/C Pilot Project

- 1) Top down or by operable unit
 - 2) Depth
 - 3) Decisionmaking
 - 4) What else?
- The challenge is to bring sources into common pathways and identify what follows behind it.
 - Run B/C Pilot Project very comprehensively---it will be an iterative, living process. Decisions would have to be made on best case scenario – not political.

- The decision is if the cleanup that has been done is sufficient to meet cleanup standards. The risk assessment should determine the level of cleanup needed – is it sufficient. Is the data collected enough or should it be better than in the RI/FS.
- A considerations should be if the soil data enough or is there a need for more biological data.
- What additional little things can be plugged into the B/C Pilot Project at this time?
- There needs to be more external involvement/input into the B/C Project.

Exposure Scenario Task Force Meeting
July 17, 2002

- ❖ Agencies report back to Task Force
- ❖ Broad Stakeholder involvement scooping the process up front including:
 - The Data Quality Objectives (DQO's)
 - Agencies must agree on DQO's
- ❖ Incorporate CRCIA's 9 models and Tribal input parameters
 - Report back on how the information received was incorporated
 - Continuing refining models with public & Tribal Consultation
- ❖ Flooding of the Hanford Reach must be assessed
- ❖ Within 4 to 6 weeks would like to a report back from Agencies on Workshop input
- ❖ Tribal use (scenario) should be used as the primary risk assessment
 - Emphasis on cultural resources
- ❖ Look at the whole picture instead of looking at the holes
- ❖ Groundwater should be cleaned up to drinking water standards or where necessary cleaning up to protect cultural resources/ecological system
- ❖ Shore line and River Corridor should be cleaned up for Tribal use (protection of all cultural resources)
- ❖ Impacts on Ecological resources like plants and animals
 - Should evaluate both the impact on the population and the use of those resources as defined by Tribal use scenarios
 - Impact to individual species need to be assessed and genetic impacts need to be assessed
 - All beings are sacred on individual basis

Timeline Group discussion

Early and on-going involvement at decision points

- Could involve oversight Task Force (to include risk assessment modelers, funded independent group)

Need to communicate analysis separate from decisions and allow for Public feedback/check-in and how it is being used

Early conduct of Risk studies/run analysis and get independent review

Use holistic approach to establish criteria and end states prior to starting work (look at whole picture, not holes)

- Agency agreement on DQO's
- Incorporate CRCIA 9 models and Tribal input parameters in the analysis and goals
- Final RODs don't give final picture

Timeline Group discussion

Early and on-going involvement at decision points

- Could involve oversight Task Force (to include risk assessment modelers, funded independent group)

Need to communicate analysis separate from decisions and allow for Public feedback/check-in and how it is being used

Early conduct of Risk studies/run analysis and get independent review

Use holistic approach to establish criteria and end states prior to starting work (look at whole picture, not holes)

- Agency agreement on DQO's
- Incorporate CRCIA 9 models and Tribal input parameters in the analysis and goals

Final RODs don't give final picture

Groundwater

- Vision/goal is g/w clean to drinking standards and ambient water quality standards
- Riv. Corr. G/w can't be separated from 200 Area g/w – keep the 200 Area g/w problem in the 200 Area
- Need cumulative risk analysis to back up assumptions
- Need dialogue with agencies re: assumptions, impacts of different scenarios
- Deal with all upgradient Hanford Sources so there is no impact on Riv. Corr.
- Upgradient impact must be shown to have no impact; if there is impact, it must be considered.
- Key theme not to lose: be protective of tribal usual and customary needs
- Need for more aggressive technology and tech. Funding, development's deployment, specific to remediation at Hanford site.
- Need better than what we have now
- Bias for action
- Focus on seeps as one place to protect users (it is where groundwater is currently accessible)

Shoreline that includes Riparian

- Cleanup Hanford shoreline so safe for tribal use and all others
- Shoreline is defined as: River bank, Riparian, Seeps, River bed, and islands
- Integrate human and ecological risks, e.g., aquatic habitat, salmon Alvin
- Value: Shoreline seeps and upwelling are seen as key contaminant pathways
- Tribal use, recreational and residential risk assessment scenarios need to be run for the Upland (land above the River for 100/300 Areas). This information is needed to make transparent tradeoff decisions (Needed consensus from workshop participants)

Integrated group on CRCIA

1. Steering management committee with technical expertise to participate with the Triparties on the R.A process and closure process for BC pilot and Hanford site-wide closure process – HAB included
2. CRCIA nine modules should be used as minimum in all assessments using CRCIA part 2. requirements document which is a comprehensive and holistic approach
3. a) Tribal use scenario probably covers highest risk. Honoring treaty commitments and trust responsibilities protects all life. Tribal use could mean residential exposure (regular use – lots of time). Impact to individual species needs to be assessed. e.g. genetics. Protect for genetic damage or other injuries to any species and individuals.

Appendix III – Hanford Advisory Board Advice

June 7, 2002

Keith Klein, Manager
U.S. Department of Energy, Richland Operations
P.O. Box 550 (A7-50)
Richland, WA 99352

Harry Boston, Manager
U.S. Department of Energy, Office of River Protection
2440 Stevens
Richland, WA 99352

John Iani, Regional Administrator
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Tom Fitzsimmons, Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Subject: Exposure Scenarios Task Force on the 200 Area

Dear Mssrs. Klein, Boston, Iani, and Fitzsimmons,

The Exposure Scenarios Task Force was formed by the Tri-Party Agreement (TPA) agencies to provide them with a broad range of stakeholder values specific to the development of exposure scenarios and risk analyses to support future cleanup decisions. As a secondary product, the Hanford Advisory Board (Board) members on this Task Force were asked to develop advice for the TPA agencies covering the risk framework for the 200 Area.

The Board acknowledges that some waste will remain in the core zone when this cleanup effort is complete. However, the core zone should be as small as possible and should not include contaminated areas outside the 200 Area fences. The waste within the core zone should be stored and managed to make it inaccessible to inadvertent intruding humans and animals.

A continued human presence in the core zone would provide an ongoing, active institutional interest vested in future management of the risks posed by Hanford waste. One way to ensure this continuous human presence is to maximize the potential for any beneficial use of the accessible areas of the core zone, rather than rely only on long-term government control of these areas.

Groundwater remediation must be an integral part of source term remediation. This effort should include aggressive technology development and implementation. Risk

assessments must include all aspects of groundwater and vadose zone. Groundwater is a valuable resource with beneficial future uses that must not be restricted outside of the individual waste management unit points of compliance within the core zone.

The Board believes that sound management, stewardship, and cleanup decisions must begin now to build equity over generations. The Tri-Parties need to engage immediately in developing robust, flexible, and creative management systems to address long-term stewardship. The Board recommends that a coalition of groups, to include the Tribes, local government, and other affected entities as appropriate be created to administer the long-term stewardship responsibilities for this site. Stewardship should be an active process involving the entire spectrum of management, education, and protection activities.

For the Central Plateau, the Board advises the agencies to analyze a range of potential human health and ecological risks, including the reasonable maximum risk expected over time. The stakeholder community will use this analysis to advise the agencies on appropriate cleanup decisions. The risk analysis should include: a reasonable maximum exposure to a resident and/or Native American, including groundwater use, in what is currently labeled the buffer zone and in areas freed up for use as the core zone shrinks. For the waste management areas within the core zone, exposure scenarios should include a reasonable maximum exposure to a worker/day user, to possible Native American users, and to intruders.

The Board also recommends that DOE continue to refine its ability to make accurate risk projections by continuing efforts to gather the data necessary to accurately characterize waste inventories and locations. The results of these analyses should be provided as soon as possible and in a publicly useful format that depicts geographic variations of risks over time.

Finally, the Board believes the values expressed by the Future Site Uses Working Group are still applicable. These values should continue to be used as a guide for making cleanup decisions.

Sincerely,

Todd Martin, Chair
Hanford Advisory Board

This advice represents HAB consensus for this specific topic. It should not be taken out of context to extrapolate Board agreement on other subject matters.

cc: Wade Ballard, Deputy Designated Federal Official, U.S. Department of Energy
Michael Gearheard, Environmental Protection Agency

Michael Wilson, Washington State Department of Ecology
Martha Crosland, U.S. Department of Energy Headquarters
The Oregon and Washington Congressional Delegations

U.S. Senators (OR)

Gordon H Smith
Ron Wyden

U.S. Senators (WA)

Maria Cantwell
Patty Murray

U.S. Representatives (OR)

Earl Blumenauer
Peter DeFazio
Darlene Hooley
Greg Walden

U.S. Representatives (WA)

Norm Dicks
Jennifer Dunn
Richard Hastings
George Nethercutt

State Senators (WA)

Pat Hale
Mike Hewitt

State Representatives (WA)

Jerome Delvin
Shirley Hankins

September 6, 2002

Keith Klein, Manager
U.S. Department of Energy, Richland Operations
P.O. Box 550 (A7-50)
Richland, WA 99352

Roy Schepens, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 450
Richland, WA 99352

Tom Fitzsimmons, Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

John Iani, Regional Administrator
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Exposure Scenarios Task Force on the River Corridor

Dear Mssrs. Klein, Schepens, Fitzsimmons, and Iani,

The Hanford Advisory Board (Board) Exposure Scenarios Task Force met in June and July of this year to provide the Tri-Party Agreement (TPA) agencies with input on risk assessment and exposure scenarios for the river corridor portion of the Hanford Site. At the agencies' request, Board members of the Task Force also agreed to provide Board advice on these subjects for the river corridor.

The Task Force discussions on the river corridor and the central plateau were very rich and broad. Many interesting and innovative ideas and values concerning risk assessment, long term stewardship, exposure scenario development and cleanup in general were expressed. This advice represents only a small fraction of those ideas. The Board advises the Tri-Party agencies to review in depth the final Task Force report when it becomes available and use its input routinely when making decisions concerning risk assessment and exposure scenario development which will not only affect us, but also generations yet to be born.

Consistent with its previous advice on risk assessment and exposure scenarios, the Board recommends that a spectrum of analyses and scenarios be run to include Tribal use,

recreational and rural residential uses in the river corridor. The agencies should consider tribal and recreational use scenarios for all lands within at least one-quarter mile from the river shoreline. In the upland areas of the river corridor, tribal, recreational and rural residential scenarios should be used. Results of risk analyses and exposure scenarios need to be communicated with the public prior to making any decisions based on these efforts, in order to allow the public to provide its input to these decisions. The TPA Agencies should conduct public involvement activities early and often throughout the risk assessment and exposure scenario process.

Groundwater in the river corridor should be remediated to meet drinking water and ambient water quality standards by the time Department of Energy (DOE) petitions the Environmental Protection Agency to remove the river corridor from the National Priorities List (see Board Advice #125). Remediation of river corridor groundwater should consider the possibility of preferred groundwater pathways, and take into account the arrival of up-gradient Hanford contaminants. Actions must be taken to ensure that the arrival of these Hanford contaminants does not again cause the river corridor groundwater to exceed drinking water and ambient water quality standards. The Board also advises DOE to take action now to protect people and wildlife from contaminated seeps.

As part of its Performance Management Plan, DOE has identified a strategy to accelerate cleanup and protection of Hanford groundwater. The Board is concerned the strategic initiative for groundwater was added to the Performance Management Plan after preliminary funding decisions had likely already been made. Accelerating cleanup and protection of Hanford groundwater is a long-standing priority for the Board. The Board strongly encourages DOE – as it makes funding allocations for Fiscal year 2003 activities – to fully fund this initiative.

When developing criteria and end-states, the Board advises the TPA agencies to use a holistic approach and look at the effects of other site activities and conditions on a given waste site or project. Further, the Board advises the TPA agencies that in developing analysis goals, Tribal input parameters should be used, along with other public values and regulatory requirements. Also, ecological parameters obtained from the study of appropriate indicator populations should be factored into analysis goals. The river shoreline should be considered to include the river bank, the riparian zone, seeps, the river bed and islands.

Sincerely,

Todd Martin, Chair
Hanford Advisory Board

This advice represents HAB consensus for this specific topic. It should not be taken out of context to extrapolate Board agreement on other subject matters.

cc: Wade Ballard, Deputy Designated Federal Official, U.S. Department of Energy
Jessie H. Roberson, Assistant Secretary, Environmental Management EM-1
Michael Gearheard, Environmental Protection Agency
Michael Wilson, Washington State Department of Ecology
Martha Crosland, U.S. Department of Energy Headquarters
Greg Hughes, U.S Fish & Wildlife
Jim Watts, Chair, Hanford Reach National Monument Federal Planning Advisory
Committee
The Oregon and Washington Congressional Delegations

Appendix IV – Task Force Workshop Attendees

March Task Force Participants

| | | |
|-----------------|-----------------|-----------------|
| Martin Bensky | Doug Huston | Gerald Pollet |
| Kenneth Bracken | Dave Johnson | Wade Riggsbee |
| Pam Brown | Robin Klein | Gordon Rogers |
| Norm Buske | Susan Leckband | Dan Simpson |
| Shelley Cimon | Jeff Luke | Keith Smith |
| Jim Curdy | Todd Martin | Patrick Sobotta |
| Greg deBruler | Debra McBaugh | John Stanfill |
| Norm Dyer | Ken Niles | Art Tackett |
| Gariann Gelston | Maynard Plahuta | Amber Waldref |
| | | Charles Weems |

Agency, Staff, Contractors, and Others

| | | |
|-------------------------|------------------------|--------------------------------|
| Kevin Clarke, DOE-RL | Laura Cusack, Ecology | Bruce Ford, BHI |
| Jim Daily, DOE-RL | Dib Goswami, Ecology | Moses Jarayssi, BHI |
| Bryan Foley, DOE-RL | Jane Hedges, Ecology | Nancy Meyers, BHI |
| Pete Knollmeyer, DOE-RL | Alisa Huckaby, Ecology | Bill Griffith, CRESP |
| John Morse, DOE-RL | Fred Jamison, Ecology | Tom Leschine, CRESP |
| Yvonne Sherman, DOE-RL | Jeff Lyon, Ecology | Chuck Powers, CRESP |
| Mike Talbot, DOE-RL | John Price, Ecology | Kim Ballinger, Critique |
| Jamie Zeisloft, DOE-RL | Dennis Faulk, EPA | John Cox, CTUIR |
| | Larry Gadbois, EPA | Stuart Harris, CTUIR |
| | | Ted Repasky, CTUIR |
| | | Linda Grotefendt, EnviroIssues |
| | | Lynn Lefkoff, EnviroIssues |
| | | Ruth Siguenza, EnviroIssues |
| | | Barb Wise, Fluor Hanford |
| | | Mike Goddu, GHJ |
| | | Kristy Collins, Informatics |
| | | Peter Bengtson, PNNL |
| | | Charles Kincaid, PNNL |
| | | J. Ferguson, UW |
| | | Earl Fordham, WDOH |
| | | Jay McConnaughey, YN |
| | | Tom Zeilman, YN |
| | | Doug Evans |
| | | John Monsor |

May Task Force Participants

| | | |
|-----------------|-----------------|---------------|
| Ken Bracken | Harold Heacock | Gerald Pollet |
| Pam Brown | Doug Huston | Gordon Rogers |
| Norm Buske | Dave Johnson | Dan Simpson |
| Jim Curdy | Susan Leckband | John Stanfill |
| Greg deBruler | Jeff Luke | Art Tackett |
| Dirk Dunning | Todd Martin | Amber Waldref |
| Norm Dyer | Debra McBaugh | Charles Weems |
| Gariann Gelston | Maynard Plahuta | |

Agency, Staff, Contractors and Others

| | | |
|------------------------|------------------------|--------------------------------|
| Joe Cruz, DOE-ORP | Rick Bond, Ecology | Sky Bradley, Audubon Society |
| Brian Foley, DOE-RL | Joe Caggiano, Ecology | Moses Jarayssi, BHI |
| D. Hildebrand, DOE-RL | Laura Cusack, Ecology | Nancy Myers, BHI |
| Marla Marvin, DOE-RL | Dib Goswami, Ecology | William C. Griffith, CRESP |
| John Morse, DOE-RL | Jane Hedges, Ecology | Tom Leschine, CRESP |
| Yvonne Sherman, DOE-RL | Alisa Huckaby, Ecology | Doug Mercer, CRESP |
| | Max Power, Ecology | Chuck Powers, CRESP |
| Jamie Zeisloft, DOE-RL | John Price, Ecology | Steve Smith, CRESP |
| | Joy Turner, Ecology | Stuart Harris, CTUIR |
| | Craig Cameron, EPA | Linda Grotefendt, EnviroIssues |
| | Dennis Faulk, EPA | Lynn Lefkoff, EnviroIssues |
| | Larry Gadbois, EPA | Barb Wise, Fluor Hanford |
| | | Mike Goddu, GHJ |
| | | Kristy Collins, Informatics |
| | | Rico Cruz, Nez Perce Tribe |
| | | Peter Bengtson, PNNL |
| | | Kathy Yuracko |

June Task Force Participants

| | | |
|-----------------|-----------------|---------------|
| Marty Bensky | Harold Heacock | Gerald Pollet |
| Pam Brown | Doug Huston | Gordon Rogers |
| Norm Buske | Robin Klein | Dan Simpson |
| Jim Curdy | Dave Johnson | Keith Smith |
| Greg deBruler | Jeff Luke | Leon Swenson |
| Gariann Gelston | Maynard Plahuta | Amber Waldref |
| | | Charles Weems |

Agency, Staff, Contractors and Others

| | | |
|------------------------|----------------------|--|
| Beth Bilson, DOE-RL | Rick Bond, Ecology | Pam Doctor, BHI |
| Marla Marvin, DOE-RL | Dib Goswami, Ecology | Ken Gano, BHI |
| Bob McLeod, DOE-RL | John Price, Ecology | Nancy Myers, BHI |
| John Morse, DOE-RL | Dennis Faulk, EPA | Walter Remsen, BHI |
| Chris Smith, DOE-RL | Larry Gadbois, EPA | BillGriffith, CRESP |
| Yvonne Sherman, DOE-RL | Mike Goldstein, EPA | Tom Leschine, CRESP |
| Alex Teimouri, DOE-RL | | Steve Sautter, CRESP |
| Jamie Zeisloft, DOE-RL | | Linda Grotefeldt, EnviroIssues |
| | | Lynn Lefkoff, EnviroIssues |
| | | Barb Wise, Fluor Hanford |
| | | Mike Goddu, GHJ |
| | | Kristy Collins, Informatics |
| | | Betsy Bloomfield, The Nature Conservancy |
| | | Tom Stoops, OOE |
| | | Don Steffeck, USFWS |
| | | Tom Cooper, WDOH |

July Task Force Participants

| | | |
|---------------------|-----------------|-----------------|
| Kristi Baptiste-Eke | Gariann Gelston | Maynard Plahuta |
| Marty Bensky | Harold Heacock | Gordon Rogers |
| Norm Buske | Doug Huston | Dan Simpson |
| Shelley Cimon | Paige Knight | Leon Swenson |
| Jim Curdy | Todd Martin | Amber Waldref |
| Greg deBruler | Debra McBaugh | Charles Weems |

Agency, Staff, Contractors and Others

| | | |
|------------------------|----------------------|--------------------------------|
| Beth Bilson, DOE-RL | Dib Goswami, Ecology | Pam Doctor, BHI |
| Yvonne Sherman, DOE-RL | Jane Hedges, Ecology | Nancy Myers, BHI |
| Chris Smith, DOE-RL | John Price, Ecology | Bill Griffith, CRESP |
| Alex Teimouri, DOE-RL | Joy Turner, Ecology | Tom Leschine, CRESP |
| Jamie Ziesloft, DOE-RL | Dennis Faulk, EPA | Chuck Powers, CRESP |
| | Larry Gadbois, EPA | Steve Sautter, CRESP |
| | Mike Goldstein, EPA | Stuart Harris, CTUIR |
| | | Linda Grotefeldt, EnviroIssues |
| | | Lynn Lefkoff, EnviroIssues |
| | | Barb Wise, Fluor Hanford |
| | | Mike Goddu, GHJ |
| | | Kristy Collins, Informatics |
| | | Tom Stoops, OOE |
| | | Don Steffeck, USFWS |
| | | Steve Wisness |
| | | Jessica Kious |

Appendix V – Task Force Workshop Agendas

Hanford Advisory Board Exposure Scenario Task Force
First Workshop: 200 Area
March 12 and 13, 2002

Venue: Washington State Department of Ecology
1315 W.4th Ave., Kennewick, Washington

Agenda:

Tuesday, March 12, 8:30 am – 5 pm:

8:30 Introduction and Workshop Overview - Doug Huston and Greg deBruler

- Purpose for Task Force
- Reports out
- Agenda, Format, Ground Rules for this workshop
- Opening exercise for participant introductions – Mike Goddu

9:30 Background – Dennis Faulk

- Hanford 101
- FSUWG
- HRA EIS and CLUP
- Hanford Cleanup: Yesterday and Today

10:00 Break

10:15 Exposure Scenarios

What is an exposure scenario? John Price

- Regulatory Processes – Drivers for Setting Exposure Scenarios
- CERCLA, RCRA, MTCA – John Price
- Trust Responsibility –Kevin Clarke
- What does trust mean? What is a trust responsibility?
- Institutional Controls – Jim Daily
- Definition; applicability to 200 areas
- Long Term Stewardship – Jim Daily

11:15 Background: Central Plateau – Pete Knollmeyer

- Tour of what is out there; why it is important (through GW plumes)
- Issues unresolved, issues of concern
- C3T work: issues unresolved, issues of concern

11:45 Review of morning's work; Setting context for the afternoon - Mike Goddu

12:00 Lunch

1:00 Risk Framework - John Price

2:00 Questions and initial discussion (opportunity to listen to each others' perspectives)

2:30 Break

2:45 Breakout Groups – Each group will address key topics: Geographic zones; Timeframes; Assumptions about activities; Groundwater (others as may arise in the course of the day)

4:15 Initial report out from Breakout groups and wrap up

5:00 Adjourn

Wednesday, March 13, 8:30 am – 12 pm:

8:30 Review of Day One; Set-up work to be accomplished in Day Two

8:45 Breakout Groups:

- Continued work on Key Topics
- Discussion of any additional topics

9:30 Break

9:45 Reports out from Breakout groups

10:30 Review of open discussion topics captured on Day One

11:30 Review of notes, documentation processes - path forward

11:40 “Lessons Learned” in this session to apply to future Task Force Workshops

11:45 Next Steps for Task Force

- 300 Area Workshop
- 100 Area Workshop

12 pm Workshop Close

DRAFT AGENDA

***HAB Exposure Scenario Task Force:
200 Area Workshop
May 7-8, 2002***

***Room 210, Consolidated Information Center
Washington State University, Tri Cities
2710 University Way, Richland, Washington***

Day, One: May 7, 8:00 am – 4:00 pm

8:00 am Welcome
Meeting Overview
Participant introductions
Brief Overview of prior 200 Area workshop
Agency feedback from prior workshop
How this session will be conducted so as to maximize participation; what we will be doing and not doing in this session

9:00 am Question #1: “When you think of cleanup of the 200 area what do you think the future use might be for:
 - core zone
 - buffer zone
 - groundwater
And in what timeframes? E.G., 50 years from now? 150 years? 500 years?”

Participants first take a few minutes and further color in a site map indicating future activities and uses they envision for the site. Participants are then organized in groups of 10 – 12 to discuss responses. A large map will be available to each of the groups, in addition to the individual maps. Note-takers and facilitators available to each of the groups.

10:15 am **Break**

Question #2: “For the 200 Area, what are the cultural and natural resources, including Tribal resources, which need to be protected? What changes, if any, would you make to the large timeline diagram these to adequately protect these resources?”
Group discussions

10:30 am Group reports on morning discussions

11:30am **Lunch**

12:45 pm Groups’ Discussions

Question #3: “What type of government controls do you envision for the future? How long do you think government controls will be effective?”

Question #4: “How does ‘equity across generations’ play into decision-making?”

Question #5: “In addition to protecting human health, how should the environment of the 200 Area and surrounds be protected?”

- 2:30 pm **Break**
- 2:45 pm Groups’ reports
- 3:30 pm Wrap-up the day
- Key themes
- Set-up Day Two
- 4:00 pm Adjourn
- 4:15pm Huddle #1: HAB – discussion regarding drafting HAB advice
 Huddle #2: Agency leads – prep for Day Two

Day, Two: May 8, 8:00 am – 12:00 noon

- 8 am Meeting Overview
- Feedback from Day One
- 8:15 am Agency Leads and Risk Assessors: Recommended discussion questions
 Question #6: “ ...?”
 Question #7: “ ...?”
- Participants assigned to groups for discussions; Note-takers and facilitators available
- Reports out
- 10:00 am **Break**
- 10:15 am Continued discussions
- 11:15 am Recap; Meeting summary
- Overall themes
- Plan for River Corridor Workshop
- Wrap-up
- 12 noon **Adjourn**

***Hanford Advisory Board Exposure Scenarios Task Force Workshop:
River Corridor
June 10 and 11, 2002***

Venue: Washington State University Tri Cities
Consolidated Information Center, Room 210

Monday, June 10, 12:00 pm – 4:00 pm:

- 12:00 pm*** ***Introduction and Workshop Overview*** - Doug Huston and Greg de Bruler
- Task Force and workshop overview
 - Agenda, Format, ground rules for this workshop – Mike Goddu
 - Participant introductions – Mike Goddu
 - Instruction regarding 5x8 cards for participants' use during presentations to capture potential discussion questions or topics
- 12:15 pm*** ***River Corridor Briefing*** – Dennis Faulk, EPA (20 min presentation and questions)
- Past Practices
 - FSUWG and 100 Area Workshop
 - Current status, including Monument designation
 - Schedule for the future
- 12:35*** ***Groundwater Overview*** – John Price/Dib Goswami, Ecology (15 minute overview; 15 minutes of questions)
- 1:05*** ***Greg Hughes - US Fish and Wildlife:*** Planning Process for Hanford Reach Monument
- 1:20*** ***GariAnn Gelston – Eco Risk Assessment process – simple overview***
- 1:30*** ***Break***
- 1:45*** ***Discussion Groups:*** What do you see the beneficial uses for the River Corridor and groundwater to be when the clean-up is complete?
- In what timeframes?
 - How much of a priority is groundwater?
- 2:45*** ***Groups report out***
- 3:00*** ***Ecological Risk Assessment – Pam Doctor*** – 20 minutes, including Q&A
- 3:20*** ***Participants write down additional questions or suggested topics*** – these are gathered for organizing the discussions on Day Two
- 4:00*** ***Adjourn***

*Lunch will **not** be provided. Please make lunch arrangements prior to coming to the workshop.*

Tuesday, June 11, 8 am – 4:00 pm:

- 8:00** ***Overview of the Day – Mike G.***
- Plan for day's discussions – based upon cards gathered and organized from the prior day
 - Discussion Groups will be organized by themes and potentially depth of topics re groundwater, eco risk assessment, etc.
- 8:15** ***Groups' Discussion #1:***
- 9:30** ***Break***
- 9:45** ***Groups report out***
- 10:00** ***Groups' Discussion #2:***
- 11:15** ***Groups report out***
- 11:30** ***Lunch***
- 12:45** ***Groups Discussion #3***
- 2:00** ***Reports out***
- 2:30** ***Compilation of key themes and topics***
- 3:45** ***Recap/Wrap-up***
- Next Workshop - schedule and focus
- 4 pm** ***Adjourn***

***HAB Exposure Scenarios Task Force Workshop:
River Corridor
July 16 & 17, '02***

Venue: Columbia Basin Advanced Technology Center
2910 W.20th Ave, Pasco, Washington

Agenda:

Tuesday, July 16, 8:30 am – 5:00 pm:

- 8:30 am** ***Introduction and Workshop Overview*** - Doug, Gariann and Greg
- Task Force and workshop overview
 - Agenda, Format, ground rules for this workshop – Mike Goddu
 - Participant introductions – Mike Goddu
- 8:45 am** ***Briefing*** – Agencies – What we heard at the prior River Corridor Workshop (15 min. presentation and questions)
- Key themes
 - Areas to discuss in this session
 - Q& A
- 9:15** ***Small Groups' Discussions:***
- Shoreline*** –
What is the reasonably anticipated human use of the River shoreline area and in what timeframe?
- 10:00** ***Break***
- 10:15** ***Groundwater --***
What is the reasonably anticipated use of the groundwater and in what timeframe?
- Some passive groundwater actions may take decades to restore the groundwater. Is this acceptable if the actions restore and protect use of the Columbia River riparian zone and are protective of the eco-system? Discuss.
- 12 noon** ***Lunch***
- TBD** ***Briefing: Stuart Harris of Umatilla Tribes – Background on potential Tribal Use Scenario for the Shoreline***
- 1:15 pm** ***Input to BC Pilot Assessment***
Overview of Columbia River Comprehensive Impact Assessment (CRCIA) – Greg DeBruler and Larry Gadbois
- In performing a BC reactor comprehensive assessment what CRCIA modules are included in the process and what modules are not? – EPA

Review and Discussion, including USF&W brief presentation and Q&A

3:00 ***Presentation: Wall display – BC Pilot Assessment public input opportunities (10 minutes)***
Q&A
Groups' discussion – wall stickies process

4:00 ***Groups report out***

4:30 ***Plan for the next day***

5:00 ***Meeting concludes*** for the day

Wednesday, July 17, 8:30 am – 12:00 pm:

8:30 am ***Overview of the Day – Mike G.***
- Plan for day's discussions – based upon cards gathered and organized from the prior day
- Discussion Groups for first discussion will be organized by themes or other key topics that grew out of day one

8:45 ***Groups' Discussion #1:***

9:30 ***Groups report out***

9:45 ***Break***

10:00 ***Groups' Discussion #2: Key themes and other messages from this workshop – gather from each group***

10:45 ***Groups report out***

11:15 ***Groups discussion: What is your vision/expectation/suggestion for Task Force products***

11:45 ***Wrap-up of workshop and Task Force***