

**Attendees**

Michael Blanton (PNNL), K6-75  
Julie Campbell (USFWS)  
John Carleton (WDFW)  
Dennis Dauble (PNNL); K6-85  
Larry Gadbois (EPA), B5-01  
Barbara Harper (YIN)  
Douglas Hildebrand (DOE), H0-12  
David Holland (Ecology), B5-18  
Susan Hughs (Oregon DOE)  
Jena Lewinsohn (DOE), H0-12  
Jay McConnaughey (Ecology), B5-18

Roger Ovink (CH2M Hill), H9-03  
Bob Peterson (CH2M Hill), H9-03  
Bob Putz (BHI)  
Fred Serier (DOE), H0-12  
Wayne Soper (Ecology), B5-18  
Geoff Tallent (Ecology)  
Darci Teel (BHI), H0-02  
Arlene Tortoso (DOE), H0-12  
Steve Weiss (CH2M Hill Hanford), H9-03  
Jerry Yokel (Ecology), B5-18  
Jamie Zeisloft (DOE-RL) H0-12

A meeting on the above subject was held on October 21, 1997, at 3350 George Washington Way, Richland, Washington. Roger Ovink of CHI was the meeting facilitator.

**I. Meeting Purpose**

The main purpose of meeting was to review the existing data on the 100 Area with the U.S. Fish and Wildlife Service (USFWS). This data included two briefing notebooks (Overview of Studies on the Columbia River and Compendium of Available Water Quality) and Attachment C (Documents for the 100 Area Assessment Plan) and Attachment D (Chromium/Salmon Documents for the Study Plan) of the interagency agreement. Items/issues discussed in relation to the meeting purpose included:

- The data review is Task 1 of the DOE/USFWS interagency agreement for the 100 Area Columbia River aquatics Resources Assessment Plan
- Need to bring the working group up-to-speed on existing information by reviewing/discussing the briefing notebooks and Attachments C and D.
- Preliminary review of the 5 NRDA criteria and the Trustee's determination to proceed with an assessment plan.
- Focus on Columbia River aquatic resources.
- Focus on current injuries (not historical).
- Contaminants/pathways to be addressed in accordance with the NRDA process.
- Identify additional pertinent data sources; identify significant data gaps.
- Answer questions/clarify issues.

**II. The NRDA definition of "injury" may include the following considerations:**

- Adverse natural resource change (e.g., reduced diversity, habitat loss, productivity, survival).

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- Biological injuries can be widely varied (e.g., genetic changes, survival/growth differences, reproductive success).
- Injuries are compared to appropriate baseline conditions.
- ARAR (MCL, AWQC) exceedance; anti-degradation for groundwater; animal avoidance behavior can be considered injury to natural resources.
- Habitat loss may be considered an "injury" if associated with a release of a hazardous substance. Determining whether the loss is the result of an injury is complicated due to non-injury related losses (e.g., hydroelectric dam operations, agricultural practices).
- The Tribal perspective of "injury" may differ from other Trustee's interpretations.
- Injury determination involves showing a biological response both in the field (i.e. free-ranging organisms) and in the laboratory (i.e. controlled experiments).
- A release prior to 1980 that continues to cause injury after 1980 can be considered in NRDA.
- Certain damages are excluded from liability (as identified in the PAS).

**III. The Hanford Trustee approach for this assessment plan includes the following considerations:**

- The primary focus will be on contaminant pathways and injury to Columbia River aquatic resources based on an ecosystem approach.
- The assessment plan will identify potential Columbia River pathway and injury studies.
  - Trustees will prioritize studies identified by USFWS
  - Number of studies conducted contingent on available funding; defer some studies until additional funding becomes available
  - Future NRDA assessment phases may address other natural resources (e.g., terrestrial, riparian)
- The USFWS team needs to review available documents prior to drafting the plan. To-date, most of the site-specific information needed for the plan has been provided to USFWS.
- Environmental exposures to be evaluated could include:
  - Salmon redds -- eggs/alevins/smolts could be exposed to contaminants
  - Steelhead -- near shore migrants, part-time residents (1+ year?)
  - Sturgeon -- residential species; contaminated food/direct exposure to upwelling
- It is important to agree on the methods/limits for gathering pertinent information, identifying important data gaps, and establishing NRDA issues that will not be addressed through CERCLA response actions.
- The assessment plan will be prepared in accordance with the applicable NRDA regulations.

**IV. Responsibility of the Trustees working group includes:**

- As per the Interagency Agreement, the assessment plan is being prepared at the direction of the Trustees.
- The working group will provide technical support to USFWS in regards to applicable past and in-progress aquatic/investigative studies at Hanford.
- There is a tight project schedule which includes various working group tasks. The group must perform these tasks in a timely fashion.

#### V. Data Review/Attachment "C"

- A brief review of Attachment C/D documents was conducted. DOE contractors (Dauble, PNNL; Weiss, ERC; Peterson, ERC; Blanton, PNNL) helped clarify certain issues. Jamie Zeisloft, DOE-RL, presented a brief Hanford historical study overview:
  - Chronology of studies (Hanford development, reactor operations, reactor/facility shutdown, RCRA/CERCLA cleanup activities)
  - 1940's: available information includes physical, chemical, and radiation data/information
  - 1950's: studies documented effects of Cr (potential for salmon injury shown in lab tests)
  - 1990's: AWQC exceedance in river gravel "pore water" (highest Cr+6 levels recorded; 800 ppb)
    - No obvious biological effects from Cr noted in ongoing groundwater/surface water monitoring
    - Surface water criteria (AWQC) exceeded for some contaminants of concern (e.g., chromium)
    - Most recent studies were done with cleanup in mind (CERCLA/RCRA characterization).
    - Quality of new data (CERCLA) is good (high quality QA/QC)
    - Some Columbia River segments have little/no analytical data
    - Groundwater plume data is available for various operable units (contaminant movement toward river)
    - ROD for Cr clean-up at HR (pump-and-treat)
    - Aqua-Tube Sampling (river/groundwater)
      - multiple depths; installed BC Area to old Hanford Townsite
      - samples at the shoreline are representative of what is entering the river
      - D-Area hot spot (high chromium in near-shore pore water; near-river wells; deep water areas)
      - Chromium (+6 and +3) is most wide-spread contaminant
- Hanford documents go back as far as the 1940's. Impacts to aquatic resources include thermal (high effluent water temperatures), radiation, and chemical (e.g., metals, solvents) contamination. The documents concluded that there were no significant biological/environmental injuries due to the contaminants evaluated. Adverse effects were noted in chromium laboratory studies. The chromium laboratory study results indicated the potential for injury to salmon at concentrations lower than those measured in groundwater or Columbia River pore water.

- The meeting attendees recommended the following information be reviewed.
  - Animal avoidance data (e.g., groundwater upwelling areas, shoreline seeps). Hildebrand, DOE-RL, indicated that B. Ricor's studies on birds of the area have indicated shifts in areas used by bird populations.
  - Hanford Annual Environmental Reports (PNNL. author: John Hall/Dana Ward are DOE's PNNL contacts)
  - Multiple exposure pathway analyses (direct exposure + foodchain exposure + incidental ingestion)
  - Summaries of long-term monitoring results
  - Non-radioactive contaminant (e.g., volatile organic compounds, metals) monitoring
  - Miley, et. al., Volume II (chromium data); Miley, et. al., Volume I - Report
  - Dunks, K., D/DR 1995 Pipeline (outfall) data (pipeline scale, sediments, video)
  - Zone 6 fishing study (1990-92, Abernathy, PNNL, author)
    - White Salmon Hatchery/USFWS (fish pathology study of Columbia River fish; mostly salmon)
  - Washington Department of Ecology Water Quality Report (Draft) for Columbia River (suggested by Dave Holland)
  - Book entitled "Columbia River and its Estuary" (suggested by B. Peterson)
  - USFWS data sets -- Yakima, Upper/Lower Columbia (suggested by M. Blanton)
  - Becker book -- background of site (suggested by D. Hildebrand)
  - Columbia River Comprehensive Impact Assessment (CRCIA); DOE-RL document important data gaps; complete summary of Hanford human/ecological risks
  - "Background" water quality data for the Columbia River upstream from Hanford
  - Oregon River Study document, Ray Paris, author (suggested by D. Hildebrand)
  - Historical salmon redd maps and photographs (D. Dauble/PNNL has these)
  - Historical population data for all aquatic species (location-specific)
  - Heron/Bald Eagle/Salmon historical monitoring (e.g., populations, locations)
  - M. Parsley/D. Dauble studies on Sturgeon (old and new documents; PNNL. author)
  - DART - University of Washington Internet Web Page
  - Health of Hanford--"summit paper" on current understanding of contaminants at Hanford (source?)
  - Studies from Russia documenting aquatic resources and radiological updates (cause-and-effect relationships; PNNL source—B. Napier?)

- There is resident fish (carp and sucker) data in the Hanford annual reports. Because their home range is the Reach they may present a worst case exposure scenario for Hanford contaminants
- New study on radionuclide uptake in sculpins (M. Blanton, PNNL) should be finished soon and will include background and "onsite" tissue concentrations
- "Residual" injury information should also be covered (suggested by B. Harper).
- Historical Hanford EIS documents (especially where resource impacts were not mitigated; I&I)

## **VI. Questions/Data Gaps**

- Several questions were raised regarding Hanford Reach aquatic resources (resident and migratory) and their potential exposures to Hanford contaminants:
  - Is the potential for contaminant exposure enhanced during low flow?
  - Are there better aquatic indicator species than salmon (e.g., other fish, aquatic invertebrates)?
  - What is the extent of juvenile steelhead exposure (unknown feeding habits, local residence time)?
  - What is the extent of sturgeon exposure (unknown feeding habits, contaminated groundwater upwelling exposure, bottom-dweller specific exposures)?
  - Are salmon redds located in gravel where  $\text{Cr}^{+6}$  is present in the pore water?
  - Do salmon prefer groundwater upwelling areas for spawning? Where are the upwelling areas?
  - What affects do nitrate, tritium, uranium, tech-99, and fluoride have on aquatic resources?

## **VII. General Questions/Concerns/Considerations Regarding the NRDA Process**

- This phase of the NRDA Assessment will not address terrestrial or riparian issues (only aquatic).
- CERCLA/NRDA integration - NRDA is a part of the CERCLA process. However, CERCLA typically focuses on the remediation of contamination while NRDA focuses on the restoration of natural resources. Remediation/restoration need to be integrated for the 100 Area.
- Need to establish links between contaminant releases and pathways and responses in aquatic resources to determine "injury".
- The Tri-Parties at Hanford have agreed to emphasize the assessment of risk to human health versus the environment.
- Address the ecological effects of radiological contamination.

- There are issues concerning the difference between the information generated by an ecological risk assessment versus a natural resource damage assessment (e.g., cumulative affects).
- Procedure for exposure pathway evaluation.
- Availability of CRCIA ecological data, results, species of concern (when will CRCIA be published?)
- The assessment plan needs to be scientifically-based but will include legal review. The plan will be prepared in compliance with the NRDA regulations.
- What is biologically acceptable for sediment exposure/risk?
- Will NRDA evaluate the biological effects of residual contamination when treatment (e.g., pump-and-treat) is completed?
- Need to look at historical I&I's (irreversible and irretrievable resources) at the Hanford site.
- Do we challenge common risk assumptions (e.g., 1 rad/day exposure has no adverse affect)?

### **VIII. Future Events**

- Lab tour (10/21)
- Boat tour (10/22) (What a great boat ride)
- Next trustee working group meeting will be rescheduled pending USFWS progress.
- Working group conference call in mid-November. Next meeting date will be scheduled during this conference call.

### **IX. Action Items**

- J. Campbell: Look at Department of the Interior regulations and answer how modeling can be used in the damage assessment process.
- All: Contact Jena Lewinsohn, (509/373-9628) in regards to new/additional review data and for copies of review data.
- All: Determine how to assign Columbia River impacts to various activities (Hanford, Agriculture, BPA)?
- J. Lewinsohn: Get Sturgeon spawning/habitat studies (M. Parsley/D. Dauble).
- J. Campbell: Define "release" -- Any contaminant release that causes injury (completed pathway)? Define "residual injury" -- Post remediation or future injury?
- All: Clarify differences/similarities between CERCLA remediation and NRDA restoration.
- J. Carleton: Provide status of "PAS" process.
- B. Peterson: Summarize new aqua tube data for USFWS (mid-December 1997).
- J. Lewinsohn: Distribute CRCIA document (final) to working group when available.
- J. Lewinsohn: Get Bob Grey files on historical ecological differences.