Appendix O

Unpublished Sources Cited in the Hanford Site Solid (Radioactive and Hazardous) Waste Environmental Impact Statement

Appendix O

Unpublished Sources Cited in the Hanford Site Solid (Radioactive and Hazardous) Waste Environmental Impact Statement

This appendix contains sources such as personal communications, memos, and other reference material. These sources are listed in alphabetical order as they were called out in the text of this Hanford Site Solid (Radioactive and Hazardous) Waste Environmental Impact Statement, and each new source starts on a face page.

HCRC# 89-200-008. Cadoret, N. A. and J. C. Chatters. September 1989. Archaeological Survey of the 200 East and 200 West Areas, Hanford Site, Washington. Unpublished report prepared for the U.S. Department of Energy. Copy on file at Pacific Northwest National Laboratory, Richland, Washington.

For Approval Of

Name	Approved	Date
RK Woodruff	RKW	4/25

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington U.S.A. 99352
Telephone (509) 375-3886
Telex 15-2874
Facsimile (509) 375-2718

bcc: JC Chatters
RH Gray
RK Woodruff
File/LB

April 21, 1989

Mr. G. C. Evans
Environmental Division
RCRA Permits Section
Westinghouse Hanford Company
H4-57
Richland, WA 99352

Dear Mr. Evans:

CULTURAL RESOURCES REVIEW OF THE LOW-LEVEL BURIAL GROUNDS PERMIT APPLICATION, HCRC #89-200-008

Reference 1. Letter dated October 3, 1988, from J. C. Chatters to M. T. Black.

In response to your request dated April 17, 1989, staff of the Hanford Cultural Resource Laboratory (HCRL) conducted a cultural resources review of the low-level burial grounds that are included in permit application DOE/RL 88-20. These burial grounds include 218-E-10 and 218-E-12B in the 200 East Area of the Hanford Site (Figure 1), and 218-W-3A, 218-W-3AE, 218-W-4B, 218-W-4C, 218-W-5, and 218-W-6 in the 200 West Area of the Hanford Site (Figure 2). The burial grounds will cover an area of 518 acres. Maximum depth of excavation within the grounds will be 30 ft.

The majority of the burial grounds have been extensively disturbed by previous borrowing and burying activities at the grounds. However, portions of 218-E-12B, 218-W-5 and 218-W-6 are undisturbed. These areas were surveyed by the HCRL in the summer of 1988 as part of HCRC #88-200-038 (Reference 1, attached). The only cultural resources identified within the perimeter of these burial grounds were two tin cans, located in the northwest corner of 218-W-6. These are not considered to be significant. An extant segment of the Historic White Bluffs Road, which is potentially eligible for the National Register, is located between 50 m and 200 m to the east of 218-W-6. No artifacts were found along this segment of the road during the same survey mentioned above. The road was located in the southern tip of 218-W-6, but has been destroyed by previous ground disturbing activities.

It is the finding of the HCRL staff that the proposed action will have no impact on any historic property. Further damage to adjacent portions of the White Bluffs Road must be avoided. Monitoring of the excavations by an archaeologist is not required. The workers, however, should be directed to watch for cultural properties (e.g., bones, artifacts) during earth moving activities. If any are encountered, work in the vicinity of the discovery must stop until an HCRL archaeologist has been notified, has assessed the

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significance of the find and, if necessary, has arranged for mitigation of impact to the find. This is a Class III and V case, new action in disturbed ground in a low-sensitivity area, and new action.

This letter constitutes cultural resource clearance for your project as described above. A copy has been sent to Kevin Clarke of Site and Laboratory Management Division, DOE-RL as official documentation of clearance.

Please call me if you have any questions.

Very truly yours,

Natalie A. Cadoret
Technical Specialist
Cultural Resources Project
GEOSCIENCES DEPARTMENT

Concurrence:

J. G. Chatters, Ph.D., Manager
Cultural Resources Project

NAC:mae

Attachment

cc: KV Clarke, DOE-RL (2)

HCRC #89-200-023. Minthorn, P. E. March 1990. Cultural Resources Review of the Effluent Retention and Treatment Complex (ERTC). Unpublished report prepared for Westinghouse Hanford Company. Copy on file at Pacific Northwest National Laboratory, Richland, Washington.

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Telephone (509) 376-8107

March 30, 1990

Mr. E. T. Trost, B4-64
Site Planning Group
Westinghouse Hanford Company
Richland, WA, 99352

Cultural resources found

Dear Mr. Trost:

CULTURAL RESOURCES REVIEW OF THE EFFLUENT RETENTION AND TREATMENT COMPLEX (ERTC), HCRC #89-200-023

Ref. 1: *Archaeological Survey of the 200-East and 200-West Areas, Hanford Site, Washington.* PNL 7264 Pacific Northwest Laboratory, Richland, Washington, by J. C. Chatters and N. A. Cadoret, 1990.

Ref. 2: *Cultural Resources Survey and Exploratory Excavations for the Proposed Skagit/Hanford Nuclear Power Project.* ERTC Northwest Inc., Seattle, 1982.

In response to your request dated August 8, 1989, staff of the Hanford Cultural Resources Laboratory (HCRL) conducted a cultural resources review of the proposed project located on the Hanford Site in Benton County, Washington. According to information you supplied, an area of approximately 84.9 ha will be developed to the northeast of the present boundaries of the 200 East Area (see Figure 1). Proposed facilities within this parcel of land include the Effluent Retention and Treatment Facilities (ERTF) (a.k.a. the Liquid Effluent Retention Facility [LERF]) (Site A), and Purge Water Projects. A pipeline will also be constructed between the 200 East and 200 West Areas and possibly from the ERTF to the Columbia River (the East River Disposal Option) a total of 26 km.

The proposed project site is located in predominantly undisturbed ground that had not been previously surveyed for cultural properties. Commonly known as the 200-Area Plateau, the vicinity of the 200 areas is characterized by broad, rolling upland flats. A lower-lying basin lies between the 200-Area Plateau and Gable Mountain and extends into an area of stable and semi-active dune fields to the east, adjacent the Columbia River. The area is dry, with the nearest nonriverine perennial source of water being West Lake, located 3.3 km to the north of the 200-East Area. Surface sediments are composed of eolian silty sand overlying glacio-fluvial sand and gravels. The vegetation is a shrub-steppe community dominated by sagebrush, with an understory of grasses and forbs. Average ground cover during survey was approximately 30-40%.

Our literature and records review showed that two archaeological sites had been recorded in the vicinity of the proposed project. In the 200-W Area, a segment of the pipeline route intersects the historic White Bluffs Road and at the rivers' edge, where the East River Disposal Option outfall area terminates, is archaeological site 45BN307.

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1

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P.E. Minthorn and N.A. Cadoret conducted a pedestrian survey of the proposed project area from 11-7-89 to 1-10-90, using a 20-m transect spacing. When archaeological properties were encountered, the survey was intensified to locate the approximate boundaries of each site.

SURVEY RESULTS

No cultural properties were identified in the area designated for the ERTC or the LERF. However, five prehistoric sites were encountered along the proposed pipeline route. In the East River Disposal Option area, two archaeological sites were recorded, temporarily designated HT-89-029 and HT-90-002. HT-89-029 is a Quilomene Bar Phase site with an age range of 2500-1500 yrs. B.P. and includes a scatter of mammal bone fragments, fire cracked rocks, and one diagnostic projectile point. HT-90-002 is an aboriginal trail extending 140m northeast-southwest. Another archaeological site HT-89-030 was recorded in the pipeline route that extends east-west on the northern edge of the 200-West and 200-East areas and consists of a cairn made from large angular basalt cobbles. On the portion of the pipeline connecting the southern edges of the 200-West and 200-East Areas, two archaeological properties, HT-89-031 and HI-89-016, were recorded. HT-89-031 consists of a small concentration of fire-cracked rock and mammal bone fragments and HI-89-016 is an isolated cobble tool.

The two previously recorded sites are intersected by the project's pipelines, the White Bluffs Road by the line between the northern edges of the 200- East and 200-West Areas, and archaeological Site 45BN307 by the East River Disposal Option; both require special consideration. The HCRL has determined that the historic White Bluffs Road meets criteria for eligibility for nomination to the National Register of Historic Places (NRHP) and is, therefore accorded certain protective measures. Archaeological site 45BN307 previously has been found to meet criteria for nomination to the NRHP, based on archaeological materials present their scientific potential for contributing to an understanding of local and regional prehistory (see Reference 2). Exploratory excavations at 45BN307, conducted by ERTEC, Inc. in 1979, revealed a previously undisturbed prehistoric cultural deposit dating from approximately 1500 B.P. to historic times. However, review of the data reported by ERTEC shows that this conclusion is incorrect. Their records show that this site contains late Frenchman Springs Phase ca 3500-2800 B.P. and a Vantage/Cascade Phase ca 8000-4000 B.P. manifestations. Reconnaissance of the site for this project also substantiated this assessment by locating a probable Cascade Phase artifact. This finding only enhances the site's claim to statutory protections.

RECOMMENDATIONS

Recommendations for the historic White Bluffs Road include the road and a culturally sensitive zone 200-m wide. Procedure requires that proposed projects located near the road be designed to minimize any foreseeable impacts upon the road and the area surrounding it. If an impact is unavoidable, we will have to reach an agreement with the Washington State Historic Preservation Officer (SHPO) and Advisory Council for Historic Preservation that would result in a finding of no adverse effect. It appears, however, that the road has already been disturbed in the location where it is intersected by the pipeline, so construction of the pipeline will have no new effects on the road.

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Archaeological site 45BN307 will require further evaluation. Because previous excavations at the site have established the site's scientific value, it is likely that the proposed pipeline would have an effect on it. To avoid having an adverse effect, some mitigation measures, probably data recovery along the construction corridor, would be necessary. Agreements on a data recovery plan will need to be reached with the SHPO and Advisory Council for Historic Preservation before your the East River Disposal Option can proceed in this location.

Of the sites recorded during the survey for this project, all appear to be surficial in nature and encompass relatively small areas, indicating only a brief occupational time span. Prehistoric site #HT-89-030, a large angular basalt rock cairn; #HT-89-029, a Quilomene Bar Phase site; #HT-90-002, an aboriginal trail; and #HT-89-031, a small concentration of fire-cracked rock and mammal bone fragments; are either in direct line or are on the peripheral margins of the proposed pipeline route. Each of these sites will require further evaluation to determine significance, if any, the appropriate protective measures, which may simply entail realignment of the pipeline route to avoid them. Prehistoric isolate #HI-89-016, a modified cobble, will collected and no further protective measures for this site will be necessary.

FINDING

It is the finding of the Hanford Cultural Resources Laboratory staff that there are no historic properties in the parcel of land designated for the ERTF/LERF adjacent the 200 East Area. This project is, therefore, cleared of cultural resource concerns. Monitoring of the excavations by an HCRL staff member is not required.

Pipelines associated with this project can be expected to have an effect on as many as five archaeological sites; three are in the path of the East River Disposal Option and two on routes between the 200 areas. Site 45BN307 meets criteria for nomination to the national Register of Historic Places, and procedures for avoiding or mitigating effects to the site will have to be followed if the East River Disposal Option is chosen. The HCRL is currently conducting evaluations of the other four sites.

This letter constitutes cultural resource clearance for the Effluent Retention Treatment Facility (or LERF) *only*. Further evaluation is required for those sites within the pipeline route before your project may proceed in those locations. A copy of this letter has been sent to Kevin Clarke of Site and Laboratory Management Division, DOE-RL.

Please keep us apprised of any new developments of your project that may require additional survey. If you have any questions, you may contact Jim Chatters' office at 376-9469.

Thank you,

P.E. Minthorn

Phillip E. Minthorn
Cultural Resources Project

PEM/cm

1 Attachments

HCRC #93-200-074. Crist, M. E., and M. K. Wright. June 1993. *Cultural Resources Review of the Solid Waste Retrieval Complex, Phase I (W-113) and Enhanced Radioactive and Mixed Waste Storage Facility Project.* Unpublished report prepared for Westinghouse Hanford Company. Copy on file at Pacific Northwest National Laboratory, Richland, Washington.

Battelle
Pacific Northwest Laboratories
Battelle Boulevard
P.O. Box 999
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Telephone (509)
372-1791

June 28, 1993

Cultural Resources Present

Mr. Ben Floyd
Westinghouse Hanford Company
Solid Waste Disposal
P. O. Box 1970/N3-13
Richland, WA 99352

CULTURAL RESOURCES REVIEW OF THE SOLID WASTE RETRIEVAL COMPLEX, PHASE I (W-113) AND ENHANCED RADIOACTIVE AND MIXED WASTE STORAGE FACILITY PROJECT. HCRC #93-200-074.

Dear Ben:

In response to your request received June 25, 1993, staff of the Hanford Cultural Resources Laboratory (HCRL) conducted a cultural resources review of the subject project, located in the 200 Area of the Hanford Site. According to the information that you supplied, the project entails constructing and operating the Phase I Retrieval complex for retrieving transuranic solid waste, which will include several support buildings and facilities. It will also involve the construction and operation of a Phase V Facility for storage of waste containers.

Our literature and records review shows that the project area has been previously surveyed (HCRC #88-200-005). Two isolates and one historic site were located on the survey. The isolates, one .38 caliber cartridge and one broken cryptocrystalline flake, and the site, consisting of one can and blue glass fragments, are not eligible for the National Register of Historic Places (NRHP). However, the historically significant White Bluffs Road will run through the southeast corner of the proposed project area (see attachment). Although the section of road that will pass through the project has been grated and does not appear to be eligible for the NRHP, a report of eligibility needs to be written (currently in progress by our office) and submitted to the State Historic Preservation Officer (SHPO), who then has thirty days to respond to our findings. Until that time, the road needs to be avoided by this and other projects.

It is the finding of the HCRL staff that the White Bluffs Road and a 100 meter buffer zone on both sides of it needs to be avoided by this project if at all possible. If the avoidance is possible, we find that there are no known significant cultural resources in the remaining project area. The workers, however, must be directed to watch for cultural materials (e.g., bones, artifacts) during excavations. If any are encountered, work in the vicinity of the discovery must stop until an HCRL archaeologist has been notified, assessed the significance of the find, and, if necessary, arranged for mitigation of the impacts to the find. If avoidance of the road is possible, please send us a map of the new project boundaries.

If the avoidance is not possible, please let us know immediately so that we can discuss the situation. This is a Class III case, defined as a project that involves new construction in a disturbed, low-sensitivity area, and a Class IV case, new construction in a disturbed, high-sensitivity area.

A copy of this letter has been sent to Charles Pasternak, DOE, Richland Operations Office, as official documentation. If you have any questions, I can be reached at 372-1791. Please use the HCRC# above for any future correspondence concerning this project.

Very truly yours,

M. E. Crist

M. E. Crist
Technician
Cultural Resources Project

Concurrence: G G Longnecker for MK Wright
M. K. Wright, Scientist
Cultural Resources Project

cc: C. R. Pasternak, RL (2)
File/LB

Attachment

HCRC #95-200-104. Cadoret, N. A., and P. R. Nickens. May 1995. *Cultural Resources Review of the Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, Infrastructure Upgrades, and Central Waste Support Complex.* Unpublished report prepared for Westinghouse Hanford Company. Copy on file at Pacific Northwest National Laboratory, Richland, Washington.

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May 15, 1995

No Known Historic Properties

Ms. P. C. Berlin
Westinghouse Hanford Company
P. O. Box 1970/MSIN N3-13
Richland, WA 99352

Dear Ms. Berlin:

CULTURAL RESOURCES REVIEW OF THE SOLID WASTE RETRIEVAL COMPLEX, ENHANCED RADIOACTIVE AND MIXED WASTE STORAGE FACILITY, INFRASTRUCTURE UPGRADES, AND CENTRAL WASTE SUPPORT COMPLEX. HCRC #95-200-104

In response to your request received May 3, 1995, staff of the Hanford Cultural Resources Laboratory (HCRL) conducted a cultural resources review of the subject project, located in the 200 West Area of the Hanford Site. The entire project area has been previously submitted to the HCRL for review (HCRC #88-200-005, #92-200-001, #93-200-074, #94-200-169, #95-200-039), except for the future sewer drainfield located on the west edge of the project area, west of Eugene Ave and north of 22nd St.

Our literature and records review shows that portions of the project area have been disturbed by previous Hanford Site activities. It is very unlikely that any intact archaeological materials exist in such disturbed ground. Most of the project area located in undeveloped ground, except for the future sewer drainfield, has been surveyed previously by HCRL staff (HCRC #88-200-005 and HCRC #88-200-038). A portion of the historic White Bluffs Road is within the proposed complex. This road has been determined to be eligible for listing on the National Register of Historic Places (Register), however, that section of the road located within the fenced 200 West Area has been found to be a non-contributing element. Therefore, this portion of the road is not considered to be a historic property. One site and two isolated artifacts were also found during the surveys. The two artifacts were collected and the site, a historic trash scatter, is not eligible for listing on the Register.

A survey of the proposed future sewer drainfield was completed by HCRL staff on May 9 and 12, 1995. No archaeological sites or isolates were recorded during this survey. The attached map shows the areas that have been surveyed in the project vicinity.

It is the finding of the HCRL staff that there are no known historic properties within the proposed project area. The workers, however, must be directed to watch for cultural materials (e.g., bones, artifacts) during all work activities. If any are encountered, work in the vicinity of the discovery must stop until an HCRL archaeologist has been notified, assessed the significance of the find, and, if necessary, arranged for mitigation of the impacts to the find. The HCRL must be notified if any changes to project location or scope are anticipated. This is a Class III and V case, defined as a project which involves new construction in a disturbed, low-sensitivity area and in an undisturbed area.

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Copies of this letter have been sent to Dee Lloyd, DOE, Richland Operations Office, as official documentation. A survey report, which will also be transmitted to Dee Lloyd, will follow this letter shortly to complete the cultural resources documentation. If you have any questions, please call me on 376-8107. Please use the HCRC number above for future correspondence concerning this project.

Very truly yours,

N. A. Cadoret
Technical Specialist
Cultural Resources Project

Concurrence:

P. R. Nickens, Project Manager
Cultural Resources Project

Attachment

cc: D. Lloyd, RL (2)
T. Clark
[redacted]e/LB

Neitzel, D. A. 2002b. Personal communication with Debbie Hickey (Richland School District), Connie Bailey (Pasco School District), and Maggie Mahan (Kennewick School District).

Rhoads, Kathleen

From: Neitzel, Duane A
Sent: Wednesday, March 20, 2002 2:29 PM
To: Duncan, Joanne P;;Rhoads, Kathleen
Subject: Homeshcooling Numbers

I called the school districts in the Tri Cities to get estimates of the number home schooled kids. I made these calls to respond to the request that we add this information to Section 4 of the Solid Waste EIS.

I received the following information:

Richland 205 students via phone call on Tuesday, March 20, 2002 from Debbie Hickey, Richland School District, 942-2051
Pasco 113 students via phone call on Monday, March 19, 202 from Connie Bailey, Pasco School District, 509/543-6722
Kennewick 226 students via phone call on Monday, March 19, 2002 from Maggie Mahan, Kennewick School District, 509/585-3060

All three women said that this information is not posted or reported elsewhere for further citation of the source.

Duane A. Neitzel
Battelle Northwest
P.O. Box 999 (K6-85)
Richland, Washington 99352
voice 509/376-0602
fax 509/376-2400
email duane.neitzel@pnl.gov <mailto:duane.neitzel@pnl.gov>
for more information about Battelle <http://www.battelle.org/>
PNNL <http://www.pnl.gov/> Ecology http://www.pnl.gov/ecology/

Lohn, R.D. January 9, 2004. Letter to S. Wisness, DOE, "Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation Management Act Essential Fish Habitat Consultation for Ongoing Hanford Site Cleanup and Characterization Activities, Columbia River, Richland, Benton County, Washington (DOE No. 03-CLO-0159) (WRIA 31)." NMFS Tracking No. 2003/01490, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Department of Commerce, Seattle, WA.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

NMFS Tracking No.:
2003/01490

January 9, 2003

Date believed to be in error — should be January 9, 2004

Steve Wisness, Director
Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation Management Act Essential Fish Habitat Consultation for Ongoing Hanford Site Cleanup and Characterization Activities, Columbia River, Richland, Benton County, Washington (DOE No. 03-CLO-0159) (WRIA 31).

Dear Mr. Wisness:

This correspondence responds to your request for consultation under the Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1536. In addition, this letter serves to meet requirements for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), 16 U.S.C. 1855.

Endangered Species Act

NOAA's National Marine Fisheries Service (NOAA Fisheries) has reviewed the Biological Evaluation (BE) for the above referenced project and request for concurrence with the effect determination of "may affect but is not likely to adversely affect" Upper Columbia River (UCR) steelhead (*Oncorhynchus mykiss*).

Ongoing project work entails biological sampling (collection of bivalves, periphyton, and possibly sculpin), water and sediment sampling, and installing monitoring equipment such as piezometers, water sampling tubes, and other sampling devices.

While conducting field surveys during February of 2003, steelhead redds were identified in the 300 Area of the Hanford Reach. This area was previously considered as unsuitable, or undesirable steelhead spawning habitat because of low current velocity and average substrate size that is larger than is considered optimal for steelhead spawning. However, the redds were located within a relatively small area that has higher current velocity and smaller-sized gravel in the substrate. It is not known if fish have used this site in the past or whether they are likely to return to this area in the future.

RECEIVED
JAN 16 2004
DOE-RL/RLCC

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There is a known ground water seep that contains elevated concentrations of contaminants (uranium, selenium, and chromium) in the vicinity of the 300 Area. All of the seeps in the vicinity of the 300 Area have been extensively monitored over the last several years in support of the 300 Area near-shore environmental characterizations. Seeps, surface water, and clam samples obtained within 10 meters of the steelhead redds were found to be well below the ambient water quality criteria (EPA 2002) or reported eco-toxicological benchmarks (Sutter and Tsao 1996).

The contaminant plume at this location is considered to be part of the baseline environmental conditions. The plume is the result of past waste management activities, such as disposal of liquid wastes in storage ponds or directly into the soil column, that occurred from the mid 1940's through the early 1990's. There is no longer any disposal of untreated liquid wastes to the soil column at the Hanford Site, and cleanup operations are removing the source of the contaminant plumes.

Future potential threats to steelhead redds at this site could be caused by physical disturbance from site cleanup and water and soil monitoring activities that occur in the area associated with biological, hydrological, chemical, radiological, and physical characterization efforts that are expected to continue for the next several years.

The Pacific Northwest National Laboratory (PNNL) has identified the following conservation measures that will be implemented to mitigate and minimize impacts of 300 Area cleanup actions to UCR steelhead:

1. The redd site will be visually inspected on a regular basis through each spawning season to determine if the site is being used for steelhead spawning.

2. If any sign of spawning activity is observed, all sampling and monitoring activities within 10 meters of the site will cease until the end of the spawning season.

3. If there is any question about the use of the site by steelhead, PNNL will assume species presence and institute administrative controls and access restrictions, or will contact NOAA Fisheries Washington State Habitat Branch Office, prior to proceeding with characterization and monitoring efforts.

4. Installation of sampling equipment will be conducted at time periods outside the steelhead spawning season (February through May).

5. These procedures also will be followed at each of the other Hanford Reach cleanup sites, should steelhead spawning activities be observed or detected in those areas.

NOAA Fisheries concurs that the proposed action is not likely to adversely affect UCR steelhead. Our concurrence is based on information and conservation measures described in the BE and other supporting documents. This concludes informal consultation on this action in accordance with 50 CFR 402.14(b)(1). The Department of Energy (DOE) must re-analyze this ESA consultation if: (1) new information reveals that the action agency may affect listed species in such a way not previously considered; (2) the action is modified in a manner that causes an affect to the listed species that was not previously considered; or (3) a new species is listed, or critical habitat is designated, that may be affected by the proposed action.

Magnuson-Stevens Fishery Conservation Management Act

Federal agencies are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NOAA Fisheries regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The MSA section 3 defines EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NOAA Fisheries is required to provide the Federal action agency with EFH conservation recommendations (MSA section 305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal action agency and descriptions of EFH for Pacific salmon contained in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (August 1999) developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce (September 27, 2000).

The proposed action and action area are described in the BE. The action area includes habitat which has been designated as EFH for various life stages of chinook (*Oncorhynchus tshawytscha*) and coho (*O. kitsutch*) salmon.

EFH Conservation Recommendations: Because the habitat requirements (*i.e.*, EFH) for MSA-managed species in the action area are similar to that of the ESA-listed species, and because the conservation measures the DOE included as part of the proposed actions to address the ESA concerns are also adequate to avoid, minimize, or otherwise offset potential adverse effects to designated EFH, conservation recommendations pursuant to (MSA section 305(b)(4)(A)) are not necessary. Since NOAA Fisheries is not providing conservation recommendations at this time, no 30-day response from DOE is required (MSA section 305(b)(4)(B)).

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations, the DOE will need to reinitiate consultation in accordance with the implementing regulations for EFH at 50 CFR 600.920(1).

NOAA Fisheries appreciates your efforts to comply with requirements under the ESA and MSA. If you have questions, please contact Dennis Carlson (dennis.j.carlson@noaa.gov) at the Washington State Habitat Branch Office, (360) 753-5828.

Sincerely,

D. Robert Lohn
Regional Administrator

References

Sutter, G.W. and C.L. Tsao. 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-96/R2.

Sackschewsky, M. R., T. M. Poston, J. L. Downs, and B. L. Tiller. 2003. Information on Steelhead Redds Found Adjacent to the 300 Area. Unpublished Report. Pacific Northwest National Laboratory, Richland, Washington.

INFORMATION ON STEELHEAD REDDS FOUND ADJACENT TO 300 AREA

M. R. Sackschewsky, T. M. Poston, J. L. Downs, B. L. Tiller

15 August 2003

On February 24, 2003, PNNL biologists working under the Public Safety and Resource Protection Program (PSRPP) identified two areas in the Columbia River along the 300 Area shoreline that appeared to be spawning sites (redds) recently built by one of two possible salmonid species (coho or steelhead). The Washington Department of Fish and Wildlife (WDFW) was contacted about these observations and Mr. Paul Hoffarth (WDFW) subsequently inspected the sites and agreed that the redds in question were recently developed and were likely steelhead (*Onchorhynchus mykiss*). At WDFW's request and under their jurisdiction, PNNL staff collected two eggs from the site on March 20, 2003. The State fish geneticist (Sewell Young) identified DNA from these eggs as steelhead in May, 2003. We have yet to receive a copy of his report.

BACKGROUND

The Hanford Reach falls within the southern-most range of the upper-Columbia River Basin steelhead "ESU" (Ecologically Significant Unit) and steelhead within this ESU are listed as federally-endangered, with the NOAA Fisheries (formerly the National Marine Fisheries Service [NMFS]) as the jurisdictional agency. State and federal agency representatives have speculated that steelhead spawn throughout the Hanford Reach; however, there have been relatively few documented sightings of steelhead redds, with the exception of a few in the vicinity of the Ringold hatchery return (spring creek) during 2002 and 2001. Earlier surveys (1999 – 2000) indicated potential spawning areas near 100-F slough, however a rapid increase in the water level after the aerial surveys made it difficult to verify the potential spawning areas as steelhead redds. Surveys conducted over 30 years ago during exceptionally low water levels identified active redds that were thought to be steelhead near Vernita bar, Coyote Rapids, Locke Island, 100-F islands, and Ringold (DOE/RL 2000). In general, aerial surveys for steelhead redds have been ineffective due to high, turbid spring flows that obscure visibility.

Steelhead are thought to spawn within the Hanford reach starting in early to mid February and continuing through late May or early June; water levels normally increase to the point that visibility through the water column is obscured by mid to late March. Over the past five years, juvenile-emergent steelhead have been captured by both the WDFW and Columbia River Tribal Fish Commission (CRTFC) field crews while surveying for and collecting juvenile salmonids throughout the Hanford Reach. Although juvenile fish may move some distance from where the redd was located, the juvenile steelhead that were captured were relatively small, and likely of local origin.

Therefore, although ample circumstantial evidence of steelhead spawning within the Hanford Reach has accumulated, these observations appear to be the first fully verified steelhead redds other than those located near the Ringold hatchery. The redds at Ringold are located within the primary flow channel of the hatchery return, in a habitat that is not typical of the rest of the Hanford Reach, and the spawning adults were suspected to be returning hatchery fish.

REDD LOCATIONS AND POTENTIAL EXPOSURE

The location of the newly found redds (Figure 1) is of additional interest for two reasons. First, they were located in a portion of the Hanford Reach previously considered as unsuitable, or undesirable steelhead spawning habitat. In general, the area adjacent to the 300 Area is characterized by lower current velocity and larger average substrate size than is considered optimal for steelhead spawning areas (DOE/RL 2000). However, the redds were located within a relatively small area that has higher current velocity and smaller-sized gravel in the substrate. Therefore, the steelhead were able to locate and use suitable micro-habitats within an otherwise unsuitable region. We do not know if fish have used this site in the past or whether they are likely to return to this area in the future.

The second issue with the location of these redds is their proximity to a known ground water seep that has elevated concentrations of several contaminants (uranium, selenium, and chromium) of which uranium is of most potential concern. All of the seeps in the vicinity of the 300 Area have been extensively monitored over the last several years in support of the 300 Area near-shore environmental characterization. Recent results of this characterization are summarized in Patton et al. (2003). The steelhead redds were found near one of the three primary 300-Area seep sites (Location #9; Patton et al. 2003). Previous sampling of that seep found elevated levels of uranium in clams, crayfish, the seep water, and surface water collected from shallow (0.25m) sample locations, as well as in the sediments. Some uranium concentrations at this site were found to be several times greater than the EPA drinking water standard of 30 μg/L (EPA 2002). EPA has not established a ambient water quality criterion for uranium. Uranium concentrations reported in the riverbank spring water at location # 9 were approximately 143 μg/L, and the values collected at a depth of 0.25 m were approximately 85 μg/L. Sediment U concentrations ranged from 3.8 to 11.5 μg/g. These concentrations decreased quickly and significantly in both bivalves and water with increasing depth and distance from the shore; and at 1.5-meter water depths, the water and clam concentrations were similar to the results reported for an upstream reference site. The redds were located at depths of between 0.5 and 1.5 meters and were between 5 and 10 meters from the shoreline during low-flow periods (approximately 45,000 CFS).

Based on the available sampling data and the fact that measurements for all contaminant concentrations decreased with depth and distance from shore, the potential exposure levels experienced by the eggs and juveniles within the redds were probably low. However, a realistic estimate of the true ecological risk to these redds would require a significant amount of

additional work because accurate estimates of the uranium concentrations in the cobble or water within the redds are not available, and little is known about the toxicological effects of uranium on embryonic and juvenile steelhead.

Few criteria are available to evaluate the potential toxicological or ecological impacts to juvenile fish or eggs exposed to elevated uranium concentrations in surface water. For many contaminants, EPA has published acute and chronic ambient water quality criteria (NAWQC). The NAWQC are based on at least 5 acute tests and 3 chronic tests for several species of aquatic invertebrates and fish. There is little aquatic toxicity data for uranium and NAWQC have not been established. In their place, other benchmarks have been established from the limited testing results that are available. These are categorized as screening benchmarks for potential toxic effects. Suter and Tsao (1996) list several toxicological screening benchmarks for uranium and freshwater fish (see attachment on toxicological benchmarks). For example, they list a Lowest Chronic Value (CV) of 142 μg/L, based on fathead minnow exposure and response. The CV is defined as the lowest reported chronic exposure level from a single test that caused an effect. This value was calculated based on a single value of an acute test using the formula: $\log CV = 0.73 \log LC_{50} - 0.70$ where the LC_{50} refers to the lethal concentration for 50% of the population. These benchmarks are best compared to the concentration of uranium in Columbia River water that is usually about 0.5 μg/L [Poston et al. 2002]. Although the elevated uranium concentrations reported in water samples collected from the riverbank spring near the location of the redds are greater than some of the published values that are used to screen uranium as a potential contaminant of concern, the comparison with the benchmark values *should not* be construed as evidence of harm or as an estimate or assessment of ecological risk.

In addition to elevated uranium, elevated concentrations (compared to background samples collected at Vernita) of selenium and chromium were found in seeps, surface water, and clam samples obtained within 10 meters of the steelhead redds. However, the concentrations of these analytes in the seeps and surface water collected at location # 9 were well below the ambient water quality criteria (EPA 2002) or reported eco-toxicological benchmarks (Suter and Tsao 1996).

In summary, the primary impact to the steelhead redds found near the 300 Area is not likely to result from chemical, radiological, or toxicological effects. However, the physical disturbance from activities that occur in the area associated with biological, hydrological, chemical, radiological, and physical characterization efforts (i.e., PSRPP and related activities) may need to be restricted either temporally or spatially to avoid negative impacts during the spawning period.

ISSUES: DISCUSSION AND PLANNED ACTIONS

The presence of these steelhead redds in the Hanford Reach and their location near a seep with elevated contaminants gives rise to several issues that can be addressed through ongoing projects under the PSRPP or through integrated efforts of ongoing programs supporting clean up activities at Hanford.

There are four main issues related to the documented presence of this endangered species near the industrial facilities of the Hanford Site.

1. **Appropriate notifications should be made and consultations pursued, if needed, with federal and state agencies responsible for management of the species.**

PNNL has notified both the WDFW and NOAA Fisheries regarding discovery of the redds and will continue to pursue discussion and correspondence with the agencies regarding steelhead spawning in the Reach with respect to DOE activities. This notification may result in reopening the Section 7 consultation that resulted in the salmon and steelhead management plan. The discussions should provide guidance as to any appropriate changes in management and monitoring of the species, and in how the species should be considered in planning and evaluation of cleanup scenarios, especially in the 300 Area.

All interested parties currently work under the assumption that steelhead spawning occurs in the Reach and general management concerns are addressed in the existing management plan (DOE 2000); substantial changes to species management are not expected for DOE.

PNNL will work with NOAA Fisheries to determine whether administrative controls (such as site protection and work restrictions around the redds) are needed to restrict access to spawning areas during critical time periods. This effort will be developed under current PSRPP projects and will be prioritized as needed within the current scope of the program.

Current Status of NOAA Fisheries Consultations:

Mr. Dennis Carlson of NOAA Fisheries was contacted on July 17, 2003 concerning the 300 area steelhead redds. The overall situation was explained, and a simple plan of action was agreed upon. It was agreed that the actions that require consultation are the continued sampling and monitoring in the area, not the exposure to the uranium plume.

PNNL will prepare a letter that will constitute a Biological Evaluation (he said it does not need to be a formal Biological Assessment) of the proposed activities. This will include a summary of the background information, details about the redds, descriptions of proposed sampling and monitoring activities in the vicinity of the redds, the mitigation measures that we propose (i.e., avoidance at critical periods), and our overall assessment of impacts to the steelhead. Ideally, he will then provide us with a concurrence letter that would close out the consultation.

PNNL will include a discussion of the uranium plume as part of the background information, such as where it came from, how long it has been there (these will establish that the plume is part of the baseline condition - i.e., it pre-exists at least the 1997 listing of the steelhead, and possibly the 1972 passage of the ESA). We will also include the recently measured concentrations, discuss the dilution factors at the site, and we can provide whatever rudimentary toxicological information that is available. Again, he definitely understood that the consultation issue is the continued physical activities near the redds and that in the long term, DOE is working toward reduction and elimination of the contaminant threats.

2. **The distribution and abundance of steelhead spawning in the Hanford Reach are not well known or mapped.**

Survey and characterization information is needed to determine whether redds are established in proximity to Hanford industrial areas, groundwater seeps on the Hanford shoreline or in areas scheduled for characterization as part of Hanford clean up activities. We do not know if steelhead are likely to reuse this site near the 300 Area in the future, or the importance of this spawning site to the overall population of steelhead in the Hanford Reach. Aerial surveys should be conducted in late February or early March, before the start of the spring freshet, when water levels are relatively low and visibility is good. Boat surveys should be scheduled to occur in conjunction with, or immediately following the aerial surveys so that confirmation can be obtained before the river rises. Previous aerial surveys were performed during April or May when visibility is greatly obscured. Early season aerial surveys might miss some of the later, and possibly peak-season, spawning, but would provide an indication of the number and distribution of spawning sites. The Ecological Monitoring and Compliance Project (EMC) will prioritize this survey and inventory within the planned project dollars and scope for FY 2004. Survey data and locations of any spawning sites would be maintained in the EMC geographic data base for the Hanford Site. Information on the presence or absence of federally listed species is required for reaching a record of decision under CERCLA cleanup activities.

3. **Little information is available to characterize potential contaminant exposures or potential effects on juvenile or adult steelhead.**

The current Salmon and Steelhead Management Plan does not address potential contaminant exposures or potential effects on juvenile or adult steelhead. The only discussion is in regard to ground water treatment activities that could alter the properties of the groundwater entering the river. Consultation with NOAA Fisheries indicates that exposure to elevated uranium for the spawning site near the 300 Area is not an immediate or priority concern at this time.

Response to this issue depends partially on whether additional survey data provide continued or new evidence of spawning sites in the Hanford Reach. PNNL will evaluate avenues to acquire additional data to help assess the potential uranium exposure level within and adjacent to known redd locations. Characterization and monitoring work accomplished under the PSRPP Surface Environmental Surveillance Project (SESP) and EMC will continue at the 300 Area and will increase over the next several years in the 100 Areas. Increased survey and monitoring for steelhead redds in areas where contaminated groundwater plumes intersect the river may be initiated under EMC. This monitoring should, at a minimum, entail an increased effort in the near shore areas of the 100 Areas and 300 Area where characterization work is being conducted. Increased survey efforts for steelhead will be considered during the annual internal design review for sampling under the PSRPP.

Characterization of steelhead spawning distribution and abundance will also be identified by the PSRPP as a data need to the Ground Water Protection Program through the Characterization of Systems efforts. EMC will prioritize this survey and inventory within the planned project dollars and scope for FY 2004. Increased monitoring may be done in conjunction with other

characterization efforts already planned at each of the areas, but specific surveys for spawning sites should be planned early for each of the 100 Areas to minimize potential impacts of survey activities on juvenile steelhead. PNNL will confer with NOAA Fisheries to determine if the use of an existing Section 10 (scientific collection) permit is appropriate, or negotiate a new Section 10 permit before monitoring if any disruptive sampling (such as egg collection) is anticipated.

The SESP has plans to continue sampling and measurement of water and sediment concentrations and biota tissue residues adjacent to the 300 Area spawning site. These efforts may include collecting sediment / pore water samples at various substrate depths from the redd locations. This sampling would need to be performed off season (i.e., between July and September and may require consultation with NOAA Fisheries. Currently, several water sampling instruments are set a various depths into the substrate and are located within a meter of one of the steelhead redds. Work involving measurements of water concentrations of uranium in the benthic community is currently underway as part of SESP/EMC integration effort. It may be possible to use water sample results obtained from these sites to estimate actual ambient exposure levels in the redds. PSRPP will assure that the field activities conducted in support of EMC, SESP, and GPP are integrated and coordinated.

Ongoing work under the PSRPP should provide additional data to help clarify the potential exposure of redds in the Reach. However, some data collection activities included in the characterization, such as sediment sampling, have the potential to adversely affect near-shore steelhead redds via direct physical disruption or through siltation or other disturbances. These physical impacts are probably a greater potential threat to the redds than any potential eco-toxicological impacts. Mitigation of these physical impacts is likely to be the primary concern of NOAA Fisheries.

Information developed through GPP groundwater monitoring and characterization of system work and under GPP science and technology tasks may provide data and predictive tools that could be used to provide additional information and insights in assessing potential contaminant exposure of steelhead redds in the Hanford Reach. Planned local-scale groundwater transport model development and application in FY 04 and 05 within the 300 area will evaluate specific relevant technical issues that include:

- Arrival of contaminants at the groundwater/river interface
- Mixing of groundwater and surface water in vicinity of the river interface
- The effect of seasonal fluctuations in river stage and bank storage on contaminant transport and potential exposure

We anticipate that the broader comprehensive site evaluations using the System Assessment Capability modeling efforts will describe relative ecological risk for juvenile salmonids at a coarse scale for the river system; however, this would not provide detailed information on exposure and risk for specific spawning sites.

4. **Relatively little information exists to document the toxicological effects of uranium on embryonic or juvenile salmonids.**

At the reported concentrations for the seep sampled at seep location 9, the uranium might present a toxicological hazard, but is well below the levels that could be considered to be a radiological hazard. Existing Hanford projects are scheduled to provide additional data concerning the toxicological effects of uranium on eggs of young juvenile fish. Plans have been submitted to address uranium toxicity in juvenile rainbow trout during FY05 under the Groundwater Protection Program (GPP). Current plans are to initiate periphyton tests with uranium in 2004, followed by tests using rainbow trout in 2005. The order of investigation might be changed if deemed necessary by DOE and NOAA Fisheries. Current estimate to perform the rainbow trout toxicological work (including both feeding and immersion studies) under the GPP is approximately $300 K.

The laboratory-based studies mentioned above will provide information for deducing toxicological properties of uranium in juvenile steelhead. Determining ecological impacts to individuals and populations of the species would likely require additional field work to assess the uptake in natural settings. A study similar to that recently performed to examine chromium uptake by juvenile fall Chinook salmon in the 100 Areas could be appropriate depending on locations of spawning sites and the data gathered through increased monitoring and characterization of both contaminants and steelhead spawning in the Reach. Such a study will be considered in the annual PSRPP design review process.

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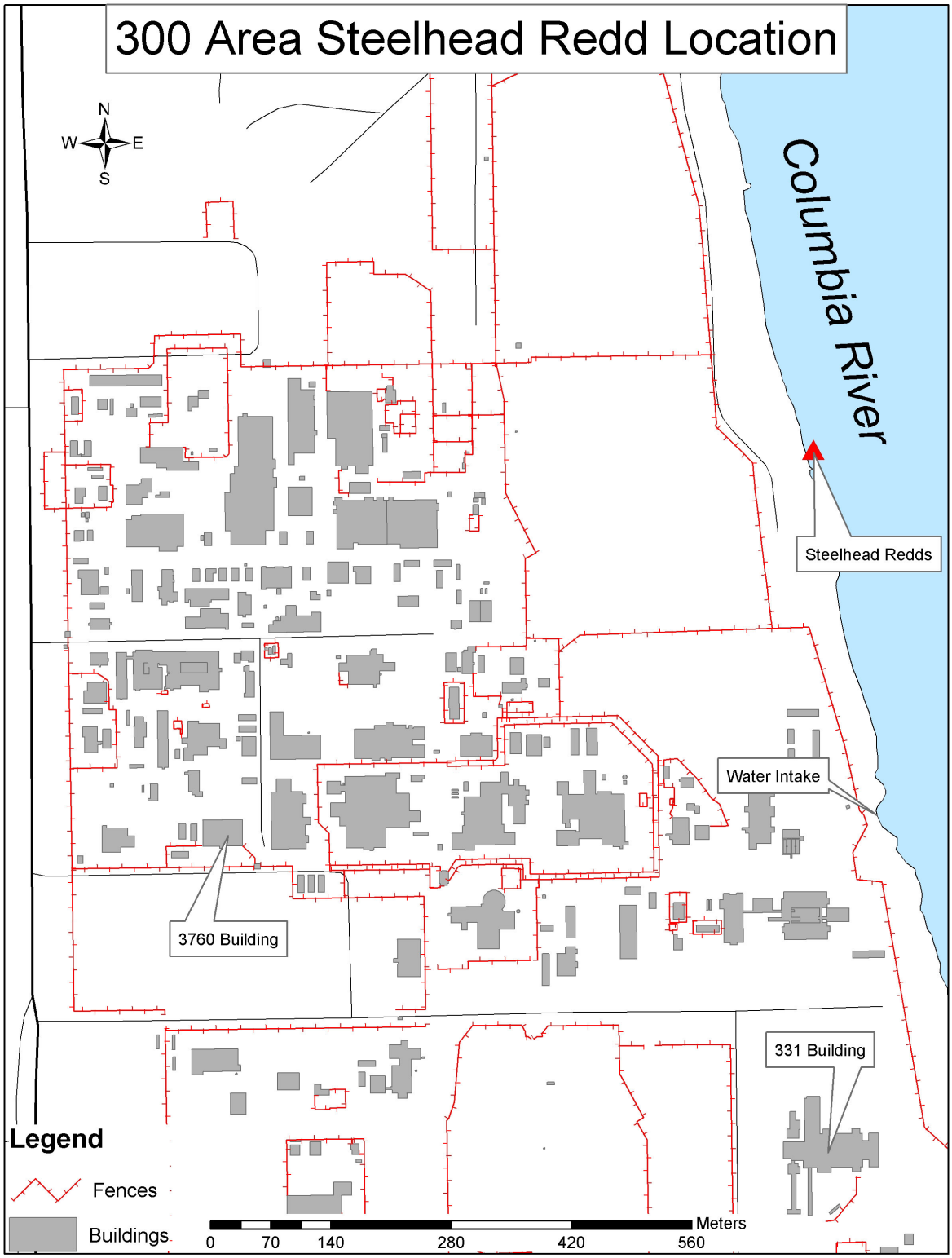

Figure O.1. Location of the Steelhead Redds near the 300 Area

Attachment 1. Published Toxicological Benchmarks for Uranium Exposures of Fish

For many contaminants, EPA has published acute and chronic ambient water quality criteria (NAWQC). The NAWQC are based on at least 5 acute tests and 3 chronic tests for several species of aquatic invertebrates and fish. There is little aquatic toxicity data for uranium and NAWQC have not been established. In their place, other benchmarks have been established from the limited number of testing results that are available. These are categorized as screening benchmarks for potential toxic effects. Suter and Tsao (1996) list several toxicological screening benchmarks for uranium and freshwater fish. These benchmarks can be compared to the concentration of uranium in Columbia River water that is usually about 0.5 μg/L [Poston et al. 2002]:

- Lowest Chronic Value (CV) - 142 μg/L, based on fathead minnow, this is defined as the lowest reported chronic exposure level from a single test. It was based on a single value of an acute test and was calculated based on the formula:
  $\log CV = 0.73 \log LC_{50} - 0.70$

- Lowest EC_{20} (Effective Concentration) – 455 μg/L, based on fathead minnow, this is the lowest calculated acute EC_{20} taken from the fathead minnow test. In absolute terms, exposure of fathead minnow to this concentration would result in a loss of mobility in the exposed population

- Population EC_{20} - 27μg/L, based on a calculated result from the single fathead minnow test. It represents a concentration that would hypothetically produce a 20% reduction (mobility) in fish populations from long term exposure.

- Secondary Acute Value (SAV) – 46 μg/L, based on two brook trout acute tests where the LC_{50} was 11,250 μg U/L. The SAV was extrapolated from this data for the level not expected to have an adverse effect following an acute (short term or 96 hour) exposure.

- Secondary Chronic Value – 2.6 μg/L, based on two brook trout acute tests where the LC_{50} was 11,250 μg U/L. This chronic benchmark was further extrapolated from the acute tests and has a high degree of uncertainty.

The secondary acute and secondary chronic values are based on a single study performed with brook trout and accordingly have a great deal of uncertainty associated with the predicted benchmarks. The other set of values were based on acute studies using fathead minnows. There applicability to exposure of steelhead embryos is open to debate, however, the benchmarks based on brook trout, as a member of the family Salmonidae, is more representative of the steelhead exposure scenario, than the data for fathead minnow.

The uncertainty associated with the toxicity benchmarks is very high for several reasons. The toxicity tests were based on exposure to juvenile fish, where as the susceptibility of steelhead eggs and alevins (sac fry) to uranium exposure is unknown. Uranium has complex

chemistry in freshwater that may influence its propensity for accumulation and toxicity in fish. Differences in water quality (e.g., carbonate concentration, pH etc.) may profoundly affect the response of aquatic organisms living in water containing elevated concentrations of uranium.

The secondary toxicity benchmarks are calculated when there is insufficient data to generate National Ambient Water Quality Criterion. They represent concentrations of uranium in water that are not expected to have an adverse impact on the species in question. A review of the toxicity data in Suter and Tsao (1996) has revealed inconsistencies and contradictions in the analysis and reporting of uranium benchmarks. These benchmarks are under further review. As an inherently conservative process, there is a reasonable possibility that higher concentrations of U may not have an adverse effect on steelhead.

Tiller, B. L. 2000. Personal communication regarding wildlife on the Fitzner/Eberhardt Arid Lands Ecology Reserve.

April 2000

I spoke with Brett L. Tiller, a scientist for Pacific Northwest National Laboratory. He informed me that he has observed sage grouse in 1999 and 2000 on the Fitzner/Eberhardt Arid Lands Ecology Reserve.

Joanne Duncan
Science/Engineering Associate
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Date: April 17, 2001

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From: Hazel Batchelor, Director of Agency Relations

NUMBER OF PAGES (INCLUDING THIS ONE): 1

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- Number of United Way Participating Agencies: 21
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