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HANFORD NATURAL RESOURCE TRUSTEE COUNCIL
FINDING 01-02

This finding is to approve the February 5, 2001 letter from the Hanford Natural Resource Trustee Council (Council) and to authorize the Chairs Signature requesting funding for analysis of fall chinook blood and tissue samples.

In summation this finding conveys :

- The Council, with technical assistance from the Fish and Wildlife Service (Service) developed study proposals that identified three rounds of fish health studies to evaluate the effects of hexavalent chromium on fall chinook salmon that spawn in the Hanford Reach of the Columbia River.

- The Service subcontracted with the U. S. Geological Survey, Biological Resources Division (BRD) to conduct Phase 1 studies which are complete. These studies used experimental water containing hexavalent chromium simulated to match Columbia River surface and pore water associated with spawning redds. Study methodology called for brood stock from the McNenny National Fish Hatchery located in South Dakota.

- In the BRD studies, fish health was significantly impaired in the highest test concentrations and changes were noted in DNA, histology, lipid peroxidation and necropsies.

- Phase 2 studies were initiated to evaluate site-specific effects upon fall chinook salmon exposed to hexavalent-chromium contaminated ground water to early-life stage, fish health, and behavior avoidance. Of these studies, the early-life stage has been initiated by Pacific Northwest National Laboratory (PNNL). Study methodology study called for the use of Hanford Reach fall chinook salmon eggs from the Priest Rapids Hatchery, Columbia River water, and chromium contaminated ground water from the site. This early life stage study remains incomplete.

- Blood and tissue samples collected in the study are stored in a PNNL freezer or in fixative and are available for analysis for DNA strand breakage and histology. The analysis of these samples may help confirm whether hexavalent chromium is potentially impairing the early life stage of fall chinook salmon.

The Council by this finding requests that the U.S. Department of Energy allocate funds to finish analyzing the samples that were collected for histology and DNA strand breakage. The analysis should be conducted by BRD to insure consistency of methods with previous results. The estimated cost of this analysis is $45,000.

Draft sent to Trustees 2/5/01.

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The Council also requests funding be provided to complete the remainder of the Phase 2 studies which include the fish health for fry, sub adult and behavioral avoidance for wild chinook salmon utilizing site water.

The Council also finds that the Phase 3 studies should be completed , specifically; wild fry exposure, fish health utilizing resident benthic fish and behavioral avoidance utilizing wild fish. In addition other species should be evaluated for potential impacts from chromium such as resident species, white sturgeon (*Acipenser transmontanus)* and sculpin (*Cottus* sp.) as well as impacts to Upper Columbia River Steelhead (*Oncorhynchus mykiss)* due to its federal status as an endangered species.

CERTIFICATION

Finding 01-02 was adopted by consensus of the Hanford Natural Resource Trustee Council on February __, 2001, with ____ abstentions and ____ separate opinions (attached).

Draft 4.

HANFORD NATURAL RESOURCE TRUSTEE COUNCIL

SIGNATURE PAGE

Finding 01-02: Approval of February _, 2001 letter, "Request for allocation of funds to complete Chromium Toxicity Studies"

_____ Support

_____ Object

_____ Abstain

_____ Support with separate opinion (below).

Signature: _____

Name: _____

Trustee Organization: _____

Date: _____

Draft 4.

February 5, 2001
January, 2?, 2001
Mr. Keith Klein
U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, WA 99352

Mr. Douglas Sherwood
U.S. Environmental Protection Agency
712 Swift Blvd., Suite 5
Richland, WA. 99252

Mr. Tom Fitzsimmons
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-1091.

Dear Messrsr. Klein, Sherwood and Fitzsimmons

Subject: Request for allocation of funds to complete Chromium Toxicity Studies

The U.S. Department of Energy (USDOE) along with 6 other trustees, via a Memorandum of Agreement (MOA), established the Hanford Natural Resource Trustee Council (Council), for restoration of natural resources pursuant to section 107 (f)(2)(b) or Section 126(d) of CERCLA. To facilitate the scope of the MOA, the USDOE on behalf of the Council entered a Interagency Agreement (IA) with the U.S. Fish and Wildlife Service (Service) to develop a Hanford Site 100 Area Assessment Plan (Plan). Volume 1 of the Plan (focused upon Columbia River Aquatic Resources) is designed to be in general accordance with 43 CFR Part 11 - Natural Resource Damage Assessment. The Plan represents a joint effort between the natural resource trustees to address potential injuries associated with the release of hazardous substances and was approved through Council Resolution 99-01. A major component of Volume I of the Plan is fish toxicity studies to determine the degree of fish health impairment of chinook salmon exposed to hexavalent chromium. The fall chinook salmon (*Oncorhynchus tshawytscha*) is a natural resource of extreme interest and importance to all the trustees and the studies were initiated with the objective of minimizing impacts from releases of hexavalent chromium to aquatic organisms . A portion of the fish health studies has been completed, but additional funds are needed to complete the remaining work.

In early 1998, a Council work group with technical assistance from the Service developed an study proposal that identified three rounds of phases or studies. The work group and Service technical staff developed a proposal to evaluate the effects of hexavalent

chromium on fall chinook salmon that spawn in the Hanford Reach of the Columbia River. The Service subsequently subcontracted with the U. S. Geological Survey, Biological Resources Division (BRD) to conduct the Phase 1 studies. Phase 1 (i.e. chromium toxicity lab studies) work has been completed. These studies used experimental water containing hexavalent chromium simulated to match Columbia River surface and pore water associated with spawning redds. Study methodology called for brood stock from the McNenny National Fish Hatchery located in South Dakota. Phase 1 noted that chromium concentrated in the kidneys. Phase 1 results indicated that neither growth nor survival of parr was affected as a result of exposure for 105 days across all test concentrations. Fish health was significantly impaired in the highest test concentrations and changes were noted in DNA, histology, lipid peroxidation and necropsies. The significance of these changes is that they may be associated with impaired growth and reduced survival at the population level. This information is important for comparisons in future Phases 2 and 3.

In the fall of 1999, Phase 2 work began, and the scope of this phase evaluated site-specific effects of fall chinook salmon that might be exposed to hexavalent-chromium contaminated ground water sources. The scope of Phase 2 was to evaluate chromium effects to early-life stage, fish health, and behavior avoidance of fall chinook. Of these studies, only the early-life stage has been initiated and was conducted by Pacific Northwest National Laboratory (PNNL). Study methodology study called for the use Hanford Reach fall chinook salmon eggs from the Priest Rapids Hatchery, Columbia River water, and chromium-contaminated ground water from the site. This early life stage study remains incomplete.

From the preliminary analysis of the data , PNNL reported that survival, development, and growth of early life-stage fall chinook salmon were not affected by extended exposure to hexavalent chromium up to 266μg/L. This lead the scientists to make the following statement "that fall chinook salmon developing in river bottom substrate (i.e redds) would not be affected adversely by chromium concentrations up to 266μg/L". The statement is premature given that blood and tissue samples were collected for analysis and remain to be analyzed for DNA strand breakage and histology. Blood and tissue samples are being stored in a PNNL freezer or in fixative and are available for these analyses. The analysis of these samples may help confirm that hexavalent chromium is potentially impairing the early life stage of fall chinook salmon. We believe that the analysis is warranted based on the test duration which was longer for hatch, swim up and termination than the BRD tests. Whole body concentrations of chromium were also higher in all treatments than in the BRD study. Due to the increase in chromium tissue concentrations for each exposure group in the study which were statistically significant, we request that U.S. Department of Energy allocate funds to finish analyzing the samples that were collected for histology and DNA strand breakage. The analysis should be conducted by BRD to insure consistency of methods with previous results. The estimated cost of this analysis is $45,000.

The Council also requests that funding be provided to complete the remainder of the Phase 2 studies which include the fish health for fry, sub adult and behavioral avoidance for wild chinook salmon utilizing site water. All of the Phase 3 studies should also be completed , specifically; wild fry exposure, fish health utilizing resident benthic fish and behavioral avoidance utilizing wild fish. In addition, we believe that other species should

be evaluated for potential impacts from chromium such as resident species, white sturgeon (*Acipenser transmontanus)* and sculpin (*Cottus* sp.) as well as impacts to Upper Columbia River Steelhead (*Oncorhynchus mykiss)* due to its federal status as an endangered species. The sculpin work was identified in Phase 3 of the overall proposal along with in-situ fall chinook salmon studies. Development of study proposals and cost estimates to complete this work needs to be determined by the Council in concert with the Service, BRD and DOE scientists.

Thank you for taking the time to consider this request from the Trustees. With the establishment of the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge, determination of injuries to fall chinook salmon and Steelhead is critical for trust resources and future cleanup of hazardous waste. If you would like to discuss the concerns of the HNRTC please call me at (503) 231 6223.

Sincerely,

Thomas F O'Brien, Chair
Hanford Natural Resource Trustee Council

cc: Hanford Natural Resource Trustees Council (HNRTC)
Todd Martin, Chair of the Hanford Advisory Board
Project Leader, Hanford National Monument/Saddle Mountain NWR
100 Area Administrative Record
HNRTC Administrative Record

bcc: Field Supervisor, FWS, Spokane WA
Don Voros, Refuge Supervisor, OR/WA/ID
Aida Farag, USGS, BRD., Jackson WY
Aaron Delonay, USGS.,BRD., Columbia MO

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No Information Noted
in the File on 6/21/05
DCW

See yellow note in File: Finding 02-02