

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352

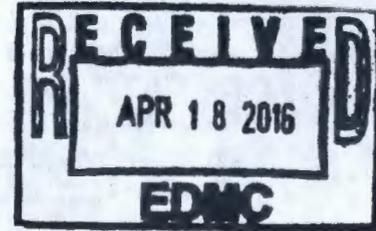
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June 16, 2015

MSA-1502630

Randy M. Hermann
CH2M HILL Plateau Remediation Company
P.O. Box 1600
Richland, WA 99352



Dear Mr. Hermann:

ECOLOGICAL AND CULTURAL CLEARANCE FOR COLUMBIA RIVER ACCESS AND SUBMERSIBLE PUMPS IN THE COLUMBIA RIVER FOR THE 300 AREA SEQUESTRATION REMEDIAL ACTIVITIES, HANFORD SITE, BENTON COUNTY, WASHINGTON (HCRC# 2014-300-004, ECR-2015-303)

References: MSA Service Catalog Request#KSR000000162082, R. M. Hermann, CHPRC, dated December 22, 2014.

MSA-1403636, *Ecological and Cultural Clearance for Sequestration Remedial Activities in the 300 Area of the Hanford Site (HCRC# 2014-300-004, ECR-2014-302)*, letter from A. L. Johnson, MSA, to R. M. Hermann, CHPRC, dated August 26, 2014.

15-SSD-0024, *Request for Consultation for the Installation and Operation of a Uranium Sequestration Groundwater Treatment System near the Columbia River Shoreline in the 300 Area of the Hanford Site, Benton County Washington*, letter from K. L. Flynn, U. S. Department of Energy, Richland Operations Office, to J. L. Gonzalez, U. S. Fish and Wildlife Service, dated April 2, 2015.

USFWS Reference: 01EWF00-2015-0567, (no title) Response to request for initiation informal consultation on the 300 Area Uranium Sequestration Groundwater Treatment Project, letter from E. V. Rickerson, U. S. Department of the Interior, Fish and Wildlife Service, Washington Fish and Wildlife Office, to K. L. Flynn, U. S. Department of Energy, Richland Operations Office, dated May 5, 2015.

15-SSD-0025, *Request for Consultation for the Installation and Operation of a Uranium Sequestration Groundwater Treatment System near the Columbia River Shoreline in the 300 Area of the Hanford Site, Benton County Washington*, letter from K. L. Flynn, U. S. Department of Energy, Richland Operations Office, to M. Tehan, NOAA Fisheries West Coast

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Region, dated April 2, 2015.

WCR-2015-2480, Re: *Endangered Species Act Section 7(a)(2) Concurrence Letter for Installation and Operation of a Uranium Sequestration Groundwater Treatment System near the Shoreline of the Columbia River at the 300 Area of the Hanford Site, Benton County, Washington (HUC170200160602) City of Richland-Columbia River*, letter from W. W. Stelle, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, to K. L. Flynn, U. S. Department of Energy, Richland Operations Office, dated June 9, 2015.

This clearance letter supplements clearance letter MSA-1403636, referenced above and attached, which expressly did not provide clearance for the installation of pumps in the Columbia River or any pumping of water from the river. Additionally, the referenced clearance letter did not provide clearance for any chemical injections into the subsurface via infiltration line, injection wells, or any other subsurface distribution systems. As described further in the Project Description below, this clearance letter does cover these activities.

PROJECT DESCRIPTION

The uranium sequestration project is one of the groundwater-related remedies that will be designed, installed, and operated to meet the remedial action objectives identified in *Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1, Hanford Site 300 Area*. The remedial design approach for the 300 Area Operable Unit groundwater is described in the *Integrated Remedial Design Report/Remedial Action Work Plan Addendum for the 300 Area Groundwater*.

Phosphate will be applied using a combination of surface infiltration into the vadose zone and injection into the periodically rewetted zone. Injection into the periodically rewetted zone will deliver treatment directly to that zone as well as to the underlying upper portion of the aquifer. During implementation, tests will be conducted on vadose core samples to refine the groundwater model, and groundwater monitoring will be conducted to assess changes in uranium concentrations and the lateral spread of phosphate.

Phosphate Infiltration into Vadose Zone

Phosphate infiltration into the vadose zone will be accomplished using buried irrigation drip line or perforated piping. A preliminary application rate of 1 cm/hr (0.39 in/hr) is proposed. With this application rate, the target infiltration rate will be approximately 1,683 liters/min per ha (180 gallons/minute per ac).

The infiltration network will be installed approximately 1.8 m (6 ft) below the ground surface to prevent accumulation and wicking of sodium and phosphate up into the superficial soil. The infiltration network will be installed using horizontal directional drilling methods (or equivalent) or trenching. Liquid distribution lines will consist of high density polyethylene irrigation drip line or perforated pipe spaced approximately 1.8 to 3 m (6 to 10 ft) apart.

Phosphate infiltration will be conducted continuously (24 hour per day operation) over the 0.3 ha (0.75 ac) Stage A treatment area (Figure 3) for approximately 5 days. The advancement of the infiltration wetting front will be monitored real-time using electrical resistivity tomography. Infiltration rates will be adjusted as needed to maximize the contact time of phosphate solution in the vadose zone during the 5 day infiltration period, while minimizing the potential for flushing phosphate solution too quickly through the vadose zone and periodically rewetted zone, potentially mobilizing uranium to groundwater.

It is assumed that the phosphate infiltration operation described above for Stage A will be repeated during Stage B for the remaining 3 quadrants of the enhanced attenuation area.

Phosphate Injection into Periodically Rewetted Zone and Top of Aquifer

Injection wells will be used for injecting phosphate into the periodically rewetted zone. In addition, these wells will be used to inject phosphate at the top of the aquifer to reduce the mobility of uranium that may be released to the aquifer during vadose zone treatment.

In total, 36 injection wells, screened across the periodically wetted zone and the top of the aquifer, will be installed across the 1-ha (3-ac) remediation area. Each injection well will be constructed with a filter pack seal, at the interface of the bottom of the periodically rewetted zone and the top of the aquifer, to allow isolated injection into either the periodically rewetted zone or the top of the aquifer. The number and placement of the wells were selected with a goal of optimizing the distribution of injected phosphate across the enhanced attenuation area. During each phosphate injection, it is assumed that an injection radius of influence of approximately 8 m (25 ft) will be achieved in each well, and the natural diurnal movement of groundwater (approximately 15 m/day [50 ft/day]) will distribute injected phosphate across the enhanced attenuation area.

The planned injection volume per well is 167,895 liters (44,360 gal) into both the periodically rewetted zone and the top of the aquifer for a total 335,815 liters (88,715 gal) total into each injection well. An injection rate of approximately 189 liters/min (50 gal/min) is anticipated. Phosphate injections will be timed when groundwater conditions are favorable (e.g., during lower river stages). The timing of application in the periodically rewetted zone will be scheduled to maximize phosphate contact with contaminated sediments (e.g., when this zone is unsaturated).

Injection wells will be installed using appropriate drilling methods. All wells will be drilled with a 25 cm (10 in) diameter temporary casing to allow construction of a 15 cm (6 in) diameter injection well. Well development will be conducted following installation in order to settle the filter pack and remove fines from the borehole wall and filter pack.

Phosphate injections into the 9 Stage A aquifer injection well screens will be conducted intermittently over approximately 7 days. In order to establish a layer of phosphate in the groundwater below the infiltration area to remediate uranium that may be flushed to groundwater during infiltration operations, injections will be initiated the day before the start of phosphate infiltration, resume during infiltration, and conclude the day after completion of phosphate

infiltration. Injections will be conducted into at least 6 wells at a time during daytime hours, while varying the location of the 6 wells being injected during the 7 day period to maximize the distribution of phosphate in the groundwater below the infiltration area.

Phosphate injections into the 9 Stage A periodically rewetted zone screens will be conducted over approximately 3 days after the completion of infiltration, when moisture content in the periodically rewetted zone will be maximized from infiltration activities. Injecting into the periodically rewetted zone when moisture content is highest will maximize the injection radius of influence during low river stage. Injections will be conducted into at least 6 wells at a time during daytime hours.

A staged approach will be used for implementation of uranium sequestration. Stage A will consist of performing infiltration / injection in one quadrant (approximately 0.3 ha [.75 ac]). Stage A results will be used to refine the Stage B approach for the remaining three quadrants (0.9 ha [2.25 ac]).

Preparation of Phosphate Solution

Phosphate chemicals will be delivered by tanker truck to the site in concentrated and pH-buffered liquid form. The concentrated solutions will either be temporarily stored in holding tanks, or fed directly from the tanker trucks to the remediation skids during the infiltration and injection operations.

Two remediation skids will be used at the 300 Area for blending phosphate concentrate solutions with feed water. Both remediation skids will be utilized during Stage A: one for mixing and pumping phosphate solution for infiltration and the other for mixing and pumping phosphate solution for injection. These skids were originally designed and constructed as part of the apatite permeable reactive barrier remedy for the 100-NR-2 Groundwater Operable Unit.

Each remediation skid is capable of pumping phosphate concentrate solutions from tanker trucks or stationary tanks and metering these solutions into feed water that has been piped to the skid from the river. Following mixing, a transfer hose distributes the dilute phosphate solution to a manifold for distribution through the infiltration network or multiple injection wells. The remediation skids are capable of delivering phosphate solution at a flow rate of 1,136 liters/min (300 gal/min).

Water pumped from the Columbia River is required to mix chemicals on a mobile chemical mixing skid prior to their addition to the groundwater. Water will be withdrawn pursuant to RL's Federal reserved water rights to use water from the Columbia River.

Water Withdrawals

Water will be obtained using two separate submersible pumps (Grundfos No. 385S200-3A), each of which are capable of supplying up to 1,136 liters/min (300 gal/min) to ground-based, mobile chemical mixing skids. Feed water from river is transferred from the pumps to the remediation skids via aboveground 4-inch hoses. The river water will be filtered prior to blending with the phosphate concentrate solutions.

The two pumps will be set in the river, at least several hundred feet apart, using a boat-mounted hoist in at least 2.4 m (8 ft) of water and approximately 30 to 45 m (100 to 150 ft) from shore. Each pump will be tethered upstream with a nominally 100 ft anchor line and have an approximately 50 ft metal winch line attached to a 50 foot sinking rope line as a leader. When the pumps are removed from the river, a grapple will be used to retrieve this line and the pump will be winched into the boat.

At the maximum pumping rate of the two submersible pumps, a total of 1.3 cubic feet per second of river water will be withdrawn, compared to the annual average flow rate of 125,000 cubic feet per second of the Columbia River along the Hanford Reach. The shoreline along the 300 Area is relatively straight and river bottom substrate consists of gravel/cobbles. Water velocity is relatively fast, and is likely between 3 and 6 feet per second under most conditions.

ECOLOGICAL RESOURCES (ECR-2015-303)

Mission Support Alliance (MSA) Environmental Compliance staff performed a pedestrian survey of the water withdrawal area on May 5, 2015. (See attachment 2 clearance letter MSA-1403636 for a description of the survey done for the remainder of the project area.). Vegetation present at the area along the Columbia River where water withdrawal will occur includes gray rabbitbrush (*Ericameria nauseosa*), green rabbitbrush (*Chrysothamnus viscidiflorus*), golden currant (*Ribes aureum*), cheat grass (*Bromus tectorum*), needle-and-thread grass (*Hesperostipa comata*), sand dropseed (*Sporobolus cryptandrus*), Sandberg's bluegrass (*Poa secunda*), bulbous blue grass (*Poa bulbosa*), Munro's globe mallow (*Sphaeralcea munroana*), slender hawkbeard (*Crepis atrobarba*), fiddleneck (*Amsinckia lycopoides*), Jim Hill's tumbled mustard (*Sisymbrium altissimum*), yarrow (*Achillea millefolium*), Russian thistle (*Salsola tragus*), diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvense*), cleavers (*Galium aparine*), Wood's rose (*Rosa woodsii*), prickly lettuce (*Lactuca serriola*), common dogbane (*Apocyanum cannabinum*), bittersweet nightshade (*Solanum dulcamara*), and common sowthistle (*Sonchus oleraceus*). Bird species observed or heard during the site visit included Black-tailed Magpie (*Pica hudsonia*), Mourning Dove (*Zenaida macroura*), Belted Kingfisher (*Megaceryle alcyon*), and Forster's Tern (*Sterna forsteri*).

Because the water withdrawal from the Columbia River and the infiltration/injection of phosphate solution during the uranium sequestration process has the potential to affect three fish species listed under the Endangered Species Act (ESA) and/or their critical habitat, informal consultation with the responsible parties was initiated as required under ESA Section 7.

- Informal consultation for Upper Columbia River steelhead (*Oncorhynchus mykiss*), which is listed as threatened, and Upper Columbia River spring Chinook salmon, (*Oncorhynchus tshawytscha*), which is listed as endangered, was initiated with the National Marine Fisheries Service (NMFS), an agency within the National Oceanic and Atmospheric Administration (NOAA). The Department of Energy, Richland Operations Office (DOE-RL) requested concurrence with their determination that the proposed

uranium sequestration groundwater treatment project is not likely to adversely affect listed salmon or steelhead or their critical habitat (DOE-RL letter #15-SSD-0025, referenced above). NMFS concurred with this finding (NOAA letter #WCR-2015-2480, referenced above).

- Similarly, informal consultation for bull trout (*Salvelinus confluentus*), which is listed as threatened, was initiated with the U. S. Fish and Wildlife Service (USFWS). The Department of Energy, Richland Operations Office (DOE-RL) requested concurrence with their determination that the proposed uranium sequestration groundwater treatment project is not likely to adversely affect listed bull trout or its critical habitat (DOE-RL letter #15-SSD-0024, referenced above). USFWS concurred with this finding (USFWS letter #01EWF00-2015-0567, referenced above).

NMFS and USFWS concurrence with the finding that the project is “not likely to adversely affect” the listed species or their critical habitat was based on the proposed project plans and a *Biological Assessment for the Installation and Operation of a Uranium Sequestration Groundwater Treatment System Near the Columbia River in the 300 Area of the Hanford Site, Benton County, Washington*, which was included in the DOE-RL requests for consultation referenced above. **The key parameters that formed the basis for the biological assessment and informal consultation are highlighted below. If any of these parameters are changed by the project, the author of this review must be contacted immediately to determine if the consultation process needs to be reopened.**

- **Water Pumps.** Water will be obtained using two separate submersible pumps with NMPFS-approved screens (see Biological Assessment for description and assessment of proposed screens). The two pumps will be set in the river, at least several hundred feet apart, using a boat-mounted hoist in water at least 8 feet deep and approximately 100 to 150 feet from shoreline. The pumps will be lowered to the bottom slowly to protect the equipment and minimize disturbance to the river bottom. Each pump will cover an area of river bottom approximately 24 square feet in size. At maximum pumping rate, a total of 1.3 cfs of water will be removed from the river. The pumps may remain in place for 60 to 90 days before being removed.
- **Project Timing.** For Phase A, pump placement will occur as early as late August for use in September / October. Phase B will be initiated no earlier than mid-July and extend no longer than late October.
- **Phosphate Solution Infiltration/Injection Area.** The target area for application of phosphate solutions is the 3-acre upland area about 790 feet from the river referred to as the “enhanced attenuation area”.

With the exception of the three species discussed above, no other plant or animal species protected under the Endangered Species Act, candidates for such protection, or species listed by

the Washington State government as threatened or endangered were observed in the vicinity of the proposed project site.

There is always the potential for birds to nest within the project area on the ground, on buildings, or equipment. The nesting season in our area is typically from mid-March to mid-July. The active nests (containing eggs or young) of migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918. The MBTA makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. **Personnel working on this project must be instructed to watch for nesting birds.** If any nesting birds (if not a nest, a pair of birds of the same species or a single bird that will not leave the area when disturbed) are encountered or suspected, or bird defensive behaviors (flying at workers, refusal to leave area, strident vocalizations) are observed within the project area, contact the author of this section to evaluate the situation.

A nesting bird survey is required if the project is to begin ground clearing activities during the nesting season. Please contact the author of this section to schedule a nesting bird survey of the project area at least one week prior to work initiation.

No adverse impacts are anticipated from the proposed projects if these recommendations are followed. If there are any changes in the scope of these activities that could result in disturbances outside of the description of this review please complete a Service Catalog Request <http://msc.rl.gov/ServiceCatalog/index.cfm> for an additional ecological review and reference the ecological review number above to determine if a follow-up Ecological Resources clearance should be conducted.

This review is valid for two years from the letter date listed above.

Technical questions should be directed to J. A. Pottmeyer at 376-0521.

CULTURAL RESOURCES (HCRC# 2014-300-004)

A Cultural Resources Review of the proposed project was conducted by K. M. Mendez and J. J. Sharpe of the MSA Cultural and Historic Resources Program. An Area of Potential Effect (APE) notification was sent to the Washington State Historic Preservation Office (SHPO) and regional tribes on May 14, 2014. A cultural resources survey was conducted on May 27, 2014. The survey did not result in the identification of any previously unrecorded cultural material. Additionally a pipe route for the placement of an above ground water line in support of future river pump use was selected to avoid known resources. A Cultural Resources Review (CRR), with a finding of "No Adverse Effect" was prepared and submitted to the State Historic Preservation Office (SHPO) and Area Tribes for a 30 day comment period on June 12, 2014. No response from the SHPO was received. The U.S. Department of Energy Richland Operations Office (DOE/RL)

provided a notice of compliance with Section 106 of the National historic Preservation Act for this project on August 22, 2014.

The objectives of the CRR conducted for this project were to identify, locate, and protect historic properties that may be present within the project APE. Additionally the CRR addressed the requirements of the National Historic Preservation Act (NHPA) Section 106 process, specifically 36 CFR 800.3 through 800.5, to determine if there is a potential for project-related activities to cause direct or indirect effects to National Register of Historic Places (NRHP) eligible historic properties.

Through background research, tribal consultation, and archaeological fieldwork, it has been established that the eastern portion of the APE is located in a highly culturally sensitive area and overlaps with the recorded boundaries of one archaeological site. Because of the cultural sensitivity of the area and the potential for adverse effects, work control measures have been developed to ensure that no cultural materials or features are damaged or displaced during project activities.

To avoid causing impacts to archaeological and cultural resources, the following work controls must be followed.

- **All staff associated with this project will receive Cultural Resources Awareness training prior to performing work.**
- **All project activities that take place east of the shoreline road will be monitored by a qualified archaeologist who will direct foot traffic and the placement of project equipment and components away from artifacts and features.**
- **Archaeologists will perform periodic inspections of the hose during the operational life of the equipment as needed to monitor progress and continued protection of archaeological sites.**
- **The SHPO and consulting parties will be given a seven day advanced notification prior to monitoring activities. Tribal representatives will be invited to participate and observe project activities that will require monitoring. Contact the author of this section at least 7 days prior to initiating any project activity that requires monitoring by an archeologist.**

No impacts to cultural resources are anticipated if these stipulations are followed. If there are changes in the scope of activities that could result in disturbances outside of the description of this project or outside the boundary of the Area of Potential Effect (APE) boundary identified on the attached map, contact K. M. Mendez at 376-1013 and submit a new Request for Cultural Resources Review through the MSA Service Catalog for a follow-up Cultural Resources Review and referencing the HCRC number listed above to determine if a follow-up Cultural Resources review should be conducted.

Although no impacts to cultural resources are anticipated, all workers must be directed to watch for cultural materials (e.g., bones, stone tools, mussel shell, cans, bottles) during all work

activities. If any cultural materials are encountered, work in the vicinity of the discovery must stop until a Cultural Resources Specialist has been notified, the significance of the find assessed, appropriate Tribes notified, and if necessary, arrangements made for mitigation of the find. In the event of any discoveries, please contact K. M. Mendez at office phone 376-1013 or cell phone 737-7669.

Guidelines for the Discovery of Cultural Materials during Project Actions

Information on recognizing cultural resources, as well as the steps to be taken in the event of a cultural resource discovery, is provided in the following sections.

Recognizing Cultural Resources

A cultural resource is an item of historical, traditional, or cultural importance. The item could be prehistoric or historic. Some examples include:

- An accumulation of mussel shell (i.e., a shell midden) alone or in association with bone, stone artifacts, burned rocks, or charcoal;
- Bones that appear to be human or animal bones associated with a shell-midden, a cooking feature, or with other artifacts;
- An area of charcoal or very dark stained soil with or without associated artifacts;
- Artifacts made of chipped or ground stone (e.g., an arrowhead) or an accumulation (more than one) of stone flakes (i.e., lithic debitage),
- Clusters of tin cans or bottles, or agricultural equipment that appears to be older than 50 years.

Reporting Steps and Responsibilities

The sequence of actions to be performed in the event cultural materials are encountered during project activities is provided below.

STEP 1: STOP WORK IMMEDIATELY. If any employee, contractor, or subcontractor believes that he or she has uncovered any cultural resource during project-related activities, all work adjacent to the discovery must stop. The discovery location should not be left unsecured at any time.

STEP 2: NOTIFY ARCHAEOLOGICAL MONITOR OR MSA CULTURAL AND HISTORIC RESOURCES PROGRAM. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions. If an archaeological monitor is not available, contact K. M. Mendez at 376-1013 office or 737-7669 cell.

STEP 3: MSA CULTURAL AND HISTORIC RESOURCES PROGRAM STAFF WILL CONTACT THE DOE-RL CULTURAL RESOURCES PROGRAM MANAGER.
The MSA Cultural and Historic Resources Program staff will contact M. K. Wright, RL Archaeologist at 376-4069 Office or 521-0628 to inform them of the discovery.

R. M. Hermann
June 16, 2015
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HCRC# 2014-300-004
ECR-2015-303

This Cultural Resources Review was written by K. M. Mendez, who meets the Secretary of the Interior's Standards for Professional Archaeologists.

Technical questions should be directed to K. M. Mendez at 376-1013.

Sincerely,



April L. Johnson, Manager
Ecological Monitoring and Compliance

jap:kmm

Attachment(s) 2

Cc: ^MSA Correspondence Distribution
^MSA Cultural Resources Program Admin Record
R. E. Day, CHPRC
A. P. Fergusson, MSA
A. L. Johnson, MSA
K. M. Mendez, MSA
J. A. Pottmeyer, MSA
J. W. Wilde, MSA

MSA-1502630

ATTACHMENT 1

June 16, 2015

**PROJECT LOCATION FOR COLUMBIA RIVER ACCESS AND SUBMERSIBLE PUMPS FOR 300 AREA
SEQUESTRATION REMEDIAL ACTIVITIES, HANFORD SITE, BENTON COUNTY, WASHINGTON
(HCRC#2014-300-004, ECR-2015-303)**

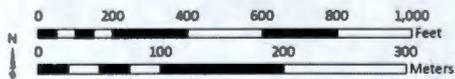
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Legend

 Area of Potential Effect (APE)

Richland and Wooded Island, WA 7.5' USGS Quad
 Township 10 N Range 28 E
 Section 2



NOTES: Aerial Image, 2012, Hanford/Benton County.

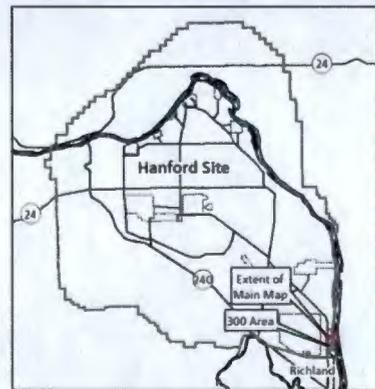


Figure 1. ECR-2015-303;
 HCRC#2014-300-004 | Sequestration
 Remedial Activities in the 300 Area
 Hanford Site, Benton County, WA

MSA-1502630

ATTACHMENT 2

June 16, 2015

**MSA-1403636 ECOLOGICAL AND CULTURAL CLEARANCE FOR [UPLAND PORTION] OF THE
SEQUESTRATION REMEDIAL ACTIVITIES IN THE 300 AREA OF THE HANFORD SITE
(HCRC# 2014-300-004, ECR-2014-302)**

**Consisting of 9 pages,
Including this cover page**

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352



MSA-1403636

August 26, 2014

Randy M. Hermann
CH2M HILL Plateau Remediation Company
P.O. Box 1600
Richland, WA 99352

Dear Mr. Hermann:

ECOLOGICAL AND CULTURAL CLEARANCE FOR SEQUESTRATION REMEDIAL ACTIVITIES IN THE 300 AREA OF THE HANFORD SITE (HCRC# 2014-300-004, ECR-2014-302)

Reference: MSA Service Catalog Request#KSR000000127226, R. M. Hermann, CHPRC, dated April 17, 2014.

PROJECT DESCRIPTION

The Hanford Site 300 Area Record of Decision (ROD) for 300-FF-2 and 300-FF-5 and Record of Decision Amendment for 300-FF-1 were signed by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy, Richland Operations Office (DOE-RL) on November 25, 2013. The selected remedies for the vadose zone and groundwater included enhanced attenuation using uranium sequestration, monitored natural attenuation, and institutional controls to address the organic, inorganic, and radionuclide contaminants of concern. Remedial actions for this area will minimize the release or threat of release of hazardous substances that pose a risk to human health and the environment.

To meet the objective established in the 300 Area RODs/ROD Amendments, the project as planned will install a minimum of 12 boreholes (about 10 centimeters (4 inches) in diameter), at least 36 injection wells up to 25 centimeters (10 inches) in diameter, a minimum of 48 small piezometers (about 2 to 5 centimeters (1 to 2 inches) in diameter), and several monitoring wells up to 25 centimeters (10 inches) in diameter. To support these activities, infrastructure consisting of well pads and access roads, subsurface infiltration lines (i.e., perforated lines or drip lines), surface water transport lines, above ground product storage tanks, equipment staging/laydown areas, as well as treatment and testing equipment will be necessary within the area identified on the attached figure.

Well pads will be approximately 30 by 30 meters (100 by 100 feet) and bladed up to 15 centimeters (6 inches) below grade. Access roads will be about 7 meters (20 feet) in width and bladed as necessary. Existing access roads will be used when available. Gravel will be used to create a desirable base for both the well pads and access roads. Staging areas and laydown areas also will be bladed to a depth of up to 15 centimeters (6 inches) below grade and graveled.

Mechanical trenching will be needed to install the subsurface infiltration lines. It is estimated that the trenching will be about 3 meters (10 feet) below grade.

For the purpose of the project activities approved in this resource review, the water source will be a line that will extend west from the primary project area to an existing fire hydrant near Route 4S. This pipe will be placed on the surface of the ground. Road crossings for the fresh water pipeline will be encased in metal pipe as needed.

ECOLOGICAL RESOURCES (ECR-2014-302)

Mission Support Alliance (MSA) Environmental Compliance staff performed a pedestrian survey of project area on May 27, 2014. The proposed project area is primarily remediated waste sites that were replanted in the mid and late 2000's by Bechtel Hanford Inc.. Current vegetation is dominated by crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass (*Poa secunda*), and cheatgrass (*Bromus tectorum*). Gray rabbitbrush (*Ericameria nauseosa*) is sparsely scattered throughout the site, blue mountain prairie clover (*Dalea ornata*) is present, and a few young sagebrush (*Artemisia tridentata*) were observed. This area has been revegetated for long term stabilization in an area identified in the *Comprehensive Land Use Plan* (DOE/EIS-0222-F) as industrial use. This designation does trigger the mitigation requirements for disturbance of restored areas as described in the *Hanford Site Biological Resources Management Plan* (DOE/RL-96-32).

Several Washington State Class B noxious weed species were present, including rush skeleton weed (*Chondrilla juncea*), diffuse knapweed (*Centaurea diffusa*), broadleaf pepperweed (*Lepidium latifolium*), and puncture vine (*Tribulus terrestris*). All Project personnel shall take precautions to limit the spread of noxious weeds. Vehicles and equipment travelling over or parking on vegetation should perform checks to prevent the carry of vegetative materials away from the project areas. No nesting birds were observed, although suitable habitat for ground nesting species is present throughout the project site. No sign of other animals was observed.

There is always the potential for birds to nest within the project area on the ground, on buildings, or equipment. The nesting season in our area is typically from mid-March to mid-July. The active nests (containing eggs or young) of migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918. The MBTA makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. **Personnel working on this project must be instructed to watch for nesting birds.** If any nesting birds (if not a nest, a pair of birds of the same species or a single bird that will not leave the area when disturbed) are encountered or suspected, or bird defensive behaviors (flying at workers,

refusal to leave area, strident vocalizations) are observed within the project area, contact the author of this section to evaluate the situation.

A nesting bird survey is required if the project is to begin ground clearing activities during the nesting season. Please contact 376-BIRD to schedule a nesting bird survey of the project area at least one week prior to work initiation.

All land areas disturbed by this project must be replanted using locally derived, native plant species as soon as feasible. The Hanford Site Revegetation Manual ([DOE/RL-2011-116 Rev. 1](#)) provides guidance regarding species mix, planting rates, and methods.

The ecological clearance provided by this letter is for the upland area installation of boreholes, injection wells, infiltration pipe and roads required for the project as identified within the project boundary identified on the attached Figure 1. **This letter does not provide clearance for the installation of pumps into the Columbia River or pumping water from the river. Additionally this letter does not provide clearance for any chemical injections into the subsurface via infiltration lines or other subsurface distribution systems.** These activities will require additional review and outside agency consultation. Please see below for guidance on requesting additional review.

No adverse impacts are anticipated from the proposed projects if these recommendations are followed. If there are any changes in the scope of these activities that could result in disturbances outside of the description of this review or to begin the process for the water and injection work please complete a Service Catalog Request by visiting the service catalog at <http://msc.rl.gov/ServiceCatalog/index.cfm> for an additional ecological review and reference the ecological review number above for a follow-up Ecological Resources clearance.

This review is valid for one year from the letter date listed above.

Technical questions should be directed to J.A. Pottmeyer at 376-0521.

CULTURAL RESOURCES (HCRC#2014-300-004)

A Cultural Resources Review of the proposed project was conducted by K. M. Mendez and J. J. Sharpe of the MSA Cultural and Historic Resources Program. An Area of Potential Effect (APE) notification was sent to the Washington State Historic Preservation Office (SHPO) and regional Tribes on May 14, 2014. A cultural resources survey was conducted on May 27, 2014. The survey did not result in the identification of any previously unrecorded cultural material. Additionally a pipe route for the placement of an above ground water line in support of future river pump use was selected to avoid known resources. A Cultural Resources Review (CRR), with a finding of "No Adverse Effect" was prepared and submitted to the State Historic Preservation Office (SHPO) and Area Tribes for a 30 day comment period on June 12, 2014. No response from the SHPO was received. The U.S. Department of Energy Richland Operations Office (DOE/RL) provided a notice of compliance with Section 106 of the National historic Preservation Act for this project on August 22, 2014

The objectives of the CRR conducted for this project were to identify, locate, and protect historic properties that may be present within the project APE. Additionally the CRR addressed the requirements of the National Historic Preservation Act (NHPA) Section 106 process, specifically 36 CFR 800.3 through 800.5, to determine if there is a potential for project-related activities to cause direct or indirect effects to National Register of Historic Places (NRHP) eligible historic properties.

Through background research, tribal consultation, and archaeological fieldwork, it has been established that the eastern portion of the APE is located in a highly culturally sensitive area and overlaps with the recorded boundaries of one archaeological site. Because of the cultural sensitivity of the area and the potential for adverse effects, work control measures have been developed to ensure that no cultural materials or features are damaged or displaced during project activities.

To avoid causing impacts to archaeological and cultural resources, the following work controls must be followed.

- **All staff associated with this project will receive Cultural Resources Awareness training prior to performing work.**
- **All project activities that take place east of the shoreline road will be monitored by a qualified archaeologist who will direct foot traffic and the placement of project equipment and components away from artifacts and features.**
- **Archaeologists will perform periodic inspections of the hose during the operational life of the equipment as needed to monitor progress and continued protection of archaeological sites.**
- **The SHPO and consulting parties will be given a seven day advanced notification prior to monitoring activities. Tribal representatives will be invited to participate and observe project activities that will require monitoring. Contact the author of this section at least 7 days prior to initiating any project activity that requires monitoring by an archeologist.**

No impacts to cultural resources are anticipated if these stipulations are followed. If there are changes in the scope of activities that could result in disturbances outside of the description of this project or outside the boundary of the Area of Potential Effect (APE) boundary identified on the attached map, contact K. M. Mendez at 376-1013 and submit a new Request for Cultural Resources Review through the MSA Service Catalog for a follow-up Cultural Resources Review and referencing the HCRC number listed above to determine if a follow-up Cultural Resources review should be conducted.

Although no impacts to cultural resources are anticipated, all workers must be directed to watch for cultural materials (e.g., bones, stone tools, mussel shell, cans, bottles) during all work activities. If any cultural materials are encountered, work in the vicinity of the discovery must stop until a Cultural Resources Specialist has been notified, the significance

of the find assessed, appropriate Tribes notified, and if necessary, arrangements made for mitigation of the find. In the event of any discoveries, please contact K. M. Mendez at office phone 376-1013 or cell phone 737-7669.

Guidelines for the Discovery of Cultural Materials during Project Actions

Information on recognizing cultural resources, as well as the steps to be taken in the event of a cultural resource discovery, is provided in the following sections.

Recognizing Cultural Resources

A cultural resource is an item of historical, traditional, or cultural importance. The item could be prehistoric or historic. Some examples include:

- An accumulation of mussel shell (i.e., a shell midden) alone or in association with bone, stone artifacts, burned rocks, or charcoal;
- Bones that appear to be human or animal bones associated with a shell-midden, a cooking feature, or with other artifacts;
- An area of charcoal or very dark stained soil with or without associated artifacts;
- Artifacts made of chipped or ground stone (e.g., an arrowhead) or an accumulation (more than one) of stone flakes (i.e., lithic debitage),
- Clusters of tin cans or bottles, or agricultural equipment that appears to be older than 50 years.

Reporting Steps and Responsibilities

The sequence of actions to be performed in the event cultural materials are encountered during project activities is provided below.

STEP 1: STOP WORK IMMEDIATELY. If any employee, contractor, or subcontractor believes that he or she has uncovered any cultural resource during project-related activities, all work adjacent to the discovery must stop. The discovery location should not be left unsecured at any time.

STEP 2: NOTIFY ARCHAEOLOGICAL MONITOR OR MSA CULTURAL AND HISTORIC RESOURCES PROGRAM. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions. If an archaeological monitor is not available, contact K. M. Mendez at 376-1013 office or 737-7669 cell.

STEP 3: MSA CULTURAL AND HISTORIC RESOURCES PROGRAM STAFF WILL CONTACT THE DOE-RL CULTURAL RESOURCES PROGRAM MANAGER.
The MSA Cultural and Historic Resources Program staff will contact M. K. Wright, RL Archaeologist at 376-4069 Office or 521-0628 to inform them of the discovery.

R. M. Hermann
August 26, 2014
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This Cultural Resources Review was written by K. M. Mendez, who meets the Secretary of the Interior's Standards for Professional Archaeologists.

Technical questions should be directed to K. M. Mendez at 376-1013.

Sincerely,



April L. Johnson, Manager
Ecological Monitoring and Compliance

jww:kmm

Attachment(s) 1

Cc: ^MSA Correspondence Distribution
^MSA Cultural Resources Program Admin Record
A. P. Fergusson, MSA
D. I. Jacques, CHPRC
A. L. Johnson, MSA
K. M. Mendez, MSA
J. A. Pottmeyer, MSA
J. W. Wilde, MSA

MSA-1403636

ATTACHMENT

August 26, 2014

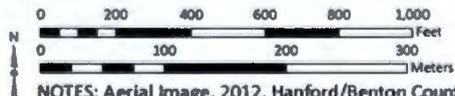
**PROJECT LOCATION FOR THE SEQUESTRATION REMEDIAL ACTIVITIES IN THE
300 AREA OF THE HANFORD SITE (HCRC# 2014-300-004, ECR-2014-302)**

**Consisting of 2 pages,
Including this cover page**



Legend
 Project Area

Richland and Wooded Island, WA 7.5' USGS Quad
 Township 10 N Range 28 E
 Section 2



NOTES: Aerial Image, 2012, Hanford/Benton County.

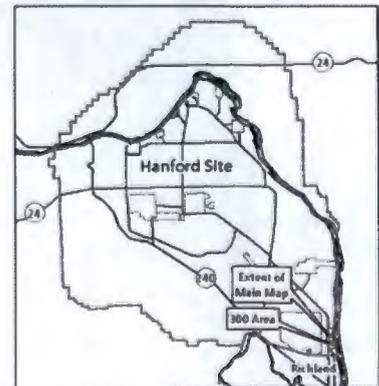


FIGURE 1
 Project Location
 ECR#2014-302 (HCR#2014-300-004) |
 Sequestration Remedial Activities in the 300 Area
 Hanford Site, Benton County, WA