RESPONSE TO COMMENTS

CH2M HILL PLATEAU REMEDIATION COMPANY, LLC (CHPRC)
A CONTRACTOR OF THE DEPARTMENT OF ENERGY
HANFORD NUCLEAR RESERVATION
NPDES Permit #WA-002591-7

On February 6, 2009 the U.S. Environmental Protection Agency (EPA) issued a public notice for the CH2M Hill Plateau Remediation Company (CHPRC), a contractor for the Department of Energy for the Hanford Nuclear Reservation. The public notice was for the draft National Pollutant Discharge Elimination System (NPDES) Permit No. WA-002591-7 for discharges from the 300 Area Treated Effluent Disposal Facility (TEDF) and the Area 100 water treatment plant. This Response to Comments provides a summary of significant comments and provides corresponding EPA responses. Where indicated, EPA has made appropriate changes to the final NPDES Permit.

Allan E. Cawrse, Manager Environmental Manager CHPRC, Ron Skinnarland, Waste Management Section Manager, Nuclear Waste Program, Department of Ecology and Diane Driscoll of the National Marine Fisheries Service, Habitat Conservation Division commented.

1. **Comment:** CHPRC is the holder of the permit as a contractor of the U.S. Department of Energy and the permittee name should be CH2M Hill Plateau Remediation Company (CHPRC), a contractor of the Department of Energy instead of CH2M Hill Plateau Remediation Company (CHPRC), The Department of Energy.

   Response: The permittee name is changed in the final permit.

2. **Comment:** The permit requires written notice of the development of the Quality Assurance Plan to EPA within 90 days from the effective date of the permit. The fact sheet states it is to be developed within 180 days from the effective date of the permit.

   Response: Hanford must follow the submission requirement of the permit and submit the Quality Assurance Plan 90 days from the effective date of the permit.

3. **Comment:** The first sentence of Condition I.B.1. states: "The permittee must limit and monitor discharges from Outfall 001 as specified in Table 1, Table 2 and Table 3 below. This associates Outfall 001 with Tables 1, 2, and 3. Correct sentence "…from Outfall 001, Outfall 004, and Outfall 004B as specified in…below, respectively."

   Response: The sentence is changed to "The permittee must limit and monitor discharges from Outfall 001 as specified in Table 1, Outfall 004 as specified in Table 2 and Outfall 004A as specified in Table 3 below.

4. **Comment:** Use of the word 'figures' is confusing on Page 5, B, second sentence (since many docs include both tables and figures). Change to Read "All monthly averages and daily maximums represent…"

   Response: The language on Page 5, B, clearly refers to Table 1. "The permittee must limit and monitor discharges from Outfall 001 as specified in Table 1, Outfall 004 as specified in Table 2 and Outfall 004A as specified in Table 3 below. All figures represent maximum effluent limits unless otherwise indicated."

5. **Comment:** Missing footnote "3" for column heading "Daily Max µg/l." Add footnote "3" to column heading

   Response: A "3" is added to each parameter listed in Column 1 requiring 24 hour violations reporting.

6. **Comment:** The nitrite limits need to be raised. The existing nitrite limits are based on best professional judgment. The permittee had requested a nitrite maximum limit of 776 µg/l in the existing permit. No data was available on the treatability of nitrite and the 60 µg/l limit was based on the premise that generally nitrite is very susceptible to oxidation. In the ultra-violet light oxidation treatment the hydroxyl radicals are formed when the UV light breaks down the hydrogen peroxide that is added. What does not appear to be understood when the limit was determined was that the UV light also causes the reduction of nitrate present in the water to form nitrite. It is well documented that reduction of nitrate in UV reactors can produce a significant level of nitrite in water. If the equilibrium in this oxidation – reduction reaction shifts to the reduction side then the nitrite produced by this treatment process will produce nitrite in excess of the permit limits. The processes involved in this reaction were not accounted for in setting the current limit and the sensitivity of the reaction has become more evident in recent years as the flow has reduced. The UV oxidation unit parameters are currently being set in an effort to minimize the amount of nitrite added to the wastewater and not driven by treatment of organic constituents as is the intended function of the treatment operation. This means the facility is using significantly more hydrogen peroxide and electrical power than would be necessary for the treatment of the organics in the waste stream. Derivation of limits using EPA Technical Support Document produces limits of a maximum daily limit of 150 µ/l with the commensurate increase in the average monthly limit to at least 87 µg/l is necessary to allow the UV unit operation to be dictated by organic treatment needs. Operating the UV unit to avoid excess nitrite production typically results in a higher hydrogen peroxide concentration than if the UV oxidation treatment parameters were set based on organic constituent treatment. This higher peroxide concentration may negatively impact the results of the WET tests, particularly when it comes to the water fleas. Residual peroxide is the likely cause of the flea mortality in the 100 percent effluent sample for the WET tests performed prior to the application submittal. Current nitrite limits and the added WET test requirements may be incompatible.

Response: The human health standard for nitrate/nitrite in fresh water is 10,000 µg/l from the EPA National Recommended Water Quality Criteria: 2002 (EPA 822-R-02-47). There is no reasonable potential to violate the water quality standard for nitrate/nitrite in the Columbia River. The anti-backsliding provisions are established in the CWA Section 402(o) and 40 CFR 122.44 (l)(1). Anti-backsliding is a prohibition on the renewal, re-issuance, or modification of NPDES permits with effluent limits, permit conditions, or standards less stringent than those established in the previous permit. Exceptions include information which was not available at the time of permits issuance and which would have justified the application of a less stringent effluent limitation. The information supplied by Hanford that UV photolysis and oxidation treatment at Hanford is adjusted to meet the nitrite limits by increasing the hydrogen peroxide strength and that this may contribute to the failure of the toxicity testing is information which was not available at the time of the last permit issuance. EPA's literature search found the oxidation reactions are achieved through the synergistic action of high intensity UV light in combination with hydrogen peroxide treatment to generate highly reactive hydroxyl radicals(OH•) that react with and destroy most organic chemical compounds. If complete mineralization is achieved in the reaction, the final products of the process are carbon dioxide, water and salts. Hanford stated they have had to increase the H_2O_2 and the UV exposure in order to try and reduce the NO_2 below permit levels. All of this is based on full scale testing with the actual wastewater. The testing showed that there needs to be enough H_2O_2 available to generate sufficient hydroxyls to oxidize the NO_3 to NO_2 and there needs to be UV light exposure to catalyze that decomposition. The increase in peroxide concentration causes an increase in peroxide residual following the reaction. By increasing the nitrite limit less peroxide residual is available to cause toxicity discharges to the Columbia River. This new information justifies the application of a less stringent nitrite limit. EPA derived higher limits using EPA's Technical Support Document using Ecology spreadsheet tools. The maximum daily limit is 186 µg/l and the average monthly limit is 91 µg/l. These effluent limitations will not result in a violation of the nitrate/nitrite water quality standards for the Columbia River nor will Hanford have a reasonable potential to violate the standards. EPA's derived effluent limits are also within the range suggested by Hanford to avoid hydrogen peroxide toxicity in discharges to the Columbia River

Monitoring for acute toxicity remains a permit condition including toxicity tests for water fleas. Hanford is still required to submit the Toxicity Identification/Reduction Evaluation (TI/RE) plan to EPA based on WAC 173-205-100(2) for violations of the acute WET limit.

PERFORMANCE-BASED EFFLUENT LIMITS FOR NITRITE (NO_2^-)

USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN =	3.5400
LOGNORMAL TRANSFORMED VARIANCE =	0.5270
NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	4
AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) =	0
E(X) =	44.8579
V(X) =	1396.174
VARn	0.2600
MEANn=	3.6735
VAR(Xn)=	349.043
MAXIMUM DAILY EFFLUENT LIMIT =	186.523
AVERAGE MONTHLY EFFLUENT LIMIT =	91.130

91.13015 75.59096

Nitrite	ln	Nitrite	ln
50.00	3.9120	0.00	0.0000
0.00	0.0000	0.00	0.0000
0.00	0.0000	0.00	0.0000
57.30	4.0483	0.00	0.0000
0.00	0.0000	0.00	0.0000
99.70	4.6022	77.85	4.3548
0.00	0.0000	56.60	4.0360
0.00	0.0000	66.15	4.1919
0.00	0.0000	59.30	4.0826
0.00	0.0000	28.65	3.3552
0.00	0.0000	25.85	3.2523
0.00	0.0000	23.00	3.1355
0.00	0.0000	19.10	2.9497
0.00	0.0000	27.25	3.3051
0.00	0.0000	17.95	2.8876
0.00	0.0000	24.20	3.1864
0.00	0.0000		
0.00	0.0000		
0.00	0.0000		

Mean	3.54
Standard Error	0.14
Median	3.33
Mode	#N/A
Standard Deviation	0.51
Sample Variance	0.26
Kurtosis	-1.66
Skewness	0.27
Range	1.47
Minimum	2.89
Maximum	4.35
Sum	49.59
Count	14.00

7. **Comment:** Based on the previous permit's requirements, the temperature and pH are sampled weekly and monthly, respectively, via grab samples from Outfall 4. The draft permit requires continuous monitoring. If the facility needs to adhere to these more stringent requirements, a transition period is requested as additional equipment will need to be purchased and installed in order to provide continuous pH.

   Response: Hanford does not have a reasonable potential to violate the water quality standards for temperature or pH. Monitoring frequency in the current permit is unclear. Discharges from the water treatment plant are intermittent discharging about 24 times per year. Monitoring Outfall 004 discharges for temperature and pH will remain weekly and monthly respectively.

8. **Comment:** The Whole Effluent Toxicity (WET) Testing Requirements are costly and results could be impacted by current operational adjustments to meet nitrite effluent limits. No basis for adding this test is identified.

   Response: The basis for adding WET testing is identified on pages 16, 17 and 18 of the fact sheet. WAC173-205-050(2) states:

   "Effluent characterization shall be used to establish:

   (a) Whether a reasonable potential under 40 CFR 122.44(d)(v) for acute or chronic toxicity exists which would require a whole effluent toxicity limit.

   (i) If at the end of effluent characterization the median survival in one hundred percent effluent is less than eighty percent, or if any individual test result shows less than sixty five percent survival in one hundred percent effluent, then a reasonable potential for acute conditions in the receiving water has been demonstrated, and the whole effluent acute toxicity limit described in WAC 173-205-070 shall be applied to the discharge."

   The effluent characterization at Hanford resulted in zero percent survival in 100 percent effluent for both the September, 2003 and February, 2004 acute WET tests. Since this is

less than the sixty five percent survival criteria Hanford has a reasonable potential to violate the acute toxicity standard for the State of Washington and monitoring is required. See also Response to Comment 6.

9. **Comment**: TEDF is scheduled for permanent shutdown in 6 months. It would not be effective use of resources to prepare the BMP plan within the 180 day period required in the permit. Any delay to the shutdown schedule could impact that deadline. Add 2 months to the compliance period.

   Response: Condition III.E. of the current permit requires Hanford at all times to properly operate and maintain all facilities and systems of treatment and control. The draft condition allows "Any existing BMP plans may be modified for compliance with this section." Since existing BMPs are implemented by Hanford and the existing plan may be used in developing the new BMP plan 180 days is reasonable. Further Hanford will not commit to a permit condition prohibiting discharges from TEDF in six months. The 180 day period to prepare a best management plan is reasonable and will remain.

10. **Comment:** Attachment K of the permit application requested approval of additional analytical methods to meet the monitoring requirements for Outfall 001. No response to this request has been received to date. Please provide response.

    Response: On September 17, 2008 EPA received this communication titled Flour Hanford Inc.'s Response to John Drabek's Comments.

    > Comment from John Drabek "The e-mail also states your on-site laboratories are accredited by Ecology. You may use your on-site laboratories if they are accredited for the pollutants analyzed. The methods must be in 40CFR Part 136 or equivalent. You agreed to contact EPA's Manchester laboratory to discuss the equivalence of your laboratory methods.
    >
    > Response: This issue is under discussion with the Manchester Laboratory."

    In response to the permit comment EPA's Manchester laboratory contacted Hanford regarding their interest in using methods other than those listed in CFR part 136 for NPDES compliance monitoring. Manchester stated:

    The regulations for analyzing compliance samples for the wastewater program are quite prescriptive. Manchester tried to describe Hanford's options, in order of simplicity, below:

    1. You may wish to review your "in-house" methods, and determine whether you are already in compliance with the Part 136 methods as written, or if small modifications would bring you into compliance.

    2. I have provided a link to a website, which describes some method deviations which are considered equivalent. Look for details under "Method Flexibility".

Equivalent changes include automated versions of manual methods, different calibration ranges, and using different equipment manufacturers, for example. They do not include any changes to the underlying chemistry of the technique, or different digestion reagents or chemicals, to name a few forbidden changes. To ascertain whether a change qualifies under the method flexibility clause can be challenging to interpret.

3. If the options above do not apply, then you will need to perform a study and submit an application for an Alternate Test Procedure (ATP). There is a link to the application form below. You would be applying for a Tier 1, Limited Use (LU) ATP. Your application would need to list the permit numbers for which the ATP would be used, and the demonstration of comparability should include representative matrices for those permits. Ginna Grepo-Grove is the EPA Region 10 ATP coordinator--you may submit your applications to her.

11. Comment: The fact sheet states "Hazardous and radioactive wastes are prohibited from discharge to the Hanford sewer system." Change to "from acceptance at 300 Area TEDF" or "…discharge to 300 Area process sewer system."

Response: Fact sheets are not changed but Hanford's will be amended with this Response to Comments. No permit condition is changed because of Hanford's recommendation that the fact sheet be changed to "discharge to 300 Area process sewer system" from "Hanford sewer system."

12. Comment: The fact sheet on page 5 states "Heating, air conditioning and ventilation wastewater discharges, which include condensates, will be reduced or eliminated during the permit cycle. Planning is underway to send the waste stream to the City of West Richland sanitary sewer system which is covered by Ecology issued permit NPDES WA-005106-3." Hanford now comments that planning applies to 310 TEDF, not just to this waste stream that is part of 310 TEDF. Discharges are to the City of Richland POTW not the City of West Richland.

Response: Comment noted on planning for all discharges from 310 TEDF. This supports and reinforces the new information in the fact sheet of elimination of discharges to the Columbia River from Area 300. The sanitary sewer receiving the discharge is not listed in Hanford's application. No permit is listed on Ecology's web site for the City of Richland, only for the City of West Richland. EPA verified with Ecology discharges from Hanford are to the City of Richland sanitary sewer. No permit changes are necessary.

13. Comment: As a placeholder for future modifications to this permit, the permittee is requesting that the description of the discharges to Outfall 004 in the fact sheet be revised as follows "…the thermal load from Outfall 004**, as well as stormwater from various drains**."

Response: Comment noted. In an expanded discuss with Ecology and Hanford it was verified the referenced stormwater discharges are not from the cleanup area and are minor. It is further agreed with Ecology and Hanford a condition will be added to the permit to specifically prohibit CERCLA cleanup action stormwater discharges from Outfall 004. Expanding on this comment Ecology, EPA and Hanford also agreed to an additional permit condition to prohibit all process water discharges from CERCLA cleanup action discharging from Outfall 004. Stormwater not from CERCLA cleanup action but within the cleanup footprint is allowed to be discharged to Outfall 004.

14. **Comment:** Revise page to read "Fire suppression wastewater, **major** leaks and line breaks are unintentional and non-routine discharges **typical of what is considered to be upset conditions** that do not…Hanford has never had **upset conditions as a result of fire**, line breaks or **major** leaks that resulted…the discharge **includes raw water returned** to the Columbia River…"No specific criteria are required for protection of the designated uses for salmonid and other fish migration, rearing, spawning, etc.

    Response: The comment is noted but does not change any condition of the permit nor the fact that returning Columbia River water back to the Columbia River is not an industrial discharge requiring authorization under this NPDES permit. A condition to prohibit any of these discharges from dilution of samples for Outfall 004 will remain in the final permit.

15. **Comment:** Add last sentence on page 6 of the fact sheet "**It is noted that fish rearing activities noted in Appendix A have ceased from the time the permit application was submitted**."

    Response: Comment noted.

16. **Comment:** In Appendix A table for Facilities Connected to 300 Area Process Sewer delete 327 boiler annex as it is no longer functional. Remove Stormwater Collection Boxes 321 and 3701U. collection boxes 321 and 3701U as they have been eliminated from the Process Sewer

    Response: Comment noted and fact sheet changed by this Response to Comments.

17. **Comment:** Ecology determined that radionuclide parameters for gross alpha, gross beta and cesium 137 are needed in the permit as part of the monitoring requirements for 100 Area, Outfall 004. The constituents will be listed as "monitor only" and be reported on the discharge monitoring reports to the U.S. Environmental Protection Agency.

    Response: Gross alpha, gross beta and cesium 137 will be added to Table 2 under Outfall 004 monitoring requirements. Hanford agreed to the monitoring.

18. **Comment:** Today I received a letter and packet of information requesting concurrence with EPA's determination of "not likely to adversely affect" for reissuance of a NPDES permit for the Hanford Nuclear Reservation that is incomplete. The location of the

proposal has the potential to affect the following ESA listed species and/or their critical habitat: Middle Columbia River steelhead, Upper Columbia River steelhead and Upper Columbia River Spring-run Chinook. In addition, the area of the proposed action is considered Essential Fish Habitat (EFH) for Chinook and Coho under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). I suggest you include pollutant loading and concentration information. Because NMFS was not involved in the initial permit issuance, we cannot approve the reissuance without additional information.

Response: As stated in the fact sheet on July 23, 2008 (in verbal communication with Matt Longenbaugh) NOAA-Fisheries excluded Coho and Chum salmon from consideration at this location; however, Puget Sound Steelhead are threatened species which may be present in this location. The United States Department of the Interior (U.S. Fish and Wildlife Service) lists Bull Trout as threatened and present in the vicinity of the discharge. NOAA's latest comment is Upper Columbia River Spring-run Chinook is an added ESA listed species. NOAA also commented that Puget Sound Steelhead listed in the fact sheet be replaced with Middle Columbia River steelhead and Upper Columbia River steelhead. EPA sent pollutant loadings to NOAA in response to their request.

Hanford Mass Loading to the Columbia River				
	TEDF	Average		
	Average Flow	Concentration		Loading
Parameter	MGD	µg/L	mg/L	lbs/day
Outfall 001A				
Aluminum	0.22	8.06	0.0081	0.0672
Selenium	0.22	0.40	0.0004	0.0033
Ammonia - N	0.22	23.66	0.0237	0.1973
Arsenic	0.22	0.25	0.0003	0.0021
Nickel	0.22	0.64	0.0006	0.0053
Iron	0.22	3.35	0.0033	0.0279
Zinc	0.22	1.16	0.0012	0.0097
Lead	0.22	0.23	0.0002	0.0019
Copper	0.22	4.13	0.0041	0.0344
Diclorobromomethane	0.22	0.28	0.0003	0.0023
Mercury	0.22	0.02	0.0000	0.0002
Nitrite	0.22	13.57	0.0136	0.1132
Manganese	0.22	0.19	0.0002	0.0016
Dichlorobromomethane	0.22	0.28	0.0003	0.0023
Chloroform	0.22	5.51	0.0055	0.0459
	Water Treatment			
	Plant, MGD			
Outfall 004A				
Chlorine (free available)	0.21	0.025	0.000025	0.000209

Concentrations are on pages 34 and 35 of the fact sheet.

The fact sheet for the prior permit stated previous NOAA involvement.

“In a letter dated June 19, 1998, the National Marine Fisheries Service provided a list of threatened or endangered species that may range in the vicinity of the NPDES discharges from the Hanford Nuclear Reservation. The letter listed upper Columbia River steelhead trout *(Oncorhynchus mykiss)* as endangered and upper Columbia River spring chinook salmon *(O.tshawytscha)* as proposed for listing as endangered.

EPA believes that discharges in compliance with the proposed effluent limitations and monitoring requirements shall not cause any violation of water quality standards established for the protection of aquatic life nor affect listed or endangered species. The discharges are from existing facilities. Nevertheless, EPA is providing copies of the proposed permit and fact sheet to these agencies for their review. Based on comments received from these agencies, EPA may engage in formal conference and consultation processes for ESA section 7 considerations (per 50 CFR Part 402).”

In consultation EPA provided NOAA with the following supplemental information.

Although discharges are usually potable water, which is drinking water, every 3-4 months or longer filter backwash water is also discharged. The existing permit and the draft permit limit this filter backwash water before it is diluted with river water from the basins in Hanford and prior to discharge to the Columbia River through Outfall 004. The point of compliance with this limit is called Outfall 004A in the permit (see schematic on page 28 of the fact sheet). The limit for just this filter backwash water is a monthly average of 30 mg/l total suspended solids (TSS) and a daily maximum limit of 45 mg/l TSS. This discharge is then diluted with Columbia River water within the 100 Area prior to discharge.

Service water is only Columbia River water in basins for fire fighting and other uses within the Hanford Reservation.

To support EPA's determination that discharges from the drinking water plant have no measureable impact to the Columbia River and to support EPA’s no effect determination EPA provided NOAA with the following evaluation for the State of Idaho.

To evaluate the protectiveness and reasonableness of the TSS permit limits EPA consulted other sources which evaluate appropriate numeric limits and targets for suspended sediment. Suggested limits for suspended sediment have been developed by the European Inland Fisheries Advisory Commission and the National Academy of Sciences, and have been used by the State of Idaho in TMDLs. In these studies, a limit of 25 mg/L of suspended sediment provides a high level of protection of aquatic organisms; 80 mg/L moderate protection; 400 mg/L low protection; and over 400 mg/L very low protection (USDA FS 1990, Thurston et al. 1979**).** IDEQ states in its June 2003 guidance document “Guide to Selection of Sediment Targets for Use in Idaho TMDLs:” “We propose no specific targets for total suspended solids. The effects of sediment are dependent on concentration and duration of exposure. We recognize that there can be effects on biota at concentrations of total suspended solids above 25 mg/L, and many papers recommend a long-term exposure of not greater than 80 mg/L to maintain a good

fish community." From the *South Fork Clearwater River Subbasin Assessment and TMDLs*, October 2003, a comprehensive review of TSS criteria conducted by DEQ and USEPA (Rowe et al. 1998) suggests that 25 mg/L is a highly protective threshold for salmonids. This threshold can be variable but likely ranges from about 25 mg/L to 80 mg/L, depending on duration.

EPA also included a color coded map supplied by Hanford to clarify the discharges to Outfall 004.

Based on the following considerations and after discussions with NOAA EPA changes its' determination to no effect on endangered or threatened species.

1. There are no measurable impacts to the Columbia River.

2. There are no meaningful measures for mitigation.

3. Discharges from Outfall 001 will cease in the summer of 2009.

4. Only clean potable water will be remaining for discharge plus filter backwash once every three to four months or longer.

5. This permit requires compliance with the State of Washington Surface Water Quality Standards, November, 2006 that protect aquatic life including threaten and endangered species.

6. Monitoring to date demonstrates no reasonable potential to violate state water quality standards that Ecology and EPA determine protect listed species. A State's water quality standards are composed of use classifications, numeric and narrative water quality criteria. The use classification system designates the beneficial uses such as cold water biota that each water body is expected to achieve. The numeric and narrative water quality criteria are the criteria deemed necessary, by the State, to support beneficial uses including for listed species. The state standards are backed up with EPA's National Recommended Water Quality Criteria.

7. Intermittent discharges

8. Low concentration discharges

9. Utilization of an outfall diffuser

10. High dilution rates in the high volume Columbia River receiving water

11. An advanced treatment system comprised of chemical precipitation, coagulation, flocculation, sedimentation, multimedia filtration, neutralization, ion exchange and ultraviolet oxidation.

12. The mass loadings are very low.

In a verbal communication from NOAA-Fisheries (Matt Longenbaugh, July 23, 2008), NOAA Fisheries described the Columbia River in the vicinity of the Hanford reservation as essential fish habitat (EFH) for Chinook and Coho salmon. This was confirmed by Diane Driscoll. The conclusion that the issuance of this permit will "not likely adversely affect" essential fish habitat in the vicinity of the discharge is changed to the discharge will have "no effect" for the same reasons that protect endangered species.