

April 01, 2019

2DB00-KJF-19-04-01

Dear Interested Parties:

EXPRESSION OF INTEREST (EOI) FOR SUPPLEMENTAL ORGANIC TREATMENT

Washington River Protection Solutions (WRPS) is seeking prospective contractors who are interested in and capable of providing a supplemental organic treatment system for the 200 Area Liquid Effluent Treatment Facility (ETF) at the U.S. Department of Energy's Hanford Site in southeastern Washington State.

Background

The U.S. Department of Energy (DOE) Office of River Protection (ORP) operates the 200 Area ETF. The ETF has been treating wastewaters from processing activities at the Hanford Site since 1994. The main treatment train at ETF includes, in order: pH adjustment; coarse filtration; ultraviolet/hydrogen peroxide oxidation (UV/OX); pH adjustment; excess peroxide decomposition; degasification; fine filtration; reverse osmosis (RO); and, ion exchange (IX). A general description of the existing system can be found in attachment A.

The ETF treats water that is Resource Conservation and Recovery Act (RCRA) listed hazardous waste (F001-F005)/Washington State dangerous waste¹. The facility design provides treatment technologies that eliminate the hazardous/dangerous characteristics of the waste and allows for delisting the effluent in accordance with 40 CFR 260.20 and 260.22. The current waste excluded under 40 CFR 260.20 and 260.22 treated via the ETF can be found at 40 CFR 261, Appendix IX, Table 2 under the facility "United States Department of Energy (Energy)" and address "Richland, Washington". A delisting petition² (ETF delisting modification) submitted to the United States Environmental Protection Agency (EPA) included a treatability envelope with influent constituent concentration limits that have been incorporated as a condition for treating the effluent within the ETF.

Future Wastewater Stream Requiring Treatment

The ETF will be receiving a new wastewater stream in the future, currently planned to be generated beginning in January 2022 by the Hanford Site's Waste Treatment and Immobilization Plant (WTP) that is currently under construction. This future wastewater stream will be generated nearly continuously for a period of roughly 40 years. The future wastewater stream is anticipated to contain

¹ Dangerous waste is defined by the Washington Administrative Code (WAC), WAC 173-303 and includes waste designated as hazardous waste at Title 40, Code of Federal Regulations, Part 261, Identification and Listing of Hazardous Waste.

² The 200 Area Effluent Treatment Facility Delisting Modification can be found at <https://pdw.hanford.gov/arpir/pdf.cfm?accession=D8918767>.

at least four organic constituents (acetonitrile, acrylonitrile, acetone and methylene chloride) in concentrations that exceed the expected performance range for the existing system. The expected concentrations of the four key organic constituents are listed in Table 1.

Table 1. Key Organic Constituents

Constituent	Concentration (ppb)
Dichloromethane (Methylene Chloride)	14
2-Propanone (Acetone)	4,240
Acetonitrile	46,450
Acrylonitrile	880

The complete estimate of the WTP effluent composition, as generated, is provided in Attachment B, Table B-1, for information. As stated previously the existing treatment system is expect to be capable of treating the effluent to the required limits for most all of the components except for the constituents listed in Table 1. The existing system primarily relies on the UV/OX system to accomplish this treatment.

Wastewater Organic Constituent End Targets

Treated effluent discharges from the ETF are subject to the conditions of existing requirements. The target discharge limits for the key organic constituents are listed in Table 2. The supplemental system should be capable of treating the key organic constituents to the levels identified in the table. It should be noted that exceptions to the target concentrations can be made by the regulatory authority based on the limits of the best available technology.

Table 2. Key Organic Constituent End Targets

Constituent	Concentration (ppb)
Dichloromethane (Methylene Chloride)	5 ³
2-Propanone (Acetone)	160 ²
Acetonitrile	1,200 ¹
Acrylonitrile	0.07 ³

¹ 40 CFR 261 Appendix IX, Table 2.

² Washington State Discharge Permit Number ST0004500 average monthly effluent limit.

³ WAC 173-200-040 (note that limits of technology exceptions can be made)

General: Discharge concentration limits are taken from either the delisting levels in 40 CFR 261, Appendix IX, Table 2, Condition 5 for the United States Department of Energy facility in Richland, Washington (i.e., ETF), or Washington State Discharge Permit Number ST0004500, or WAC 173-200-040, Table 1, Groundwater Quality Criteria. Precedence is given to the minimum value from either 40 CFR 261, Appendix IX, Table 2 or Washington State Discharge Permit Number ST0004500 or WAC 173-200-040, Table 1. If a value is presented in ST0004500 and WAC 173-200-040, Table 1, then the ST0004500 value takes precedence.

Summary of Work Scope

Work associated with this EOI may include the following activities as they are applicable. The applicability of the activities will be influenced by the level of maturity and availability of the technology. The supplemental treatment system may be configured to be an add-on to the existing

process or function to replace or upgrade an existing system. A general description of the existing system can be found in attachment A.

1. Off the Shelf Procurement - Upon identification of a suitable ready to order treatment technology package WRPS would provide requirements for purchasing, testing (if required), and documentation.
2. Procurement with Design Activities - Upon identification of a suitable technology that requires design to support integration WRPS would prepare an engineering specification that defines the performance requirements, design requirements, interfaces, testing (if required) and required documentation. Design would occur in phases with the vendor providing a preliminary design package, WRPS review and comment, the vendor providing a final design package for WRPS approval, and ultimately authorizing fabrication of the system.
3. Testing – If required, treatability testing at an appropriate level/scale may be requested to determine the treatment effectiveness of the proposed method for the treatment of the key constituents listed in Table 1 to the discharge targets identified in Table 2. It is anticipated that the vendor would perform all aspects of the testing including providing a suitable simulant of the key organics. The treatability testing is envisioned to be performed with a minimum of four separate test runs to demonstrate performance. Samples would need to be analyzed via EPA Method SW-846-8260, SW-846-8270, and SW-846-9060. At the conclusion of the testing the vendor would provide results of the treatability testing in an engineering report.

Requested Information in Response

Interested firms are invited to submit an expression of interest letter and include a response to the following:

1. Your company's desire to participate in the competitive opportunity for a future contract of this work scope.
2. Size of your company, how many employees and annual gross income (see note below).
3. Your company's technical expertise and experience in providing treatment systems including specific examples of systems where you have performed design, fabrication, testing and delivery for wastewater treatment of organic contaminants of similar concentrations and types of contaminants and flowrate of wastewater to that described in this EOI.
4. Identify the specific recommended technology that would perform the treatment and any limitations associated with it.
5. Your company's system or series model that would be most aptly suited to provide the organic treatment of this wastewater stream and an explanation of why.
6. Your company's project management expertise and experience in providing systems including specific examples of similar systems with specific examples regarding your company's ability to deliver systems meeting the initial contractual budgetary and schedule requirements.
7. Your company's capabilities for performing testing activities (if required) and at what scale would be recommended. Include a description of your testing capability whether in-house or contracted through a third party.

8. Your company's expertise, experience, and approach in performing sampling and analysis (either in-house or through a third party) in accordance with U.S. EPA publication, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, and specifically current versions of: Method 8260, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry; Method 8270, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry; and Method 9060, Total Organic Carbon.
9. Your company's estimated ROM cost and schedule duration, for budgetary and planning purposes only, for the following (as applicable):
 - a. Off the Shelf Procurement
 - b. Procurement with Design Activities
 - c. Testing (if required)

Note for responses regarding standard sizes for #2 above.

The size standards are for the most part expressed in either millions of dollars (those preceded by "\$") or number of employees (those without the "\$"). A size standard is the largest that a concern can be and still qualify as a small business for Federal Government programs. For the most part, size standards are the average annual receipts or the average employment of a firm. How to calculate average annual receipts and average employment of a firm can be found in the Code of Federal Regulations (CFR) at [13 CFR § 121.104](#) and [13 CFR § 121.106](#), respectively. SBA also includes the table of size standards in the Small Business Size Regulations, [13 CFR § 121.201](#). This table includes size standards that have changed since publication of the last annual edition of the CFR. Be aware that companies will not be excluded based on the company not being a small business, rather it is a required area for consideration on DOE contracts.

For more information on these size standards, please visit SBA's site on Small Business Size Standards <https://www.sba.gov/>.

Vendor Responses

Please send all correspondence regarding this EOI to Wrps_eoi_responses@rl.gov. Please be aware, this is not a Request for Proposal, but a request for an Expression of Interest. WRPS will not award a Subcontract(s) based on this Expression of Interest, nor pay for information solicited. Questions and your response to this expression of interest are due by 9:00 AM (Pacific Time Zone) Monday, April 22, 2019 to Wrps_eoi_responses@rl.gov.

We look forward to hearing from you regarding this request.

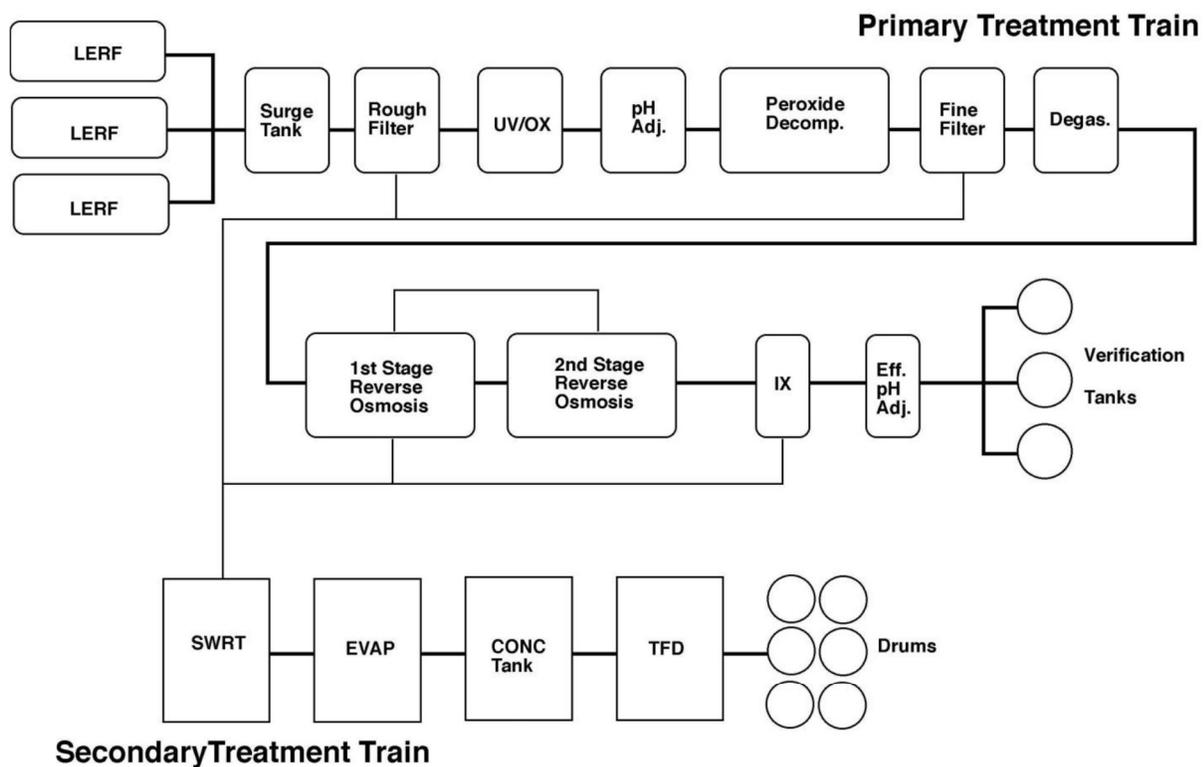
Sincerely,

Katherine Fulton *Katherine Fulton*
CFCM, Procurement Specialist
Specialized Materials –Construction-Fabrication-Services
Washington River Protection Solutions LLC
Phone: 509-376-6803
Fax: 509-376-0825
Katherine_j_fulton@rl.gov

Attachment A

General Existing Treatment System Description

The primary treatment train for the ETF system is illustrated in the diagram below. Waste water is pumped from the Liquid Effluent Retention Facility (LERF) into the ETF for treatment. The ETF primary treatment train maximum design flow rate is 150 gpm and the system is typically operated at ~ 90 gpm. The stream moves through a surge tank and undergoes a pH adjustment to ~ 6 then is passed through a roughing filter to remove solids. Prior to entering the ultraviolet oxidation system, peroxide is added to support the organic destruction. After organic treatment is performed the stream is neutralized, the excess peroxide decomposed, and degassing is performed to remove carbon dioxide and other dissolved gases. The final steps involve a reverse osmosis system and a mixed bed cation and anion exchange system prior to transfer to the verification tanks.



CONC Tank = Concentrate tank
 Degas. = Degasification column
 Eff. pH Adj. = Effluent pH adjustment tank
 EVAP = Evaporator
 IX = Ion Exchange
 LERF = Liquid Effluent Retention Facility
 pH Adj. = pH adjustment tank
 SWRT = Secondary waste receiving tank
 TFD = Thin film dryer
 UV/OX = Ultraviolet Oxidation

M0704-3.8
4-21-07

Figure source: WA7890008967 Hanford Facility RCRA Permit Dangerous Waste Portion

Attachment B

WTP Effluent Composition Estimate

Table B-1 provides the estimated composition of the as-generated WTP effluent that will be treated by the ETF. The table lists carbonate and bicarbonate as a single entity. At pH 9.3, it is expected that 90% of the carbonate/bicarbonate will be in the bicarbonate form.

Table B-1. WTP Effluent Composition Estimate^{1,2}

Constituent	Concentration (ppb)	Constituent	Concentration (ppb)	Constituent	Concentration (ppb)
Properties					
Conductivity	5-1200 µS/cm	pH	9.0-9.6	Total Dissolved Solids	2600-5200
Total Suspended Solids	none	--	--	--	--
Inorganic Constituents					
Aluminum	21	Magnesium	2	Fluoride	38
Ammonium	68,290	Manganese	1	Hydroxide	291
Antimony	3	Mercury	33	Nitrite	276
Arsenic	4	Selenium	6	Nitrate	16,160
Boron	7	Silicon	1	Phosphate	52
Calcium	27	Sodium	1,473,490	Sulfite	10
Chromium	1	Tungsten	1	Sulfate	29
Potassium	34	Carbonate/Bicarbonate	1,916,960	--	--
Lead	94	Chloride	2,970	--	--
Organic Constituents					
2-Butanone (Methyl ethyl ketone)	1,460	Bis (2-Ethylhexyl) phthalate	10,000	Nitrobenzene	951
2-Butoxyethanol	1,210	Butanal (Butyraldehyde)	77	N-Nitrosomorpholine	8,360
2-Nitrophenol	6,290	Dichloromethane (Methylene Chloride)	14	N-Nitroso-N,N-dimethylamine	18
2-Propanone (Acetone)	4,240	Diethyl phthalate	5,530	o-Cresol	4,210
4,6-Dinitro-o-cresol (2-Methylphenol)	21,720	Di-n-octylphthalate	544	Oxalate	379
Acetate	859	Formate	3,640	Phenol	4,270
Acetonitrile	46,450	Glycolate	1,300	p-Nitrophenol	38
Acetophenone	1	m-Cresol	3,120	Propionitrile (Ethyl cyanide)	1
Acrylonitrile	880	Naphthalene	1,780	Tributyl phosphate	1,170
Aroclors (Total PCB)	1	n-Butyl alcohol (1-Butanol)	19	--	--

- 24590-BOF-M4C-DEP-00002, Rev A Direct Feed LAW Effluent Management Facility Process System (DEP) Condensate Composition Estimate
- HNF-3172, Rev 6, Waste Profile Sheet for Liquid Effluent Retention Facility and Effluent Treatment Facility