

# Technology Innovation News Survey

Entries for April 1-15, 2016

## Market/Commercialization Information

### INTERNATIONAL REMEDIATION AND ENVIRONMENTAL SERVICES

U.S. Army Corps of Engineers, USACE HNC, Huntsville, Alabama.  
Federal Business Opportunities, FBO-5264, Solicitation W912DY-16-R-0003, 2016

The objective of this contract is to provide services to safely locate, identify, recover, evaluate, manage and make final disposition of munitions and explosives of concern, munitions constituents, chemical warfare materiel, biological waste and warfare materiel, and hazardous, toxic and radiological waste. Requirements also include implementing environmental compliance measures and performing other munitions-related support services, such as reducing DoD Conventional Munitions Stockpile at other federally controlled sites (including foreign jurisdictions). A target MATOC pool of a total of 10 contractors is planned to result from this acquisition, with \$950M in capacity to be shared amongst all awardees over a period of five years, if the option is exercised. Offers must be received by 2:00 PM CT on June 10, 2016. <https://www.fbo.gov/procurement/procurement/contract/USACE/HNC/W912DY-16-R-0003/listing.html>

### VENDOR COLLABORATION (NATIONAL RESPONSE SYSTEM FOR THE SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM CLASS OF CONTRACTS, REGION 6)

U.S. Environmental Protection Agency, Region 5, Chicago, IL.  
Federal Business Opportunities, FBO-5285, Solicitation S01-R5-16-00006, 2016

The purpose of this sources-sought notice is to determine the availability of small businesses that are capable of meeting the requirements of the draft performance work statement (PWS) for assistance to EPA's on-scene coordinators and other federal officials implementing EPA's responsibilities under the Superfund Technical Assessment and Response Team (START) class of contracts. These services primarily support the Emergency Management Branch in the Superfund Division of EPA Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas). The contractor provides scientific/technical support and has extensive experience in restoring or directly supporting the restoration of a contaminated environment. EPA anticipates awarding a single advisory and assistance IDIQ-type contract (NAICS code 541620) starting around December 2016 for a 60-month base period with an estimated maximum potential value is \$87M. Interested small businesses are invited to submit a capabilities statement by 2:00 PM CT on May 26, 2016. The draft PWS is available only on Fedconnect at: <https://www.fedconnect.net/FedConnect7?dir=E16PS01233&agency=EDA>. (Note: It might be necessary to copy and paste the URL into your browser for direct access.)

### NEXT GENERATION CHEMICAL DETECTOR XM14

Army Contracting Command, ACC-APG (W911SR) Edgewood, Aberdeen Proving Ground, MD.  
Federal Business Opportunities, FBO-5287, Solicitation W911SR-RF1-2002, 2016

The XM14 program for field-level chemical threat detection is currently in the technology maturation and risk reduction phase. Army Contracting Command-Aberdeen Proving Ground (ACC-APG) previously awarded three contracts to fabricate prototypes and mature the technologies (2013, Next Generation Chemical Detector 3 for Sample Analysis or Multi-Sample Identifier). The prototypes are being evaluated. ACC-APG is conducting market research to identify interested potential sources having industry technologies available to support the engineering and manufacturing development, low-rate initial production, and full-rate production of the XM14 multi-phase sample analysis chemical agent detector. Information acquired from this notice will be used to adjust the XM14 acquisition strategy and contribute to determining the method of procurement. Multiple awards may be made. An Industry Day for XM14 is contemplated in mid or late August 2016. Any solicitation received is expected to have a security classification level of Secret. Interested firms should submit a brief capabilities package via email by June 15, 2016. <https://www.fbo.gov/procurement/procurement/contract/USACE/HNC/W911SR-RF1-2002>

### DRIFLINE LEAD CONTAMINATED SOIL ABATEMENT

National Park Service, Boston National Historical Park, Charlestown Navy Yard, Boston, MA.  
Federal Business Opportunities, FBO-5284, Solicitation P16PS01233, 2016

The National Park Service intends to issue a solicitation to acquire services for drifline lead-contaminated soil abatement at Valley Forge National Historical Park, King of Prussia, Penn., and Hopewell Furnace National Historic Site, Elverson, Penn. The basic effort will be for the School House and Sam Britain Sr. House at Valley Forge, with options for the Church House, the Church House Garage, and Tenant House 3 at Hopewell Furnace. Work to be completed by October 14, 2016, includes site preparation; installation of a two-stage decontamination unit; collection, removal, and disposal of lead-contaminated soil; testing and documentation; and landscape reclamation in the treated areas. If issued, this effort will be solicited as a total small business set-aside, firm-fixed-priced type contract under NAICS code 562910. Release of the RFP is anticipated on or about May 25, 2016. Visit <https://www.fedconnect.net/FedConnect7?dir=E16PS01233&agency=DOI> for project details. [Note: It might be necessary to copy and paste the URL into your browser for direct access.]

### BOWDOIN NATIONAL WILDLIFE REFUGE CLEANUP

Fish and Wildlife Service, CGS-WO, Lake Plaza North, Lakewood, CO.  
Federal Business Opportunities, FBO-5287, Solicitation F16PS00575, 2016

This contracting action is 100% set aside for small business under NAICS code 562910. The Montana Department of Environmental Quality requires the U.S. Fish and Wildlife Service to conduct additional soil and groundwater investigation to assess the current extent of petroleum contamination related to historic leaking underground storage tanks (since removed) at two Fish and Wildlife Refuges: Bowdoin National Wildlife Refuge, near Malta, and Red Rock Lake National Wildlife Refuge, near Lime. Release of the solicitation package is expected on or about May 31, 2016, with an anticipated closing date of June 15, 2016. Once released, solicitation documents can be obtained through Fedconnect at: <https://www.fedconnect.net/FedConnect7?dir=E16PS00575&agency=DOI>. [Note: It might be necessary to copy and paste the URL into your browser for direct access.]

### MOBILE TRAINING CENTERS TO REDUCE MERCURY USE IN ANDEAN SMALL-SCALE GOLD PROCESSING

Department of State, Funding Opportunity OES-OMM-16-003, 2016

The State Department plans to award one Cooperative Agreement for up to \$145,000 for work that will support designing, assembling, and field testing one or more mobile mercury-free gold processing plants to be used for training miners within the ASGM sectors of Bolivia and Peru. Eligibility is limited to U.S. higher educational institutions and research centers that have established relationships with regional institutions and/or organizations. The closing date for applications is June 13, 2016. <http://www.crds.gov/web/grants4use/announcement.html?opid=28384>

## Cleanup News

### PINELLAS SITE USES HORIZONTAL WELLS FOR ENHANCED BIOREMEDIATION

U.S. DOE, Office of Legacy Management, Energy.gov website, 2016

Operations to develop and manufacture components at the former Pinellas Plant in Florida during the nation's Cold War-era nuclear weapons program released solvents to subsurface soils beneath the plant's 11-acre Building 100. Release areas became sources of dissolved contamination, creating groundwater plumes that extended south and east from the source areas under Building 100 and on to private property. DOE continues environmental restoration at the site—now known as the Young-Rainey Science, Technology, and Research (STAR) Center—using bioaugmentation and biostimulation to treat the chlorinated-solvent source areas and groundwater plumes under Building 100. Treatment is based on injection of a concentrated solution of emulsified vegetable oil (EVO) and bacteria (*Dehalococcoides mccartyi* or DHM) diluted with water prior to injection to maximize its subsurface distribution. Once introduced into the subsurface, EVO ferments and produces dissolved hydrogen, which DHM uses to break the bonds on contaminant molecules, resulting in nontoxic end products. In November 2015, diluted EVO and DHM were injected into eight horizontal wells installed as deep and shallow pairs to target the contaminated zone. Monitoring wells placed inside and outside Building 100 will be used to monitor project performance. <http://nsl.srs.gov/articles/pinellas-site-uses-horizontal-wells-pnpand-cf-bioremediation>

### INDEPENDENT TECHNICAL SUPPORT FOR THE FROZEN SOIL BARRIER INSTALLATION AND OPERATION AT THE FUKUSHIMA DAICHI NUCLEAR POWER STATION (F1 SITE)

Looney, B.B., D.G. Jackson, M.J. Truex, and C.D. Johnson.  
SRNL-STI-2015-00215, 81 pp, 2015

Water countermeasures are being implemented at the Fukushima Daiichi Nuclear Power Station to limit the releases and impacts of radioactively contaminated water to the surrounding environment. The diverse countermeasures work together in an integrated manner to provide different types and levels of protection. In general, the strategy represents a comprehensive example of a "defense in depth" concept that is used for nuclear facilities around the world. One of the key countermeasures is a frozen soil barrier encircling the damaged reactor facilities. The frozen barrier is intended to limit the flow of water into the area and thus reduce the amount of contaminated water that requires treatment and storage. The technical characteristics of a frozen barrier are relatively well suited to the Fukushima-specific conditions and the need for inflooding reduction. This independent review generally supports the countermeasures design, installation strategy, and operation plan. <http://sti.srs.gov/fulltext/SRNL-STI-2015-00215.pdf>

## Demonstrations / Feasibility Studies

### IN SITU BIOGEOCHEMICAL TREATMENT DEMONSTRATION: LESSONS LEARNED FROM ESTCP PROJECT ER-201124

Stroob, H.F., J.T. Wilson, F.J. Evans, C.A. Lebron, B.M. Henry, D.E. Latta, R.S. Ghosh, and A. Leeson.  
ESTCP Project ER-201124, 80 pp, 2015

The project originally was intended to demonstrate and update engineering guidance for a subsurface bioreactor technology based on results from field-scale testing at the same site used for earlier column testing (mainly TCE and daughter products). The test site was changed from the original location, however, and the engineering guidance has not yet been developed. Although the demonstration was not successful, this report explains the reasons for the disappointing results, summarizes the findings, and captures lessons learned from this effort to demonstrate biogeochemical transformation at field scale. <https://www.estcp.com/content/download/137117/355815/file/ER-201124%20Lessons%20Learned.pdf>

### PILOT-TESTING ON THERMAL ENHANCED SVE OF MERCURY IN SOIL AND BEDROCK UNDER AN ONGOING CHLORO-ALKALI PLANT

Bergeron, E., A. Eriksson, L. Torin, B.-O. Jorjolev, and L. Froessling.  
RP-2016 Federal Contaminated Sites National Workshop, Real Property Institute of Canada, 2016

An indirect heating pilot was designed for subsurface remediation at the mercury-based chlor-alkali plant at INOV'N Sverige, Stenungsund, Sweden. Steel casings inserted in the sand and bedrock vadose zone carry steam (~140°C) delivered from the plant to conduct heat into the soil/bedrock matrix. The treatment cell comprises three heating elements, two central air extraction wells (one each for soil and bedrock), and several multi-level monitoring wells. The pilot was conducted inside the plant during ongoing production for four months and is planned to continue for up to six months. After four months, ~10% of the estimated total Hg mass in the pilot cell was extracted. Heating increased the Hg extraction rate significantly from 2,500 to 28,000 µg/Nm<sup>2</sup> Hg. The temperature rose rapidly in the monitoring wells, especially during the first month. After four months the temperature was around 50-55°C in the top 2 m below the plant—1 m from a heating well. The temperature increase in the saturated zone led to about one order of magnitude higher Hg concentration in the water as solubility increased, but no increased spreading was seen outside the pilot cell. Installation drilling inside the plant encountered a free water table 1 m bgs, likely consisting of perched rainwater from uphill areas. Gas could not be extracted from the bedrock below a depth of 1 m, and dewatering techniques are under investigation to improve and assess Hg extraction from the bedrock fractures.

### EFFECTIVE REMEDIATION OF GUN PROPELLANT RESIDUES IN SURFACE SOILS USING COMMERCIALY AVAILABLE ASPHALT HEATERS

Connell, K.K., G. Ampleman, S. Thiboutot, and S. Downie.  
RPIC 2016: Federal Contaminated Sites National Workshop, Real Property Institute of Canada, 2016

Deposition of propellant fibers coming from the use of shoulder-fired weapons has deposited high concentrations of nitroglycerin (NG) behind the firing positions of anti-tank ranges in Canada. Risk of surface ignition and fire upon discharge of the weapon as well as potential inhalation of volatile NG poses health and safety risks to the range users. To address high NG concentrations in soil, two trials were conducted with a commercially available infrared heating unit typically used to reheat asphalt in the paving industry. Different burning cycles were evaluated for effectiveness in reducing NG soil concentrations. The first year of trials showed a decrease in NG concentrations after 5 and 10 minutes of burning cycles, but the shorter burning cycles did not provide temperatures sufficient to destroy all NG. During the second year of trials, thermocouples were installed to monitor temperatures produced from the heater at and below the soil surface. Results from the thermocouples in the second year showed a critical point where water vaporization occurred in the soils, after which soil temperatures were able to reach between 400-500°C, where total destruction of NG can occur. Results below detection limits were achieved for burning cycles of 60 minutes and greater. The technology and resources to conduct the remediation are readily available within most Canadian Forces bases. Further trials will be conducted with the technology on energetics contamination at demolition and grenade ranges.

### PHYTO PROCESSES FOR PCB REMOVAL IN LAGOON AND RIVERINE SEDIMENTS

Licht, L.A.  
12th International Conference of the International Phytotechnology Society, 27-30 September 2015, Manhattan, Kansas. Abstract only, 2015

A demonstration using phytoremediation techniques is addressing PCBs in sediments at the Altavista, Virginia, 6-acre wastewater lagoon site. PCB concentrations up to 50,000 ppm have been measured in the sediments, and the Virginia Department of Environmental Quality has established a 50 ppm total PCB cleanup concentration goal. ECA80 tree covers are being tested to evaluate their potential for containing PCBs in the subsurface by keeping the surface soil layer intact while sustaining microflora in the root zone. Six ECA80 tree cover plots were installed at the site between 2012 and 2014 in 2,000 m<sup>2</sup> plots built into the lagoon by placing a layer of blended local materials over sediment. Unrooted poplar whips were pushed through the soil and sediment layers to the top of the clay liner. Poplar and willow roots now expand throughout the sediment and cover layer, providing a plant rhizosphere in 3 ft of sediment within an operating lagoon. The planted poplar and willow trees growing in the cover soil and sediment increase water transpiration from sediment. During the growing season, flooding and drying within the lagoon sediment pulses the water content, oscillating the redox potential in a diverse microbial population. <https://vavatercentralnews.wordpress.com/2014/03/18/phytoremediation-project-in-altavista-va-phytoremediation-test-project-for-pcb-removal-from-wastewater-pond-march-2014-update-of-information-posted-in-october-2011/>

## Research

### ASSESSMENT OF A HYDROXYPATITE PERMEABLE REACTIVE BARRIER TO REMEDIATE URANIUM AT THE OLD RIFLE SITE COLORADO

Moore, R.C., J. Szecsydy, M.J. Rignall, V. Vermuel, and J. Leullen.  
Waste Management 2016, 6-10 March, Phoenix, Arizona. Paper 16193, 9 pp, 2016

Investigators are testing the effectiveness of a hydroxypatite permeable reactive barrier (PRB) and source area treatment to decrease uranium mobility at DOE's former Old Rifle uranium mill processing site (Rifle, Colorado), where uranium ore was processed from the 1940s to the 1970s. Although the mill facilities and tailings have been removed, groundwater in the alluvial aquifer beneath the site still contains elevated concentrations of U and currently is used for field tests to study U behavior in groundwater and investigate potential remediation technologies. The in situ formation of apatite in sediment can be used to create a subsurface apatite PRB and also provide source area treatment. The process is based on injecting a solution containing calcium citrate and sodium citrate for constructing the PRB within the U plume. As the indigenous sediment microorganisms biodegrade the injected citrate, the calcium is released and reacts with the phosphate to form hydroxypatite. This paper reports on proof-of-principle column tests with Old Rifle sediment and synthetic groundwater. <http://www.nsti.gov/scitech/sciletters/nsti123832>

### MEASUREMENT AND MODELING OF ECOSYSTEM RISK AND RECOVERY FOR IN SITU TREATMENT OF CONTAMINATED SEDIMENTS

Luthy, R., Y.-M. Cho, Y. Choi, Y. Wu, and D. Werner.  
SERDP Project ER-1552, 2015

Lab and field trials have shown that in situ sediment treatment technologies using activated carbon (AC) sorbents can reduce ecological and health risk from PCBs and PAHs. While several lines of evidence have demonstrated AC treatment effectiveness, further research is needed to understand ecosystem recovery after AC sorbent amendment, assessment of secondary effects of AC on ecosystem health, development of mechanistic mass transfer modeling frameworks, and the design and testing of rapid and reliable performance monitoring tools. The overarching objective of this project was to advance sediment in situ AC treatment technologies by studying these considerations. The work included an investigation of the

