

HANFORD FORWARD

Hanford Workforce Engagement Center

CENTRAL PLATEAU

Years of Planning
& Technology
Development Lead to
Project Startup Success

TANKS

Waste Treatment
Plant Construction
& Startup Moving
Forward



SITOWIDE

HANFORD WORKFORCE ENGAGEMENT CENTER CELEBRATES GRAND OPENING



SUMMER 2018 ISSUE

QUARTERLY PUBLICATION COVERING
HANFORD CLEANUP NEWS & PROGRESS



ABOUT HANFORD



The Richland Operations Office is responsible for cleanup of much of Hanford’s waste, including preparing to move radioactive “sludge” away from the Columbia River, disposing of contaminated soil and solid waste, and treating groundwater, while providing occupational medical services and maintaining site infrastructure for the future.



CH2M HILL Plateau Remediation Company (CHPRC) is the prime contractor for the safe, environmental cleanup of the Central Plateau. CHPRC’s responsibilities include waste retrieval and fuels management, groundwater remediation and demolition of facilities and canyons, and closure of the Plutonium Finishing Plant.



HPMC Occupational Medical Services provides occupational medical services to the Department of Energy and to Hanford employees.



Mission Support Alliance (MSA) is responsible for integrated infrastructure services for the Hanford cleanup mission, including roads and transportation services, electrical and water services, facility maintenance, emergency response (fire and patrol) services, network and software engineering as well as environmental compliance and clean energy solutions.



The Office of River Protection is responsible for the retrieval, treatment, and disposal of Hanford's tank waste in a safe, efficient manner. The River Protection Project is the largest and most complex environmental remediation project in the nation.



Bechtel National Inc. is responsible for designing, building and commissioning the world’s largest radioactive and chemical waste treatment plant. When completed, the plant will be used to solidify waste stored in 177 aging underground tanks using a process called vitrification.



Washington River Protection Solutions is responsible for storing and retrieving the approximately 56 million gallons of radioactive and chemical waste stored in Hanford's tanks.



Wastren Advantage, Inc. is the prime contractor responsible for managing the 222-S Laboratory.

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Hanford Workforce Engagement Center



HANFORD WORKFORCE ENGAGEMENT CENTER CELEBRATES GRAND OPENING

Department of Energy (DOE) Assistant Secretary Anne Marie White joined elected officials, Hanford Site leadership and union leaders to celebrate the grand opening of the Hanford Workforce Engagement Center on May 3.

The center is a first of its kind in the DOE complex. Its mission is to be a one-stop shop for current and former Hanford workers and their families for assistance with questions about occupational health and compensation programs.

“I want to thank the DOE and contractor management here at Hanford, the site workforce, and the labor unions for their unique partnership that made this center a reality,” White said. “This marks a new era of collaboration that results in these programs working more effectively and efficiently for the benefit of Hanford workers, past and present.”

Additional speakers at the ceremonial ribbon-cutting included Sen. Maria Cantwell (D-Wash.); a representative from Sen. Patty Murray's office (D-Wash.); Rep. Dan Newhouse (R-Wash.); DOE Richland Operations Office Manager Doug Shoop; DOE Office of River Protection Manager Brian Vance; Central Washington Building and Construction Trades Council (CWBCTC) President Mike Bossé; and Hanford Atomic Metal Trades Council (HAMTC) President Jeff McDaniel.

Community leaders, Hanford workers, and other community supporters attended the presentations and ribbon-cutting.



“THE STAFF AT THE CENTER ARE SECOND TO NONE. THIS IS A PLACE WHERE WORKERS CAN GO TO GET HELP WITH THEIR QUESTIONS AND GET POINTED IN THE RIGHT DIRECTION.” – *Jeff McDaniel, Hanford Atomic Metal Trades Council president*

DOE, Hanford contractors and the two unions — CWBCTC and HAMTC — worked together to establish the center.

The center opened on April 2 and is staffed by union and non-union Hanford workers who are knowledgeable about the many programs and options available to employees and their family members with occupational health concerns. Staff members are experts on navigating the federal and state programs available to current and former Hanford workers. *



United States Congressman Dan Newhouse speaks with the media at the ribbon cutting of the Hanford Workforce Engagement Center.



Department of Energy Assistant Secretary Anne White (center) talks with Representative Dan Newhouse (left) and Department of Energy Richland Operations Office Manager Doug Shoop at the grand opening ceremony of the Hanford Workforce Engagement Center May 3 in Richland, Wash.



Senior Department of Energy officials and members of Washington State's Congressional delegation joined local community leaders and Hanford Site workers in cutting the ribbon to celebrate the grand opening of the Hanford Workforce Engagement Center.



Workers inside the 105KW Annex working over a sludge transfer and storage container used to transport sludge to T Plant.

YEARS OF PLANNING & TECHNOLOGY DEVELOPMENT LEAD TO PROJECT STARTUP SUCCESS

The U.S. Department of Energy (DOE) and contractor CH2M HILL Plateau Remediation Company (CHPRC) have started removing some of the most contaminated material away from the Columbia River at the Hanford Site in Washington State.

“This is a major risk reduction to the Columbia River,” said Project Director for DOE, Mark French. “We are glad to begin this work as we have planned extensively to make sure sludge removal is a success.”

In 2008, CHPRC assumed the contract and responsibility for establishing a sludge removal program. Experts spent years planning and preparing for this one-of-a-kind project. They began by developing sludge removal technology as part of the Engineered Container Retrieval and Transfer System (ECRTS) to resolve the daunting technical challenge of removing 35 cubic yards of highly radioactive material from under 16 feet of water in the aging 105KW fuel storage basin.

The sludge consists of fuel corrosion particles, spalled concrete, wind-blown sand and fuel fragments smaller than 1/4 inch in diameter. In addition, the sludge, which accumulated over decades in the reactor fuel storage basin, is abrasive and difficult to handle.

“ WE HAVE COME A LONG WAY AND THE DEDICATION TO THE MISSION HAS GOTTEN US TO THIS POINT. OUR HIGHLY KNOWLEDGEABLE TEAM HELPED US OVERCOME THE CHALLENGES THROUGHOUT THE VARIOUS PHASES WITH THIS COMPLEX PROJECT.”

– Ray Geimer, Vice President of CH2M HILL Plateau Remediation Company's Sludge Removal Project

Workers constructed a replica of the 105KW basin at the Maintenance and Storage Facility (MASF) to engineer and test the sludge removal tools and equipment. Once testing confirmed it worked as designed, the retrieval and transfer system was deployed to the 100K Area to prepare for sludge removal operations. They also used the MASF replica to train on the retrieval and transfer equipment, develop operational procedures



Workers remove a sludge transportation and storage container from a truck trailer at T Plant.



Operator training at the Maintenance and Storage Facility on how to use the sludge removal control panel.



Workers install sludge removal equipment in the 105KW Basin.

and test system processes. The mock-up enhanced safety because workers could train in a radiation-free environment.

In 2017, workers finished installing the sludge removal system in the 105KW Basin and the newly constructed 105KW Annex. The Annex sits adjacent to the 105KW Basin. It will be used to package and prepare sludge for transport. After several phases of acceptance and operational testing, the construction team handed off the system to Facility Operations.

In 2018, CHPRC successfully passed two operational readiness reviews (ORR) that proved they were ready to begin sludge removal. The ORRs reviewed every phase of the process to ensure procedures, processes and personnel were prepared for safe sludge removal. The team began moving sludge from the 105KW Basin in May. They expect it will take one year and 18 to 24 sludge transfer and storage containers to safely remove all the sludge from the 105KW Basin.

Once sludge removal is complete, the basin will be demolished and the underlying contaminated soil removed. The remaining 105KW Reactor will then be placed in interim safe storage to ensure protection of the Columbia River. *



Engineers at the Maintenance and Storage Facility test, engineer and modify sludge removal equipment and tools.



The sludge consists of fuel corrosion particles, spalled concrete, wind-blown sand and fuel fragments smaller than 1/4 inch in diameter.

DEMOBILIZATION ACTIVITIES

PROGRESSING IN HANFORD'S C FARM



Riggers use a crane to position a bottle-handling tent at Hanford's AN Farm. The tent will be used to support workers who don self-contained breathing apparatus needed to remove waste transfer lines from C farm to AN Farm.

Department of Energy (DOE) contractor Washington River Protection Solutions (WRPS) continues to make substantial progress demobilizing equipment from Hanford's C Farm.

In November 2017, DOE and WRPS completed waste removal operations from waste storage tank C-105 to the limits of three technologies. C-105 was the last of 16 tanks to be retrieved in C Farm, the first of Hanford's tank farms to be retrieved. C Farm is one of the oldest tank farms at Hanford, dating back to the Manhattan Project.

Since then, WRPS has been working to disposition a wide variety of in-farm retrieval equipment. "We're de-energizing most everything used for flow or power that is no longer in use," said WRPS' Garth Stowe, the project manager.

Specifically, the team is disconnecting, removing and disposing of 52 portable electrical skids and temperature monitoring racks; draining, removing and disposing of 30 sluicer hydraulic units; draining and disconnecting 12 raw-water and high-pressure water skids; laying up the POR107 Exhauster; and demobilizing three control trailers.

Permanent water and power will remain available for future use, including the possible removal of waste from Catch Tank C-301 and the 244-CR Vault, and eventual closure of all C-Farm tanks.



“WE’RE MOVING ALONG AT A GOOD PACE. WE’VE HAD TO WORK AROUND SOME ISSUES THAT WERE OUT OF OUR CONTROL, BUT WE HAD A VERY MILD WINTER THAT ALLOWED US TO GAIN SOME MOMENTUM. WE’VE GOT AN EXPERIENCED, HARD-WORKING CREW THAT IS USED TO ADJUSTING TO CHANGING CONDITIONS AND ENSURING THE WORK IS COMPLETED SAFELY.”

– Garth Stowe, project manager for Washington River Protection Solutions

By September, the team is also scheduled to complete the removal of the last 20 hose-in-hose transfer lines from C Farm to AN Farm. The transfer lines are used to move highly contaminated waste from single-shell tanks to double-shell tanks. Some of the lines are buried in shallow trenches and were covered with 1-inch-thick steel plates while others were above ground and shielded by hose barns. The steel plates and hose barns have been removed and are being staged for future use.

Removing hose-in-hose transfer lines involves disconnecting and capping the lines from tank pits, splitter boxes and diversion boxes. The hose sections are lifted by a crane, placed on a flatbed trailer and moved into a radiological materials area, where they were loaded into sacrificial roll-on/roll-off waste containers for transport to the Environmental Restoration Disposal Facility in Central Hanford for permanent disposal.

In late March, the team turned over a new bottle handling tent at AN Farm to Operations after installing the interior heating, ventilation and air conditioning ductwork. The tent is used to support donning and doffing of self-contained breathing apparatus equipment during the removal of the remaining hose-in-hose transfer lines connected from C Farm to AN06A and AN01A pits.

“I’m very pleased with the progress we’re making,” said Vikki Wagner, C Farm Retrieval manager. “We have dedicated field crews that have been working in the farm since we began removing the hose-in-hose transfer lines and want to be here at the end. They know their work is essential for the long-term care of the farm, and will provide a safer work environment for the surveillance and closure teams that come in behind them.” *





PFP UPDATE



PFP UPDATE CONTINUED



This speaker is set up near AW Farm, which contains six million-gallon-plus waste storage tanks.

NEW PA SYSTEM INSTALLED IN HANFORD TANK FARMS TO IMPROVE COMMUNICATION

Department of Energy (DOE) tank farms contractor Washington River Protection Solutions (WRPS) is making it clear that worker safety is its highest priority.

WRPS is installing a public address (PA) system that will help notify and direct workers to safety in or near any of the Hanford Site's 18 tank farms during operational events. The PA system will augment existing communications methods, which include two-way radios and cell phones.

"DOE and WRPS recognized that, during potential chemical vapor events, there was a need for a notification system that would complement our existing tools," said WRPS engineer Bobby Nelson, who manages the PA system installation project. "We worked closely with Operations, field personnel and our vendor to select, modify, install and program equipment that would best suit our needs in the tank farms."

The team installed pole assemblies, wireless speakers/beacons and speaker cabinets, along with electrical and other associated equipment in eight of the 11 200 East Area tank farms. After passing its functional testing, the system is operating in four of the farms and is expected to be operational in the other four farms later this spring.

Meanwhile, design and construction preparation activities continue for installing the PA system in the B farm complex (200 East Area) and all the 200 West Area tank farms. Installation activities in those farms are scheduled to begin this spring.

Mark Johnson, a field work supervisor for WRPS who often works on high-risk projects, welcomes the new PA system. "It allows all personnel in the vicinity to get the message as soon as possible and will help eliminate any confusion," he said.

The PA system is controlled from the Central Shift Office (CSO) or, if needed, a backup shift office. CSO personnel communicate with field crews through Hanford Local Area Network computers and video screens located in change trailers. Roadside reader boards placed in strategic locations throughout the tank farms and at farm access points also are used to communicate to workers.

In addition to the PA system, WRPS is transitioning to a new software application that enables the Central Shift Office staff to issue integrated Shift Office Event Notifications (SOEN) and further streamline the event notification process. Event notifications are used to notify workers of an abnormal event in or near the tank farms.

"The purpose of modifying the process is to reduce the number of 'non-action' items our field personnel receive," said Kent Smith, WRPS manager of Production Operations. "For example, events such as minor vehicle accidents will no longer prompt an SOEN message. However, crews will still receive notifications regarding significant operational events, abnormal operating event entries, event investigations and similar activities." *



Hanford Site Contractors Exceed Recycling Goals

As a part of Hanford's hard hat recycling campaign, a Hanford employee collects expired or damaged hard hats. So far this year, Hanford workers have collected and recycled nearly half a ton of hard hats.

With a strong emphasis placed on recycling and protecting the environment, Hanford Site workers continue to lead the “going green” movement.

As the Hanford Site's integrator and manager of the site's recycling programs, Mission Support Alliance (MSA) focuses on environmental awareness and sustainability. Each year, MSA's goal is to divert at least 50 percent of nonhazardous solid waste debris (e.g., plastic, cardboard, paper, wood, furniture, scrap metals, electronics and tires) away from landfills.

In 2017, the Department of Energy (DOE) and Hanford contractors diverted approximately 1,224 metric tons away from landfills. This represents 57 percent of the nonhazardous waste generated on site.

Universal waste, including fluorescent light bulbs, batteries and other recyclable material such as aerosol cans, are collected and sent to Hanford's Centralized Consolidation/Recycling Center then sent off site for recycling. In 2017, Hanford Site workers collected 154 metric tons of universal waste and other recyclable material.

Hanford contractors, in coordination with DOE, maintain an integrated sustainability network to communicate recycling campaign efforts, such as the annual hard hat recycling campaigns held in November and April. Last year, Hanford workers gathered and recycled more than 1,220 pounds of expired or damaged hard hats. They have already recycled more than 950 pounds of hard hats this year.

“Recycling is an important part of the cleanup mission at Hanford,” said Carly Nelson, environmental compliance officer with MSA. “Our success in reducing the amount of waste sent to landfills is tied directly to workers across the site making a commitment to protect the environment. April is Earth Month, which is a good reminder for everyone to take a moment and think about how they can have a positive impact on the environment by making conscious recycling choices.” *



With various recycling options across the site, Hanford employees maintain a strong commitment to protecting the environment. In 2017, Hanford employees diverted 1,224 metric tons of non hazardous waste away from landfills.



Construction workers place concrete inside formwork and around reinforcing steel during structural concrete wall placements for an effluent management facility at Hanford's Waste Treatment and Immobilization Plant project.

WASTE TREATMENT PLANT CONSTRUCTION AND STARTUP MOVING FORWARD

The Department of Energy (DOE) plans to treat radioactive tank waste through Direct Feed Low-Activity Waste (DFLAW) vitrification gained momentum this spring. Contractor Bechtel National Inc. (BNI), completed some major construction and startup efforts at the Waste Treatment and Immobilization Plant (WTP), also known as the Vit Plant, to advance the mission.

VITRIFICATION FACILITY RECEIVES PERMANENT POWER

In April, WTP workers handed over the Non-radioactive Liquid Waste Disposal system, which comprises the Building 54 Pump House and 54-S Power House. While dozens of systems have been turned over from construction to startup across the project, the handover marks the first transfer of an entire building for commissioning.

The system consists of sumps, pumps, pipes, valves, instruments, and a 540,000-gallon tank, all of which are designed to collect non-radioactive, non-hazardous effluent from the Low-Activity Waste (LAW) Facility, Analytical Laboratory, and several balance

of facilities systems. It is one of many facilities required to achieve the Department of Energy's direct feed low-activity approach to feed waste directly from the Hanford tank farms to the LAW Facility, and vitrify waste by 2022.

POWERING LAW

Until recently, Hanford's LAW vitrification facility had used a temporary power system — typical for an industrial construction project. Now there is access to permanent plant power thanks to startup crews that 'energized' the facility's completed electrical switchgear building. Permanent plant power was brought to the switchgear building after months of



preparation and testing to ensure the success and safety of the energization.

“Providing permanent power to the facility is a significant accomplishment and marks a change in methodology at the LAW Facility,” said Roy Tyrie, project startup director. “It’s symbolic of a change from construction to startup and kicks off a waterfall of startup work, including testing the permanent plant equipment in the facility.”

Now with permanent power, electricity can be sent sequentially to lower voltage motor control centers and panels throughout the facility as startup testing of electrical systems occurs over the next several months. This will be no small feat considering the facility includes more than 1.1 million linear feet of electrical raceway, cables, and wiring.

The LAW vitrification facility is an integral component of DOE’s direct feed approach. The facility will heat Hanford’s low-activity tank waste and glass-forming materials to 2,100 degrees Fahrenheit – a process called vitrification – before the mixture is poured into stainless steel containers for permanent storage.

CONCRETE WALLS COMPLETED FOR MAJOR SUPPORT BUILDING

WTP construction crews also completed structural concrete foundation and wall placements for an onsite balance of facilities effluent management facility. Building concrete work

began last year and has included more than 990 tons of reinforcing steel bar, 147 tons of embeds, and 7,465 cubic yards of high-strength concrete so far.

“Finishing the effluent management facility main concrete foundation and walls is another sign of progress toward DFLAW completion,” said Brian Reilly, a Bechtel senior vice president and BNI project director for the WTP Project. “Once the topping slab and protective floor coatings are complete, the next key steps are to receive the necessary permit authorization and begin installing process equipment and piping racks inside the building.”

The effluent management facility works with robust underground double-walled transfer pipes as part of the balance of facilities support infrastructure to remove excess water from the vitrification process, which allows a greater concentration of waste to be vitrified.

During low-activity waste vitrification operations, secondary liquids – or effluents – will be generated from the melter off-gas system and when transfer pipes are flushed. The liquids will be sent to the effluent management facility which will evaporate away excess water and reduce the overall volume of certain secondary liquids so they can be sent back for use a second time in the vitrification process. *



Tour guide Gerry Griffin provides an on-bus briefing at one of the stops along the Hanford Site Cleanup Tour route. In 2017, nearly 350 people visited Hanford through the tour program Mission Support Alliance conducts for the Department of Energy.

2018 HANFORD SITE PUBLIC TOUR SEASON UNDERWAY

Within 35 minutes of open registration, all 400 seats for the Hanford Site Cleanup Tours were filled. This year's tours are scheduled from May through August.

The cleanup tours take members of the public to the Central Plateau for a first-hand look at the work supporting Hanford's environmental cleanup mission. As they tour the site, participants receive briefings on key cleanup projects.

This year's route covers the Cold Test Facility, the 324 Building Disposition Project, 200 West Pump and Treat facility, the Waste Treatment and Immobilization Plant and more.

People who couldn't get a seat on registration day can sign up on the tours website to be notified if seats become available. *



Destry Henderson with CHPRC Plateau Remediation Company explains how the injection and extraction wells work to clean up groundwater on the Hanford Site during a 2017 public tour stop at the 200 West Groundwater Treatment Facility.





Mission Support Alliance organizes at least four volunteer events at Second Harvest each year because employees feel so strongly about the organization and enjoy seeing the tangible results of their efforts.



HANFORD CONTRACTORS WORK TOGETHER TO ERASE HUNGER

Two contractors at the Hanford Site recently joined forces to help end childhood hunger. Employees from Bechtel's Waste Treatment and Immobilization Plant (WTP) and site services provider Mission Support Alliance (MSA) spent an afternoon at Second Harvest Tri-Cities packaging weekend food kits for the Bite2Go program.

Bite2Go distributes the food kits, which include foods that don't need to be refrigerated or cooked, to local children who may not otherwise have access to food over the weekend.

"Hungry kids have a harder time learning and staying focused in school," said Bob Wilkinson, MSA's president. "Supporting this program gives these students, our future leaders, the opportunity to do better in school."

In addition to hundreds of employee volunteer hours a year at Second Harvest, both Bechtel and MSA make corporate financial contributions to support the Bite2Go program. WTP project director Brian Reilly said, "It's exposure to things like this that make you realize how fortunate you are. It makes me feel good that I can do something that helps the community, especially children."

Regional executive director of Second Harvest, Holly Siler, appreciates the support from Hanford contractors. "Bite2Go has reached new levels of service thanks to the time and financial contributions from Bechtel and MSA. Hanford contractors are such a vital part of our economy, it's amazing to see the support they are also willing to provide in the community." *



Mission Support Alliance president Bob Wilkinson (left) and Waste Treatment Plant Project director Brian Reilly (right), after helping to pack more than 6,100 Bite2Go food kits.



Bechtel's NextGen and Women@Bechtel employee resource groups volunteer at the Bite2Go Builds and mobile markets throughout the year.



Washington River Protection Solutions volunteers Mark Tavelli and Tom Pickles visit Rosalind Franklin STEM Elementary to help students build their own wind meters using paper cups.

Hanford Tank Farm Engineers Engage Area Students

Giving young students a taste of what it's like to be an engineer is the focus of Engineers Week. Each February, volunteers from the Department of Energy (DOE) tank operations contractor, Washington River Protection Solutions (WRPS), visit local classrooms as part of a national outreach program designed to encourage young people to pursue an education in engineering.

This year was the biggest outreach event ever; 125 WRPS volunteers visited 30 area schools to spark interest in nearly 6,600 students. Natalie Young, an engineer in WRPS' Tank & Pipeline Integrity organization, coordinated the effort.

"It's so rewarding to see the impact we're making in the classroom," Young said. "The support we get from our volunteers is amazing, and the teachers and students are so enthusiastic. It's only a few hours of our time, but you can really see the difference it makes to these kids."

The WRPS sponsored outreach segment focuses on third, fourth and fifth graders. During the week-long outreach, WRPS volunteers teach these students what engineers do and how they affect our world. They also lead fun, interactive games designed to build interest, such as building hoop

gliders, bridges and wind meters. The students test which designs work best.

"I THINK IT'S A GREAT LEARNING EXPERIENCE FOR EVERYONE. WE LEARN THAT SOMETIMES WE HAVE TO WORK TOGETHER AS A TEAM AND COOPERATE TO ACHIEVE THE GOAL."

— Bradley, Badger Mountain Elementary fifth grader

"They're learning that we learn from failure, and we can develop a plan to improve upon and recreate their design.



Students at Pasco's Marie Curie STEM Elementary attempt to build bridges out of marshmallow and toothpicks.

It is all part of the engineering process, so failure is okay,” said Kelsey Jager, a fifth grade teacher at Badger. “I love that these volunteers find value in teaching and educating the next generation of workers. It’s super important and we really appreciate them,” she said. *

Washington River Protection Solutions volunteer Ashley Ansolabehere (right) coaches students at Kennewick's Cottonwood Elementary on an exercise that asked teams to transfer “radioactive” ping pong balls from one container to another.



WSU Tri-Cities Partners with Hanford Contractor to Develop Technologies for Hanford Site



Engineering professor Srinivas Allena and students work with samples in the concrete lab at WSU Tri-Cities.

Two teams at Washington State University Tri-Cities (WSU-TC) have partnered with Washington River Protection Solutions (WRPS) to develop technologies that will protect Hanford Site workers.

One team's goal is to procure and program an autonomous vehicle; the other team strives to develop a form of ultra-high-performance concrete that will help protect workers in radioactive areas at the Hanford Site and safely immobilize solid secondary wastes.

WRPS is the Department of Energy's (DOE) Tank Operations contractor responsible for managing Hanford's 56 million gallons of highly radioactive waste and preparing it for delivery to the onsite Waste Treatment Plant. The partnership with WSU-TC will provide WRPS with customized technology to fit their needs. It will also improve the safety capabilities of WRPS' employees and environmental impact stemming from the Hanford Site tank farms.

ROBOTICS TO ANALYZE RADIOACTIVE VAPORS

WRPS provided a WSU-TC team with an initial contract to procure and program an autonomous vehicle that would be

used for measuring vapors (chemical gases) in the tank farms.

The WSU team consists of Akram Hossain, vice chancellor for research, graduate studies and external programs; Scott Hudson, professor of electrical engineering; John Miller, associate professor of computer science; and Changki Mo, associate professor of mechanical engineering.

The team plans to purchase a prefabricated, compact, programmable vehicle with the capacity to hold 40 to 50 pounds of equipment. The team will eventually outfit, customize and program the vehicle for its desired purpose in the tank farms. The vehicle must be able to follow a defined path, dock itself to charge its battery, withstand long-term use and be able to run autonomously, as well as allow manual override operations.

“This vehicle will be going into areas, minimizing personnel entries, so we need to ensure that it can operate reliably and it won’t break down,” Miller said “We have to make certain that the quality is of impeccable standards and that the system can demonstrate operational longevity in these areas.”

The design of the autonomous vehicle marks the first phase of what potentially will be a multi-phase project. WRPS also has expressed interest in having the robot detect obstacles in a changing environment, change filters at the work site and monitor radiation. Miller said those challenges will most-likely be addressed in future phases of the project.

The team plans to have the first phase of the autonomous vehicle completed and demonstrated to WRPS in the next few months. They will conduct demonstrations and work on additional development phases over the course of the year. When fully developed, the autonomous vehicle would be deployed in tank farms to support construction and operations.

“ THIS IS A GREAT OPPORTUNITY FOR WSU, AS WELL AS FOR OUR STUDENTS. IT CREATES OPPORTUNITIES FOR UNDERGRADUATE RESEARCH, AS WELL AS PROVIDES FUNDING FOR GRADUATE RESEARCH. IT IS THE PERFECT OPPORTUNITY FOR US.”

– John Miller, associate professor of computer science at WSU Tri-Cities

ULTRA HIGH-PERFORMANCE CONCRETE TO ENCAPSULATE NUCLEAR WASTE

Srinivas Allena, WSU Tri-Cities associate professor of civil and environmental engineering, received a contract to develop an ultra-high performance cementitious material to potentially be used as a grout to encapsulate solid secondary waste from the Hanford Site tank farms.

“WRPS is using a grout they obtain from a local concrete supplier. This grout uses a regular cement mix with sand and some other chemical additives,” Allena said. “But the goal with our research is to use locally available materials to create a composite with low permeability, superior durability and greater stability that would perform at the same level as the commercially available prepackaged ultra-high-performance concrete.”

Allena said that available types of ultra-high-performance concrete are limited and high operational costs are associated with use of the material. By using locally available materials and optimizing mixture constituents with more environmentally friendly choices, the team’s composite would keep the costs low, while maintaining the concrete’s quality and reducing the impact to the environment.

“We will be able to compare our grout materials with the properties of what WRPS is currently using and show the improved properties,” he said. “The goal is to provide a cheaper, more environmentally friendly option that will compete with the best product on the market.”

The team plans to have initial mixtures ready with their mechanical and durability properties evaluated by September.

The projects are a part of solving some of the world’s grand challenges. They pertain particularly to developing sustainable resources and smart systems by harnessing technology to improve quality of life. The projects are also in line with WSU’s Drive to 25, which is an initiative to turn the college into a top 25 public research university by 2030. ✨

