August 23, 2022

REQUEST FOR EXPRESSION OF INTEREST
Improved Annulus Visual Inspection Camera System

Introduction

Washington River Protection Solutions (WRPS) is the Tank Operating Contractor (TOC) for the U.S. Department of Energy Hanford site. The Hanford Site stores mixed radioactive and chemically hazardous waste in large underground tanks. Hanford has 149 older Single Shell Tanks (SST) and 27 newer double-shell tanks (DST) grouped together in tank farms. The DSTs have capacities from 500,000 to 1,000,000 gallons; and measure up to 75' in diameter and 45' in depth. Each double-shell tank has an annulus space between its primary tank and secondary liner containment. Multiple openings at the top of this annulus space called risers, provide access for deployment of inspection equipment. The smallest size of these risers used for visual inspections is a 3" diameter pipe. To ensure fitment through these penetrations from grade, the outer diameter of tools being deployed is limited to be less than 2.75" in diameter. While the camera systems are deployed into the annulus of these DSTS, the devices are controlled remotely, many hundreds of feet away from the riser access points. Inspection personnel remain outside the bounds of the tank farm fence line to control deployed inspection tools. Typical requirements for this include a 300 ft tether from the fence line to the riser access point at grade. Deployment vertically into the annulus space from grade to the bottom of the annulus is approximately 60 ft. The annulus space is 30 inches wide between the primary tank wall and secondary liner. Inspection camera technologies will need to be able to provide acceptable inspection results within a few feet from the camera up to approximately 25 ft away when the camera looks around the circumference of the tank to the left and right.

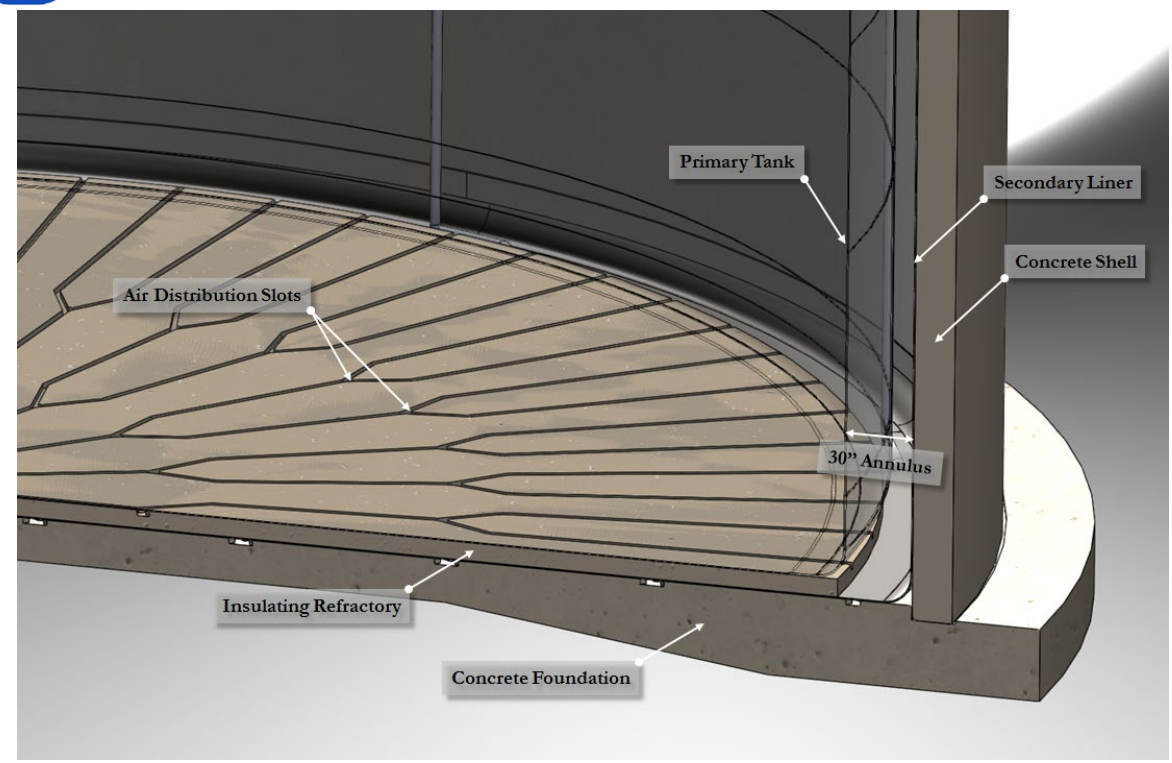

Figure 1. Double-Shell Tank General Features

Current Technology

Video inspections of the tank annulus occur every three years utilizing tether deployed pan-tilt-zoom inspection cameras systems. Several cameras are utilized, but the most common is a GE PTZ-70 given annulus diameter limitations. These inspections result in approximately an hour of video footage through each riser access point around the perimeter of the annulus space. Footage is captured through 8-10 risers at each tank, resulting in approximately 10 hours of footage per tank to be evaluated by Engineering personnel. We would like to streamline this inspection approach through the application of improved technology. Currently, still images are taken as screenshots from this inspection footage to compare between instances and identify areas of interest. These images are of lower quality than a native still image may have otherwise been. An improved inspection device solution is needed to provide rapid still image capture results of a higher quality that can be more easily interpreted by engineering to understand any changing conditions or areas of concern. A single panoramic image from various elevations within the annulus space would be desirable, but a collection of high quality images with sufficient field of view would also be sufficient. The annulus space of double-shell tanks includes no supplementary lighting, so a successful device will need to include its own sufficient illumination.

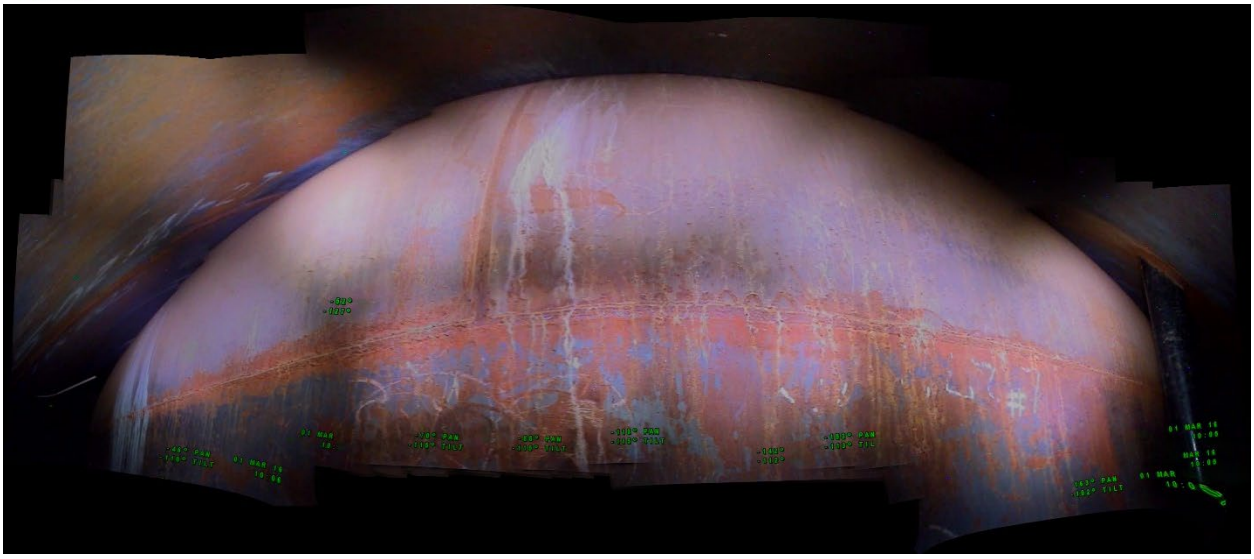

Figure 2. Double-Shell Tank Annulus Composite Image, Upper Tank

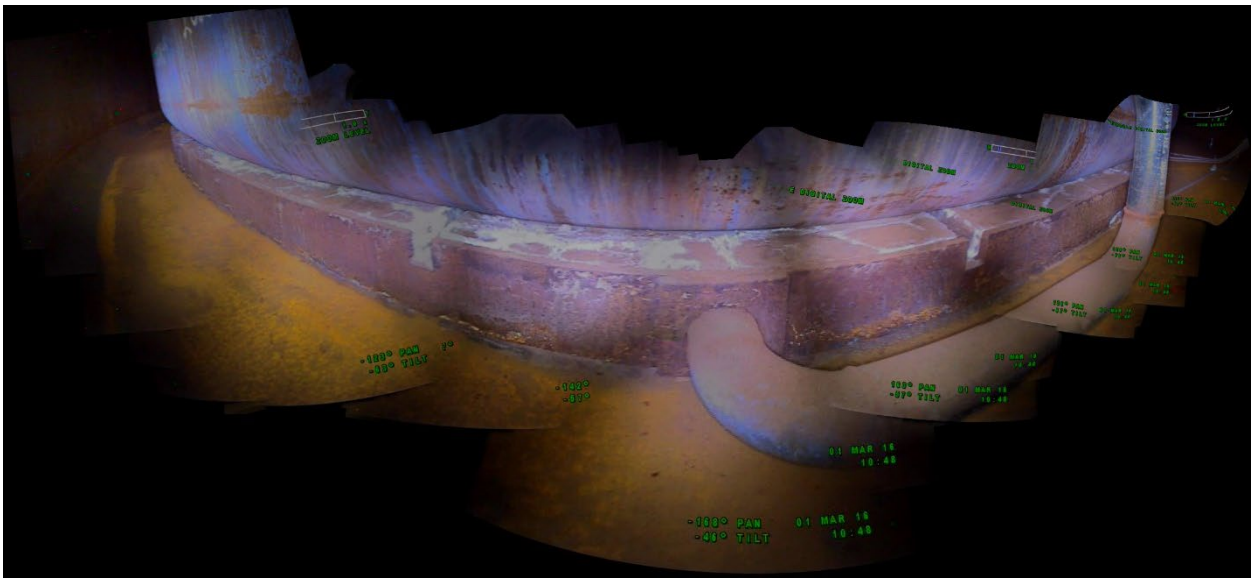

Figure 3. Double-Shell Tank Annulus Composite Image, Lower Tank and Annulus Floor

For more historical Hanford tank information please visit http://www.hanford.gov/page.cfm/hab.

Technology Need

As the TOC continues to conduct these high value inspections on a more frequent basis within DST annuli for signs of corrosion, more timely review of inspection footage is required.
An improved inspection device solution is needed to provide rapid still image capture results of a higher quality that can be more easily interpreted by engineering to understand any changing conditions or areas of concern. A single panoramic image from various elevations within the annulus space would be desirable, but a collection of high-quality images with sufficient field of view would also be sufficient. The annulus space of double-shell tanks includes no supplementary lighting, so a successful device will need to include its own sufficient illumination.

The purpose of this EOI is to solicit interest from vendors to provide a capable camera inspection solution to streamline the field inspection and post-inspection review of these double-shell tank annulus visual inspection efforts.

QUALITY ASSURANCE

This work is classified as QL-3, General Service.

EOI SUBMITTALS:

Interested parties are invited to submit an expression of interest letter to include the following:

- Provide a description of similar projects where your technology was used, if possible
- Rough Order of Magnitude (ROM)
- Include a response to the following items which signify the Camera Criteria:

1. Does the camera fit down a diameter of 3.0" or less?
2. Does the equipment use consensus standard tools and connections?
3. Provide a description of how your technology will be able to record annulus tank features and record still images of targets in the tank.
4. How is the camera operated (e.g. controller, one touch-button, etc.)?
5. Does the operator need to manipulate the instrument during the scan? Does it have automation capability.
6. Is the deployed hardware water proof or water resistant?
7. What are the temperature ranges that the instrument can handle?
8. How durable is the instrument (i.e. jarring, dropping, vibration, etc.)?
9. How well will the laser scanner hold up in a radiological environment?
10. What kind of chemical resistivity does the laser scanner have?
11. What interfaces with the camera are required (power, air, internet connection?) Please provide specific requirements for any interfaces.
12. What are the power requirements (i.e. 110, 220 Volts, batteries, etc.)? Will additional power be required?
13. Is the electrical equipment listed or labeled by an organization currently recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL)?
14. Does the video and images have at least 1080p resolution?
15. Does the system automatically generate the panorama images for each riser?
16. Describe riser deployment.
17. What is the ability/accuracy of the instrument to determine its own position within the tank (i.e. mechanical encoding or LIDAR)?
18. How stable does the instrument have to be to get quality readings?
19. Is the data stored on the instrument? If so, how?
20. How is the data transferred? (Umbilical cord, Memory Card)
21. A description of the software used to stitch and create panoramic images.
22. What are the data output file formats?

This is not a Request for Proposal, but a request for an expression of interest. WRPS will not award a contract(s) based on this expression of interest nor pay for information solicited.

Responses with details on the recommended technology must be received by WRPS no later than close of business on September 13, 2022 by 4:00 pm (PDT) via email to: Marisa Struwe – marisa_m_struwe@rl.gov