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Revision 0

300-FF-5 OPERABLE UNIT STAGE B URANIUM SEQUESTRATION FUNCTIONAL REQUIREMENTS

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

P.O. Box 1600
Richland, Washington 99352

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Terms

AMSL	above mean sea level
bgs	below ground surface
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CHPRC	CH2M HILL Plateau Remediation Company
EA	enhanced attenuation
ERT	electrical resistivity tomography
FRD	functional requirements document
LVZ	lower vadose zone
MSA	Mission Support Alliance
O&M	operations and maintenance
PRZ	periodically rewetted zone
RCRA	*Resource Conservation and Recovery Act of 1976*
S&GRP	Soil and Groundwater Remediation Project
TD	total depth

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1 Introduction

This functional requirements document (FRD) was developed for delivery of phosphate solutions to the vadose zone in a 0.9 ha (2.25 ac) plot located in the 300 Area. A short background and project description are provided in the following subsections.

1.1 Background and Need

The applicable groundwater remedial action presented in the 300 Area record of decision (EPA and DOE, 2013, *Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1*) requires enhanced attenuation (EA) through uranium sequestration across 1.2 ha (3 ac) of the 300 Area. The uranium sequestration remedy was planned in two stages (Stage A and Stage B) per DOE/RL-2014-13-ADD2, *Remedial Design Report/Remedial Action Work Plan Addendum for the 300 Area Groundwater.* Both documents require phosphate solution delivery to the vadose zone and top of the aquifer.

Stage A was completed on 0.3 ha (0.75 ac) of the required 1.2 ha (3.0 ac) in the fall of 2015. Implementation of the remedy on the 0.3 ha (0.75 ac) Stage A area was successful and the remedy will be implemented on the remaining 0.9 ha (2.25 ac) for Stage B. This FRD is needed to stipulate the requirements for successful installation and operation of equipment necessary for completion of the remedy on the remaining Stage B area.

The scope of this project is to design an injection network to meet the requirements in this FRD using existing equipment to the extent practical.

1.2 Project Description

The Stage B treatment area is located near the former 300 Area Process Trenches and former North Process Pond, as shown in Figure 1.

The Stage B treatment area consists of two segments where injections are required. The segments will be equipped with 48 injection wells, up to 24 monitoring wells, and an electrical resistivity tomography (ERT) system. Injection wells will be constructed with 15.2 cm (6 in.) diameter schedule 80 polyvinyl chloride permanent casing and well screens. The injection wells will be drilled to an elevation of 101 m (331 ft) above mean sea level (AMSL) (i.e., minimum final depth of 13.5 m [44 ft]) with a lower screened interval nominally from 105 to 106.5 m (344.4 to 349.4 ft) AMSL and an upper screened interval from approximately 108 to 109.5 m (354.3 to 359.2 ft) AMSL, separated by a 1.5 m (5 ft) blank section of casing. Several preselected injection and monitoring wells will be fitted with ERT sensors attached along the outside of the well casing.

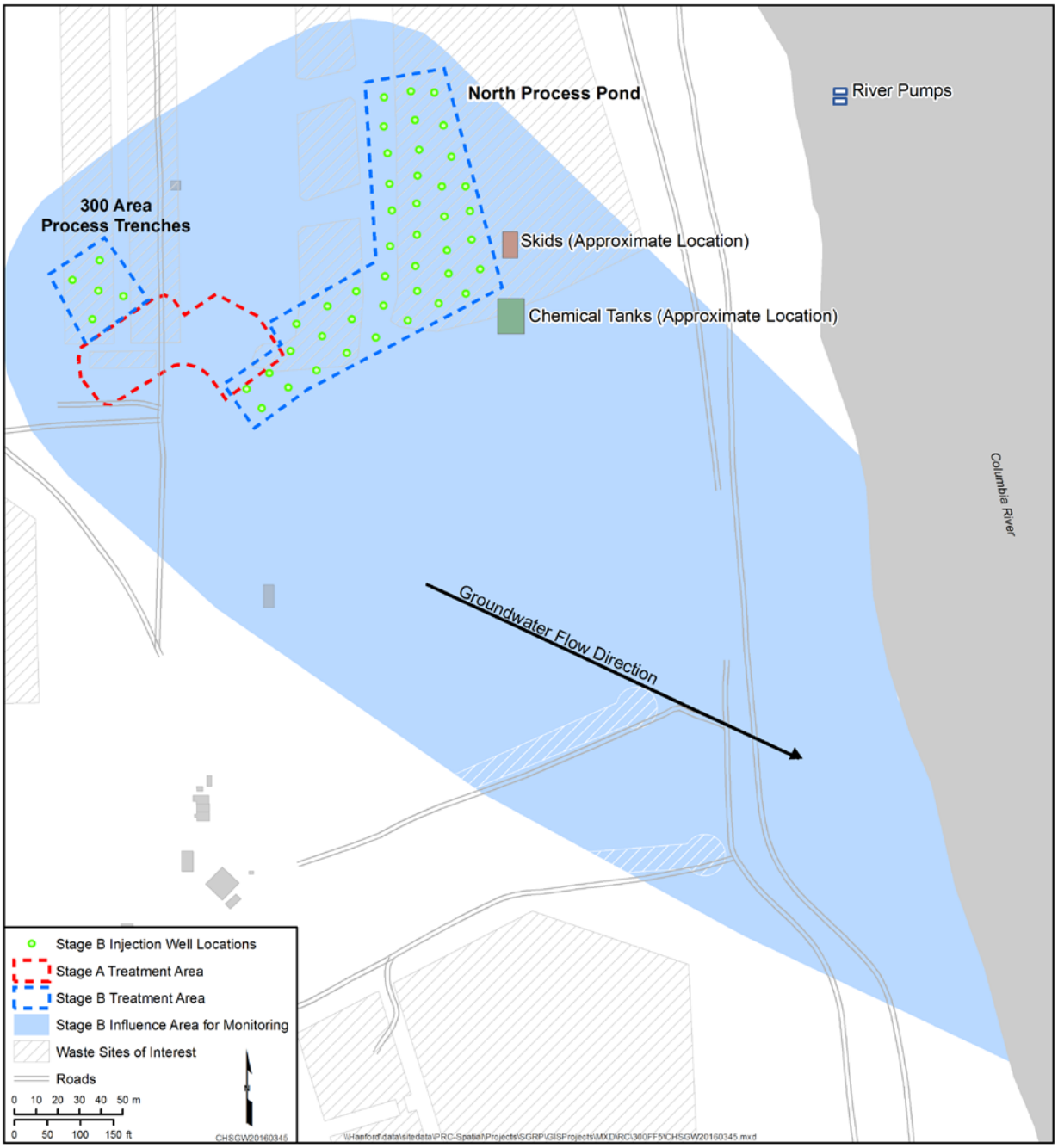

Figure 1. Stage B General Site Layout

2 Facility Requirements

Existing equipment used in Stage A operations will be used or evaluated for reuse and resized, if necessary, for efficient Stage B operations.

2.1 New Facility

No permanent equipment or facilities are associated with the EA uranium sequestration remedy; every component is intended to be temporary. At the conclusion of Stage B operations, all equipment will be removed, Stage A and Stage B wells will be decommissioned, and the immediate area will be restored to the condition existing prior to EA remedy implementation.

2.2 Modifications to Existing Facilities

During design, an evaluation of increased throughput and efficiency through equipment upgrades (e.g., pumps size, hose size, and chemical tank) may be considered.

3 Utility Requirements

Utility requirements and configuration will be similar to the design in ECR-15-000692, *300 Area Chemical Injection System*. The following components of the project require power sources:

- Mixing skids/river pumps
- ERT system
- Office trailer
- Work area lighting
- Monitoring well submersible pumps, downhole instrumentation, and data loggers
- Additional items, such as portable eye wash stations and heat blankets, which may require a power source
- Air compressors for well packers

Power is available at a pole mounted transformer to the west of the site near the old 300 Area substation. An evaluation of the usability of this power supply for applicability to the listed Stage B components will be conducted. Portable generators may be considered to supply power.

4 Process Requirements

The following subsections provide the process description, capacity requirements, and storage and handling requirements.

4.1 Process Description

Columbia River water will be pumped inland, via a submersible pump through a filter pack, to the chemical mixing skids where it will be mixed with two phosphate solutions. From the mixing skids, treatment solutions will flow to injection wells for two injection cycles. Initially, treatment solutions will be injected into the periodically rewetted zone (PRZ) followed by treatment solution injection into the lower vadose zone (LVZ).

4.2 Capacity Requirements

Until the target volume is achieved at each of the screened intervals, 48 dual screened injection wells will require mixed treatment solution at a target flow of 189 L/min (50 gal/min) per well. Higher injection rates

are desirable to reduce operational duration. The network of monitoring wells requires data loggers plus collection of daily samples from up to 24 wells. Sample pumps will be permanently installed in the monitoring wells, for the duration of the Stage B groundwater sampling evolution, and connected to a central sampling station.

4.3 Storage and Handling Requirements

All materials and equipment will be designed such that outdoor use and storage are permitted. Phosphate chemicals will be delivered by a chemical vendor and stored in up to eight 30,000 L (8,000 gal) tanks. Phosphate chemicals are stable at temperatures above 1.6°C (35°F). Phosphate solutions are nonhazardous and nonregulated.

5 Operating Requirements

The following sections describe the operating assumptions realized during Stage A and provisions for planned operations.

5.1 Operating Assumptions

Operations will be conducted between August and November above freezing temperatures. Based on Stage A injection well performance, all wells screened in the PRZ and LVZ will be designed to accept greater than 189 L/min (50 gal/min).

5.2 Operating Provisions

The work area will have provisions for system operation 24 hours a day. Mixing skid operations will be conducted to use both skids for injection operations.

6 Design Requirements

Stage B design requirements will consider the following lessons learned from Stage A operations:

- The following hose, fitting, and connector issues were identified by workers:
  - Handling of large diameter water hose from the river pumps was difficult.
  - Mixing skid discharge is recommended to be changed to a solid 45-degree (downward-angled) fitting.
  - During hose pressurization, connection fittings leaked for numerous reasons including incompatibility between hose type and hose clamp and unknown hose clamp torque values, with some hoses requiring double clamping of fittings; crimp fittings on smaller red hoses caused problems at pressure regulators and need to be changed for Stage B.
- River pump issues identified by workers include the large physical separation between the river pumps and their adjustable frequency devices (not the optimum configuration for system operation).
- The following chemical mixing skid issues were identified by workers:
  - Rework all globe valve internals, given that the chemicals negatively impacted ability of valves to properly seat causing leaks (more suitable alternative may be to select valves more compatible with chemical solution).
  - Explore replacing chemical pumps with metering pumps.

  - Design chemical mixing pump to operate in an automatic mode.
  - Repair or replace trailer flow meters to enhance reliability.
  - Consider relocating flow meters to discharge lines in order to simplify operations.
- ERT issues identified by workers include ensuring that hazardous energy control requirements, surface voltage, electrical safety listings, and inspections are accounted for in the process.
- Involve operations and maintenance (O&M) personnel in the processes, as early as possible, for hazards identification and equipment determination.

6.1 Equipment and Controls

The work area will be located in the 300 Area (Figure 1). Key equipment includes up to 8 chemical storage tanks, 2 mixing skids, 2 submersible river pumps, up to 24 monitoring wells, an ERT system, 48 well packers, and 48 injection wells. Skid details and river pump details will be similar to those in ECR-15-000692. Grounding rods will be used for electrical grounding of equipment.

6.1.1 Site Infrastructure

The operational area will be designed for safe and ergonomic personnel occupancy and equipment/material storage. Components of the site infrastructure include the following:

- Portable office trailer
  - Suitable for occupancy by up to eight people
  - Computer with Hanford Local Area Network access (wireless [Scorpion])
  - Printing, fax/scan, and photocopy capability
  - Temperature controlled
  - Refrigerator and microwave
  - Eating area
  - Closet/storage space for office consumables
- Restroom trailer (men and women)
- Chemical eyewash with capability to deliver warm (tepid) water
- Designated parking for a minimum of 10 vehicles (provided by others)
- Temperature controlled storage for sensitive equipment
- Site lighting
  - Entrance on Route 4 South
  - Office trailer
  - Skids
  - ERT trailer
  - Chemical tanks
  - Parking area

- Road access
  - River pump access point
  - Chemical delivery access
  - Site parking
- Gravel pads
  - Mixing skids
  - Chemical tanks (with 5.0 to 10.1 cm [2 to 4 in.] sand base)
  - Injection and monitoring wells
  - ERT trailer
- Site access control
  - Designated location for shoreline and river access (shoreline access as allowed by Mission Support Alliance [MSA] cultural and ecological requirements)
  - River shoreline access restriction without MSA cultural approval
- Spill control
  - Onsite spill control kits
  - Chemical tank spill pads
  - Generator spill pads

Provisions will be in place for pest control and pest control contact information (e.g., wasps, mice, and snakes). All activities requiring permits will be commenced after appropriate permits have been signed by the Responsible Manager. Applicable permits include excavation, fire permit for operation, and office occupancy permit.

6.1.2 Chemical Tanks

Injection operations will use up to eight 30,000 L (8,000 gal) chemical storage tanks storing concentrated mixtures of two nonhazardous and nonregulated phosphate solutions. Tanks are equipped with sight tubes for level indication and 7.62 cm (3 in.) male inlet and outlet ports. Tanks will be at similar elevation as mixing skids and will be located per engineering design. Tanks will be positioned on spill pads, which will be on 5.0 to 10.1 cm (2 to 4 in.) of sand for wear protection. Chemical tanks will be located to accommodate chemical delivery truck access and spill control.

6.1.3 Mixing Skids

Two existing mixing skids are each capable of mixing liquids, received from river pumps and two chemical pumps, and discharging the treatment solution at nominal rates of 1,135 L/min (300 gal/min).
The baseline assumption is that the mixing skids used in Stage A operations will be used to meet Stage B requirements. However, evaluation of skid upgrades will be conducted for efficiency improvements. Mixing skids will be located per engineering design along the eastern edge of the Stage B treatment area. A 6-pack filter bank, connected to each skid, will be in line between the skids and river pumps. Monosodium phosphate and pyrophosphate solutions will be pumped from the chemical storage tanks by the mixing skid chemical pumps and mixed with river water. The river water to monosodium phosphate ratio is 9.5:1, and the water to pyrophosphate ratio is 15.5:1. Table 1 shows chemical blending concentrations.

Table 1. Target Stage B Chemical Blending for Phosphate Injection

Reagents	Concentration in Buffered Concentrate (+/- 5%) (mg/L)	Target Injection Concentration (+/- 5%) (mg/L)	Total Injection Rate[a] (L/min/gpm)	Concentrate Feed Rate (L/min/gpm)	Makeup Water Feed Rate (L/min/gpm)
NaH_2PO_4 and KH_2PO_4 Blend (Monosodium and Monopotassium Phosphate	83,000[b]	7,444[b]	2,270/600	204/54	1,942/513
$Na_4P_2O_7$ (Pyrophosphate)	20,000	1,097	2,270/600	125/33	1,942/513

a. Total injection rate for 12 wells.

b. Target concentration measured as phosphate.

6.1.4 River Pumps

Each of the two river pumps will be capable of delivering approximately 969 L/min (256 gal/min) of water to two mixing skids. The skids are approximately 9.1 m (30 ft) higher in elevation than the pumps. River pumps will be located 30.4 to 45.7 m (100 to 150 ft) from the river shore in at least 2.4 m (8 ft) of water. The baseline assumption is that the river pumps used in Stage A operations will be used to meet Stage B requirements. However, evaluation of pump upgrades will be conducted for efficiency improvements. MSA cultural staff will be present when setting, removing, and accessing the river pumps. Pumps will be tested and confirmed to be in working order prior to deployment.

6.1.5 Water and Chemical Transfer Hose

Three categories of hose are required: hose in river, aboveground water hose, and chemical hose. Hose in river will be durable and able to withstand abrasion from the river bottom and shoreline rocks. Aboveground water hose will be designed with weight and maneuverability for consideration of worker ergonomics. Chemical hose will be designed to withstand suction collapse and chemical deterioration.

6.1.6 Injection Wells

All injection wells will be constructed with 1.5 m (5 ft) of well screen in the PRZ (105 to 106.5 m [344.4 to 349.4 ft] AMSL) and 1.5 m (5 ft) of well screen in the LVZ (108 to 109.5 m [354.3 to 359.2 ft] AMSL). The two screened intervals will be separated by 1.5 m (5 ft) section of blank casing. Injection wells will be operated to reach the target injection volume to the lower screen in 12 of 48 injection wells and then to the upper screen in the same 12 of 48 injection wells and repeated until all 48 wells have received the target injection volume. Several preselected injection and monitoring wells will be fitted with ERT sensors attached along the outside of the well casing. All injection well casings will be glued. Injection well locations and ERT equipped wells are presented in Table 2, and injection well construction information is shown in Table 3. Figure 2 shows injection well locations and injection zones.

Table 2. Injection Well Location and Injection Well Name

Easting	Northing	Well Identification	Injection Well Name	ERT Well	Easting	Northing	Well Identification	Injection Well	ERT Well
594247.387	116547.767	C9642	399-1-98		594220.267	116492.602	C9666	399-1-122	
594260.352	116536.258	C9643	399-1-99		594203.334	116470.773	C9667	399-1-123	
594248.787	116531.604	C9644	399-1-100		594191.957	116478.446	C9668	399-1-124	Y
594258.367	116547.767	C9645	399-1-101		594189.331	116462.704	C9669	399-1-125	
594207.832	116499.216	C9646	399-1-102		594178.725	116472.337	C9670	399-1-126	Y
594180.183	116484.135	C9647	399-1-103	Y	594176.346	116454.898	C9671	399-1-127	
594220.664	116588.910	C9648	399-1-104		594167.615	116461.381	C9672	399-1-128	
594232.967	116591.688	C9649	399-1-105		594164.043	116445.241	C9673	399-1-129	
594243.815	116591.159	C9650	399-1-106		594157.032	116454.105	C9674	399-1-130	
594248.049	116575.946	C9651	399-1-107		594205.715	116486.384	C9675	399-1-131	
594234.952	116578.327	C9652	399-1-108		594192.272	116490.964	C9676	399-1-132	Y
594220.400	116575.416	C9653	399-1-109		594231.512	116485.722	C9677	399-1-133	
594222.252	116563.113	C9654	399-1-110		594245.932	116493.660	C9678	399-1-134	Y
594236.804	116564.701	C9655	399-1-111		594237.357	116500.066	C9679	399-1-135	Y

Table 2. Injection Well Location and Injection Well Name

Easting	Northing	Well Identification	Injection Well Name	ERT Well	Easting	Northing	Well Identification	Injection Well	ERT Well
594251.753	116561.393	C9656	399-1-112		594076.598	116504.508	C9680	399-1-136	
594236.142	116552.662	C9657	399-1-113	Y	594085.859	116486.384	C9681	399-1-137	
594223.046	116548.826	C9658	399-1-114	Y	594100.146	116497.100	C9682	399-1-138	
594224.236	116536.655	C9659	399-1-115	Y	594089.166	116513.504	C9683	399-1-139	
594235.613	116539.830	C9660	399-1-116	Y	594250.430	116507.418	C9684	399-1-140	Y
594261.146	116523.161	C9661	399-1-117		594258.500	116498.158	C9685	399-1-141	Y
594264.982	116509.403	C9662	399-1-118		594223.442	116520.118	C9686	399-1-142	
594247.729	116516.787	C9663	399-1-119		594235.084	116510.858	C9687	399-1-143	
594221.061	116506.228	C9664	399-1-120		594235.746	116525.410	C9688	399-1-144	
594216.828	116477.917	C9665	399-1-121		594088.637	116499.481	C9689	399-1-145	

Table 3. Injection Well Requirements

Number of injection wells: 48
Well diameter: 15.24 cm (6 in.)
Well screen from 8 to 9.5 m (26.5 to 31 ft) bgs, blank section of casing from 6.5 to 8 m (21.3 to 26.5 ft) bgs with approximately 0.9 m (3 ft) well packer installed; well screen from 5 to 6.5 m (16.4 to 21.3ft) bgs
Target flow rate: 189 L/min (50 gal/min) per well screen
Total well depth: approximately13.5 m (44 ft) bgs (estimated depth to water 10 m [32.8 ft] bgs)
Inject minimum target volume into lower well screen and then into upper well screen
Capability to adjust and measure flow of river water and chemicals to mixing skid and flow of effluent from each mixing skid port
Inject mixed chemical and river water solution at 7,396 mg/L as PO4 (+/- 5%) and 1,097 mg/L as Na4P2O7 (+/-5%)

bgs = below ground surface

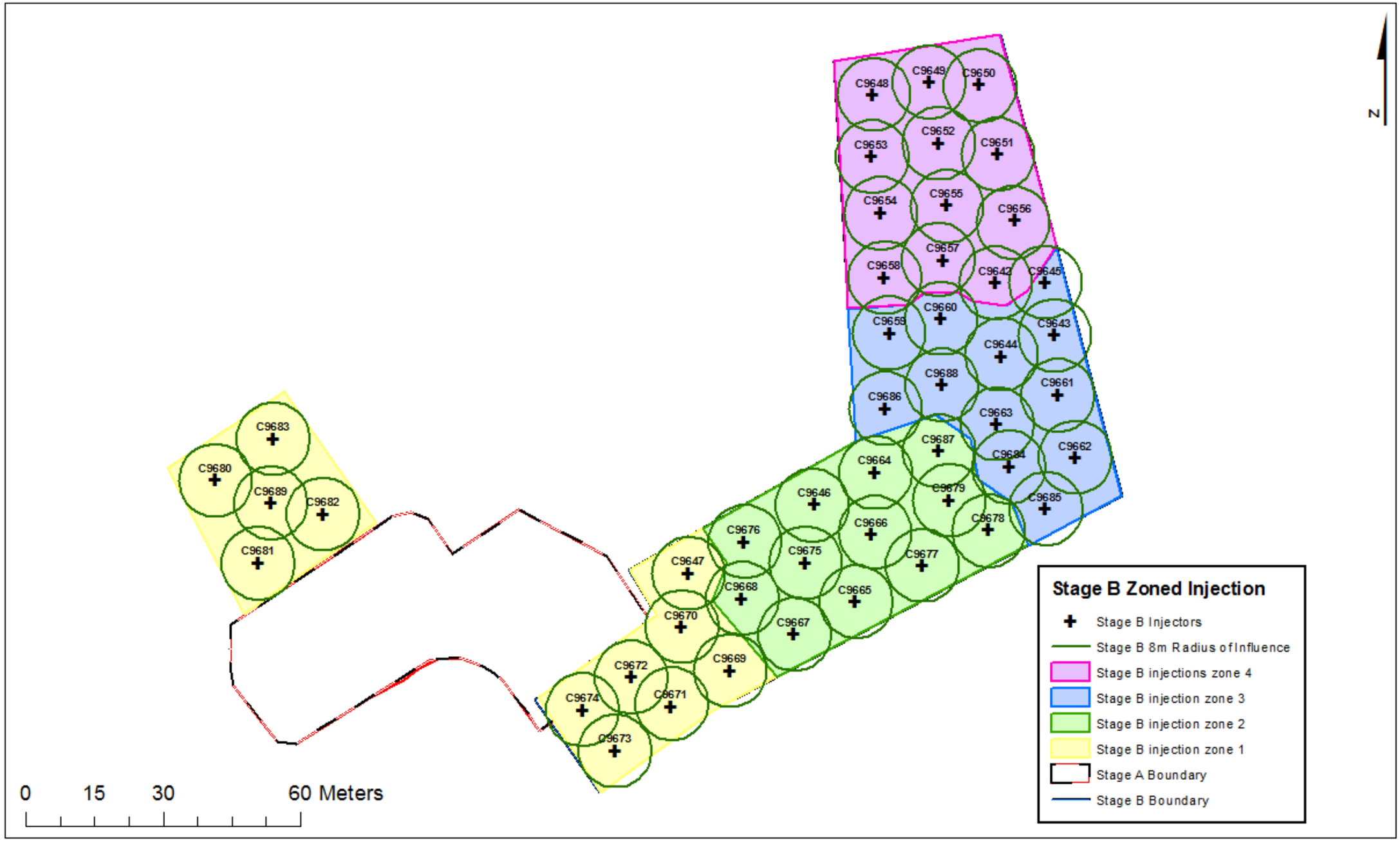

Figure 2. Injection Well Locations and Injection Zones

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6.1.7 Monitoring Wells

Performance monitoring will occur at up to 24 monitoring wells. A groundwater monitoring system will be designed so that up to 24 monitoring wells may be sampled daily. The monitoring wells will be equipped with low flow pumps and continuously purged during the daily sampling regime.
Storage capacity for volume of purge water generated in 2 days and shipment to ModuTanks[1] will be provided. Daily sampling will occur through the duration of the Stage B treatment plus 1 week after treatment operations have concluded, followed by weekly sampling for 4 weeks and monthly sampling for 6 months. Sample tubing will be equipped to readily allow for draining of water during freezing weather. Monitoring well locations and ERT equipped wells are shown in Tables 4 and 5 with construction details in Table 6. Monitoring well locations are shown in Figure 3 with injection well and monitoring well cross sections shown in Figure 4.

Table 4. Paired Monitoring Well Location and Identification

Easting	Northing	Well Identification	Well Name	ERT Well	Existing Well
594245.11	116568.35	C9690	399-1-146	-	-
594216.11	116486.30	C9691	399-1-147	-	-
594081.69	116494.22	C8935	399-1-73	-	Y
594080.16	116494.16	C8934	399-1-72	-	Y
594256.28	116530.17	C9692	399-1-148	-	-
594187.99	116480.11	C9693	399-1-149	Y	-
594227.46	116546.41	C9694	399-1-150	Y	-
594247.84	116497.99	C9696	399-1-152	Y	-
594166.11	116453.36	C9697	399-1-153	-	-
594227.36	116583.22	C9698	399-1-154	-	-
594231.83	116542.84	C9699	399-1-155	Y	-
594255.69	116529.82	C9700	399-1-156	-	-
594246.20	116568.61	C9701	399-1-157	-	-
594228.34	116583.85	C9702	399-1-158	-	-
594249.16	116502.81	C9703	399-1-159	Y	-
594184.02	116481.99	C9704	399-1-160	Y	-
594214.84	116486.70	C9705	399-1-161	-	-
594167.01	116454.12	C9706	399-1-162	-	-

[1] ModuTank is a product name of ModuTank Inc., Long Island City, New York.

Table 5. Stage B Downgradient Monitoring Well Location and Identification

Easting	Northing	Well Identification	Well Name	Existing Well
594112.87	116413.79	A5028	399-1-17A	Y (399-1-17A)
594236.45	116395.56	C9708	399-1-164	
594332.50	116473.98	C9709	399-1-165	
594323.61	116586.22	C9710	399-1-166	
594113.51	116453.15	C5000	399-1-23	Y (399-1-23)
594260.06	116335.09	A5040	399-1-7	Y (399-1-7)

Table 6. Monitoring Well Requirements

Up to 24 monitoring wells sampled daily
Well diameter 10.16 cm (4 in.)
PRZ monitoring wells screened from 8.5 to 10 m (27.8 to 32.8 ft) bgs and aquifer monitoring wells screened from 10.5 to 12 m (34.4 to 39.3 ft) bgs
Equipped with instrumentation and data logging capability for pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and water level
Equipped with submersible pumps capable of low flow delivery
Power supply for submersible pumps and downhole data instrumentation
Purge water storage
Remote sampling from sample manifold

bgs = below ground surface

6.1.8 Electrical Resistivity Tomography System

The ERT system will be designed and installed to prevent hazard to the workers by ensuring that surface operations may be conducted with potential for hazardous energy exposure from the ERT system remaining below the level that would require hazardous energy controls (i.e., the uppermost ERT probe will be located deeper than 1.8 m [6 ft] below ground surface). Previously used and evaluated ERT equipment will be used for Stage B, including power supply and load requirements; any new equipment will be inspected by appropriate subject matter expert before it is placed into service. The injection wells and monitoring wells fitted with ERT equipment will not use bentonite for sealing but rather a high strength, low permeability, low conductivity cement. The recommended grout mixture is a combination of portland cement, blast furnace slag, and fine sand. Figures 5 and 6 provide photos of ERT sensors and wiring attachments on well casing.

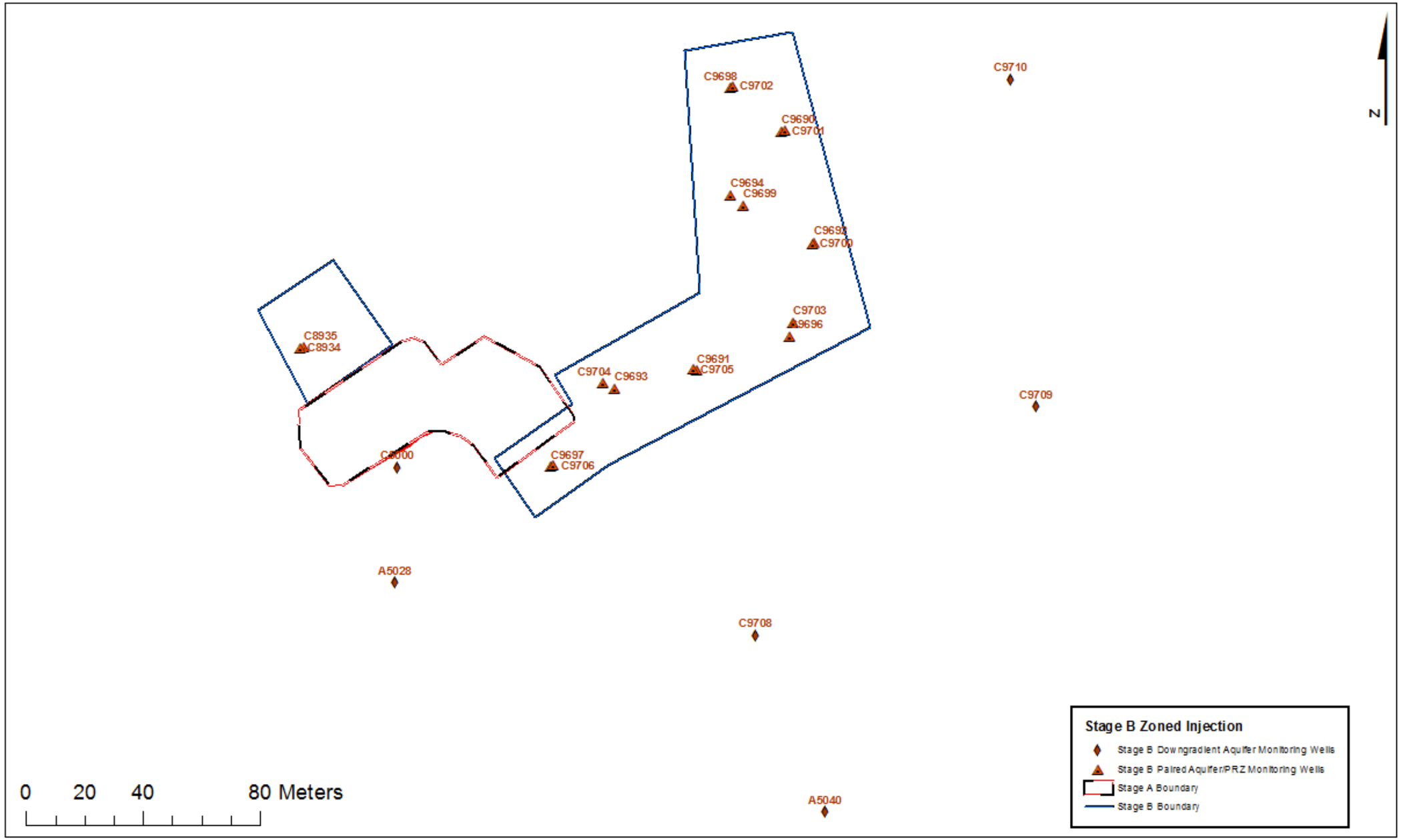

Figure 3. Monitoring Well Locations

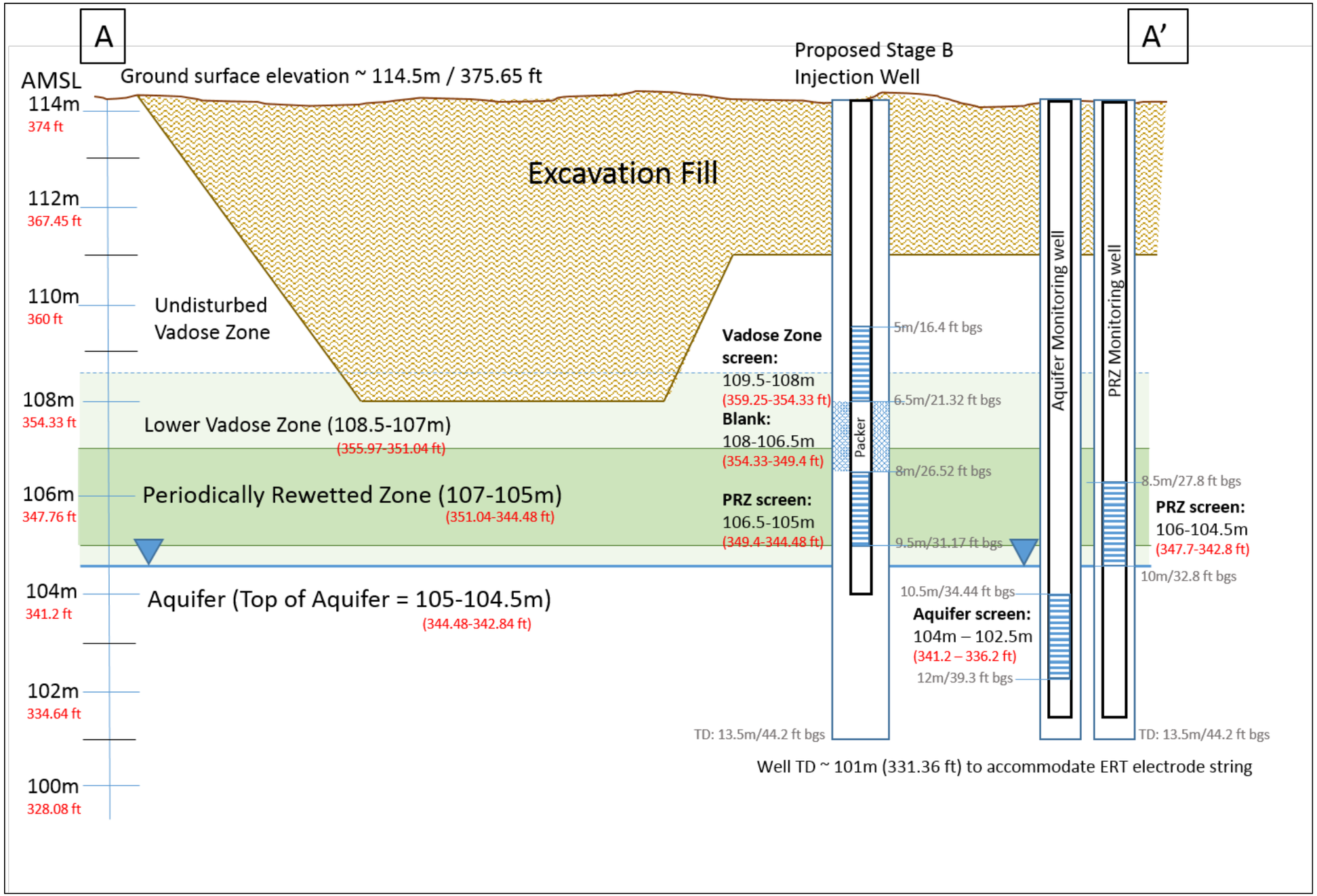

Figure 4. Injection Well and Monitoring Well Cross Section

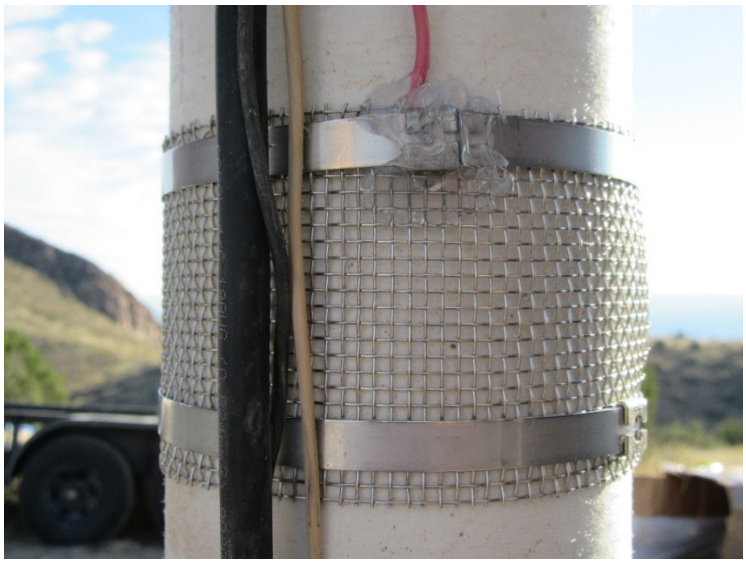

Figure 5. ERT Cross-Well Sensor

Figure 6. ERT Cross-Well Sensor Spacing and Installation

6.2 Testing Provisions

River pumps and mixing skids will have provisions for prestart functional testing and mechanical testing for leaks. All aboveground hose will be exercised and tested for leaks. The injection system will be tested to determine flow rate and adequacy to meet target flow rate.

6.3 Maintenance Provisions

River pump and chemical pump design parameters will be limited to less than 150 psig with an upper temperature limit of 51.6°C (125°F) to avoid having additional lock-and-tag requirements imposed on operation personnel when performing maintenance activities. Provisions will be in place for safe operation, security, and storage of site equipment and materials in case of inclement weather (e.g., high winds, precipitation, and extreme hot and cold temperatures).

6.4 Spare Capacity and/or Future Expansion Needs

No spare capacity and/or future expansion needs will be required to support this project.

6.5 Human Factors

Human factors will be considered in design, including review and approval by O&M.

7 Interrelationships with Other Processes, Facilities, and Support Services

Relationships with other support services include MSA Ecological Monitoring and Environmental Survey (cultural and ecological) staff, Hanford Site electric utilities organization, and other Hanford organizations as necessary (e.g., Hanford Fire Department and Hanford Patrol). There are no operating facilities or processes in the location of Stage B:

- Where possible, pipeline routes will be selected to minimize disturbance of existing plant life and wildlife resources.
- Coordination with cultural and natural resource management personnel will be performed as part of the route selection and excavation process and river access (e.g., MSA-1502630, “Ecological and Cultural Clearance for Columbia River Access and Submersible Pumps in the Columbia River for the 300 Area Sequestration Remedial Activities, Hanford Site, Benton County, Washington (HCRC# 2014-300-004, ECR-2014-303)”).
- All tie-ins to existing utilities will be coordinated and approved by the site approving authority (e.g., electrical utilities organization).

8 Radioactive, Hazardous, and Mixed Materials (Non-Waste)

Radiological hazards will be evaluated and controlled during well drilling, trenching associated with installation of ERT probes, grounding rods, other ground disturbing activity, and groundwater monitoring/sampling. Radiological hazards are not applicable to aboveground operation of mixing skids and well injections.

9 Waste Management

Waste will be managed in accordance with DOE/RL-2000-56, *Waste Management Plan for the 300-FF-5 Operable Unit*.

10 Health, Safety, and Environment

The following sections describe design requirements for consideration of radiation, nuclear, industrial, fire, and environmental safety elements.

10.1 Radiation Safety

Field operations will be performed in accordance with 10 CFR 835, "Occupational Radiation Protection," and applicable CH2M HILL Plateau Remediation Company (CHPRC) radiological requirements for all radiological work activities.

10.2 Nuclear Criticality Safety

This section is not applicable for this FRD.

10.3 Industrial Hygiene and Safety

Field operations will be performed in accordance with 10 CFR 851, "Worker Safety and Health Program," health and safety requirements and appropriate Soil and Groundwater Remediation Project (S&GRP) requirements. Additionally, work control documents will be prepared for further control of site operations.

10.4 Safety Analysis

A hazard analysis will be conducted in accordance with 29 CFR 1910.119, "Occupational Safety and Health Standards," "Process Safety Management of Highly Hazardous Chemicals," and DOE-HDBK-1100-2004, *Chemical Process Hazards Analysis*.

10.5 Fire Protection

The fire protection requirement in the general sense is to limit activity in the wild land area especially during the annual fire season. This requirement is enforced during the year by restricting access to the wild land on a graduated scale. The higher the fire danger level, the less access is granted. The danger is twofold: a wild land fire resulting from the construction activity can have a negative fiscal impact on the project, and there is a risk to the worker when fire danger is at an elevated level.

Therefore, the design of the hose through the wild land will be laid out so that it follows the accessible trails and roads through the wild land. The hose will be fabricated on the roadway (area free of vegetation) and hand carried to its design location just off the roadway. Cabling will be installed adjacent to the piping. Use of equipment to lay hose in the wild land is not acceptable.

Work will be conducted during potentially high fire conditions. Work will be conducted in accordance with applicable fire permit governing operations. Occupancy for any personnel trailer will be obtained through the fire marshal's office.

10.6 Environmental Protection and Pollution Control

The project will seek to minimize the impact to existing plant life and wildlife resources through the site selection process. Where undisturbed habitat must be used, the footprint will be limited and appropriate biological, ecological, and cultural resources reviews will be conducted.

No environmental permitting actions are necessary for this project, as the project is being conducted under the authority of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). In lieu of permitting, substantive compliance with applicable or relevant and appropriate requirements in state and federal codes and regulations will be achieved. ECR-15-000692 includes the Environmental Activity Screening Form. Ecological and cultural reviews have been conducted for this activity and are documented in ECR-2015-303 and HCRC-2014-300-004 (MSA-1502630).

11 Impacts During Project Execution

There are no impacts to operating facilities from implementation of this project.

One environmental consideration is the application of phosphate solutions, which is restricted to the months of August through November with a target of start of mid-August. During this period, sensitive bull trout are migrating in the Columbia River. The U.S. Fish and Wildlife Service will be consulted prior to project start.

Another consideration is the traditional cultural property along the Columbia River shoreline. Activities along the shoreline will be conducted in accordance with ecological and cultural reviews documented in ECR-2015-303 and HCRC-2014-300-004 (MSA-1502630).

12 Relations to Other Projects

There are no relationships to other projects or future projects.

13 Quality Assurance Provisions

CHPRC-00189, *CH2M Hill Plateau Remediation Company Environmental Quality Assurance Program Plan*, Appendix C, "Soil and Groundwater Remediation Project Quality Assurance Project Plan," describes the following graded approach for applying quality levels to S&GRP items and services:

- Use the approach to applying quality levels as outlined in PRC-PRO-QA-259, *Graded Approach*, Section 3.0, "Process."
- The following additional S&GRP items and services are enhanced commercial (General Service, Quality Level 3):
  - Testing of instruments used to demonstrate regulatory compliance
  - Procurement of services or standards used to calibrate instruments used to collect environmental data
  - Items procured for use on the electrical system (e.g., computers, refrigerators, and motors) that will be approved by the Electrical Authority Having Jurisdiction or labeled listed by a nationally recognized testing laboratory
  - Procurement of services to develop CERCLA and *Resource Conservation and Recovery Act of 1976* (RCRA) response action documents that include tasks requiring the use of computational and analytical software, including spreadsheets (tasks would include, but not be limited to, vadose zone and groundwater contaminant fate and transport modeling and human health, ecological, and protection of groundwater risk assessments; CERCLA and RCRA response action documents include the administrative and technical plans and reports developed to support the selection and implementation of removal and/or remedial actions)

- Procurement of selected items that are susceptible to counterfeiting, as described in DOE G 414.1-3, *Suspect/Counterfeit Items Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1B, Quality Assurance* (e.g., graded fasteners, circuit breakers, ratchet type tie downs, and other items as determined by the Design Authority and Quality Assurance); purchase orders for such items shall include clauses or statements regarding procurement of potentially suspect or counterfeit items and require receipt inspection

14 Safeguards and Security

The project will not handle, process, or store nuclear material.

15 Communications Requirements

Communications required include Hanford Local Area Network access (wireless [Scorpion]).

16 Decontamination and Decommissioning

Early in the site preparation process, 15 wells will be decommissioned and an infiltration gallery will be backfilled. These specific wells and infiltration gallery are associated with the field-scale water infiltration test described in DOE/RL-2009-16, *300-FF-5 Groundwater Operable Unit Infiltration Test Sampling and Analysis Plan*. The wells were not compliant with the *Washington Administrative Code* when installed.

17 References

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10 CFR 851, "Worker Safety and Health Program," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title10-vol4/xml/CFR-2010-title10-vol4-part851.xml.

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DOE/RL-2014-13-ADD2, 2015, *Remedial Design Report/Remedial Action Work Plan Addendum for the 300 Area Groundwater*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0081151H.

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EPA and DOE, 2013, *Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1*, U.S. Environmental Protection Agency and U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/pdf.cfm?accession=0087180.

MSA-1502630, 2015, "Ecological and Cultural Clearance for Columbia River Access and Submersible Pumps in the Columbia River for the 300 Area Sequestration Remedial Activities, Hanford Site, Benton County, Washington (HCRC# 2014-300-004, ECR-2014-303)" (letter to R.M. Hermann, CHPRC, from A.L. Johnson), Mission Support Alliance, Richland, Washington, June 16.

PRC-PRO-QA-259, 2015, *Graded Approach*, Revision 1, Change 0, CH2M HILL Plateau Remediation Company, Richland, Washington.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at: http://www.epa.gov/rcraonline/.