

<b>DOCUMENT RELEASE AND CHANGE FORM</b>		1a. Doc No: RPP-SPEC-60062	Rev. 00
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**DOCUMENT RELEASE AND CHANGE FORM  
CONTINUATION SHEET**

**Document No:** RPP-SPEC-60062 **Rev.** 00

See attached document.

RPP-SPEC-60062, Rev. 0

# Procurement Specification for AY-102 Retrieval Concrete Hose Barns

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**S Philo**

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U.S. Department of Energy Contract DE-AC27-08RV14800

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Key Words: 241-AY, 241-AP, Concrete, HIHTL, Hose Barn, Shielding

**Abstract:** This procurement specification provides the requirements for HIHTL shielding using concrete hose barns in order to reduce radiation levels for 241-AY to 241-AP retrieval activities.

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**APPROVED**

By Janis D. Aardal at 7:50 am, Mar 09, 2015

Release Approval

Date

**DATE:****Mar 09, 2015****HANFORD  
RELEASE**

Release Stamp

**Approved For Public Release**

RPP-SPEC-60062, Rev. 0

**PROCUREMENT SPECIFICATION FOR AY-102  
RETRIEVAL CONCRETE HOSE BARN**

January 2015

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## RPP-SPEC-60062, Rev. 0

**TABLE OF CONTENTS**

1.0	SCOPE .....	1
2.0	APPLICABLE DOCUMENTS .....	1
2.1	Non-Government Documents .....	1
2.2	Non-Code of Record Documents .....	1
3.0	TECHNICAL REQUIREMENTS .....	2
3.1	Item Definition .....	2
3.1.1	Item Diagrams .....	3
3.1.2	Interface Definition .....	8
3.2	Characteristics .....	9
3.2.1	Functional Characteristics .....	9
3.2.2	Physical Characteristics .....	10
3.2.3	Reliability .....	11
3.2.4	Maintainability .....	11
3.2.5	Transportability and Storage .....	11
3.3	Design and Construction .....	11
3.3.1	Materials .....	11
3.3.2	Drawings and Material Lists .....	12
3.3.3	Fabrication/Assembly Processes .....	12
3.3.4	Cleaning .....	12
3.3.5	Special Tools .....	12
3.3.6	Interchangeability .....	12
3.3.7	Identification and Marking .....	12
4.0	QUALITY ASSURANCE REQUIREMENTS .....	13
4.1	Quality Assurance Program .....	13
4.2	Qualifications .....	13
4.2.1	Welding Personnel and Procedures .....	13
4.2.2	Welding Inspectors and Procedures .....	13
4.3	Inspections and Tests .....	13
4.3.1	Weld Inspection and Examination .....	13
4.3.2	First Article Inspection and Tests .....	14
5.0	DOCUMENT SUBMITTAL .....	14
5.1	Approval of Submittals .....	15
5.2	List of Submittals .....	16
6.0	PREPARATION FOR DELIVERY .....	16
6.1	Preservation and Packaging .....	16
6.2	Marking .....	17
6.3	Shipping and Handling .....	17

## RPP-SPEC-60062, Rev. 0

**LIST OF TERMS****Abbreviations and Acronyms**

ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
DMCS	Document Management Control System
DOE	Department of Energy
FTP	File Transfer Protocol
HIHTL	Hose-in-Hose Transfer Line
IBC	International Building Code
MSR	Master Submittal Register
SSC	System, Structure, and Component
WRPS	Washington River Protection Solutions

**Units**

°	Degree
°F	Degrees Fahrenheit
ft	Foot
h	Hour
%	Percent
lb	Pound

## RPP-SPEC-60062, Rev. 0

**1.0 SCOPE**

This procurement specification provides the requirements for the design and fabrication of concrete hose barns used to shield Hose-in-Hose Transfer Lines (HIHTLs) during the AY-102 Retrieval (241-AY to 241-AP Farm waste retrieval). Work includes the design, fabrication, assembly, inspection, testing, documentation, packaging, and shipping of the assemblies. Work does not include the site placement and installation of the equipment.

**2.0 APPLICABLE DOCUMENTS****2.1 NON-GOVERNMENT DOCUMENTS**

The following documents, of the exact issue shown, form a part of the basis of design to the extent specified in the applicable sections of this document and establish the Code of Record. In the event of a conflict between documents referenced herein and the requirements of this specification, the requirements of this specification shall take precedence. Table 2-1 contains the Non-Government portion of the code of record.

**Table 2-1. Non-Government Code of Record Documents.**

Document Number	Title
<b>Industry Consensus Codes and Standards</b>	
ASCE 7	<i>Minimum Design Loads for Buildings and Other Structures</i> , American Society of Civil Engineers (ASCE), Reston, Virginia.
International Building Code <sup>®1</sup>	International Building Code <sup>®</sup> (IBC <sup>®1</sup> ), International Code Council <sup>®1</sup> Inc., Washington, DC.

Technical society and technical association specifications and standards are generally available for reference from libraries or they may be obtained directly from the Technical Society/Association.

**2.2 NON-CODE OF RECORD DOCUMENTS**

The following documents, of the current revision in effect, shown in Table 2-2 are utilized in or are referenced by this Specification. The following documents form a part of this Specification to the extent identified herein, but are not considered to be Code of Record documents.

**Table 2-2. Non-Government Non-Code of Record Documents. (2 Sheets)**

Document Number	Title
<b>WRPS Documents</b>	
DOE/RL-92-36	<i>Hanford Site Hoisting and Rigging Manual</i> , U.S. Department of Energy, Richland Operations Office, Richland, Washington.

<sup>1</sup> "International Code Council," "IBC," and the "International Building Code" are trademarks of the International Code Council, Inc.

## RPP-SPEC-60062, Rev. 0

**Table 2-2. Non-Government Non-Code of Record Documents. (2 Sheets)**

<b>Document Number</b>	<b>Title</b>
TFC-ENG-STD-02	“Environmental/Seasonal Requirements for TOC Systems, Structures, and Components,” Washington River Protection Solutions, LLC, Richland, Washington.
TFC-ENG-STD-06	“Design Loads for Tank Farm Facilities,” Washington River Protection Solutions, LLC, Richland, Washington.
TFC-ENG-STD-27	“Above Ground Transfer System Vehicle Barriers,” Washington River Protection Solutions, LLC, Richland, Washington.
<b>Drawings</b>	
H-14-110130, Sh. 1	2”Hose Barn Shielding Assembly, Rev. 2 Washington River Protection Solutions, LLC, Richland, Washington.
H-14-110130, Sh. 2	2”Hose Barn Shielding Assembly, Rev. 2 Washington River Protection Solutions, LLC, Richland, Washington.
H-14-110130, Sh. 3	2”Hose Barn Shielding Assembly, Rev. 2 Washington River Protection Solutions, LLC, Richland, Washington.

**3.0 TECHNICAL REQUIREMENTS****3.1 ITEM DEFINITION**

The hose barns are to be used to provide radiation shielding for Hose-in-Hose Transfer Lines (HIHTL) located on grade at the Hanford site. When assembled, the hose barns must be at least 2-ft in thickness and must provide a minimum 4-ft wide by 2-ft high passage in order to accommodate up to four 11-in. diameter HIHTLs.

The transfer line configuration requires the fabrication of two end caps and two angled sections that each allow for a 45° turn in hose path. Additionally, junction caps must be constructed to fit over and overlap gapped hose barn segments at HIHTL junction locations. Each junction cap must contain an air sample port halfway along the longitudinal length of the segment.

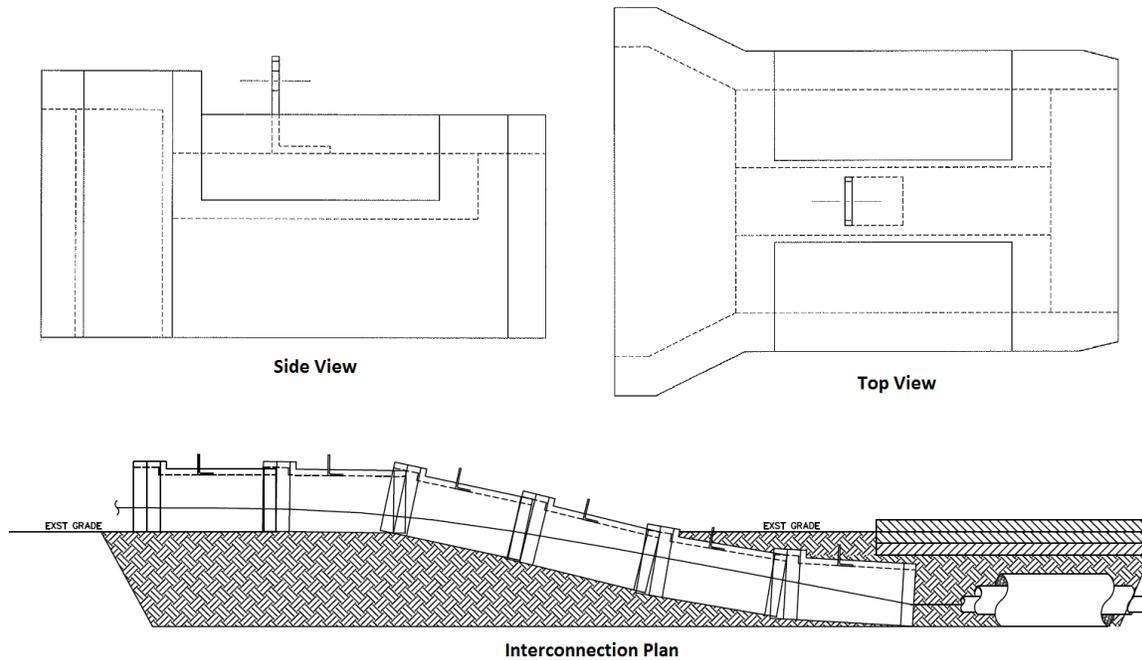
It is estimated that the total hose path will be approximately 1800-ft in length; straight and junction cap hose barn segments shall be purchased as needed to house the entirety of the HIHTL configuration.

The hose barns must be designed to shield continuously along the length of the hose path, minimizing radiation at the cracks between barn segments. Hose barns currently in use at Hanford utilize an overlapping design, wherein each barn segment is designed to cover a portion of one neighboring segment and is itself partially covered by the other neighboring segment. Drawing H-14-110130, Sheets 1-3 show small overlapping lead hose barns fabricated for use in 241-AY Farm.

## RPP-SPEC-60062, Rev. 0

### 3.1.1 Item Diagrams

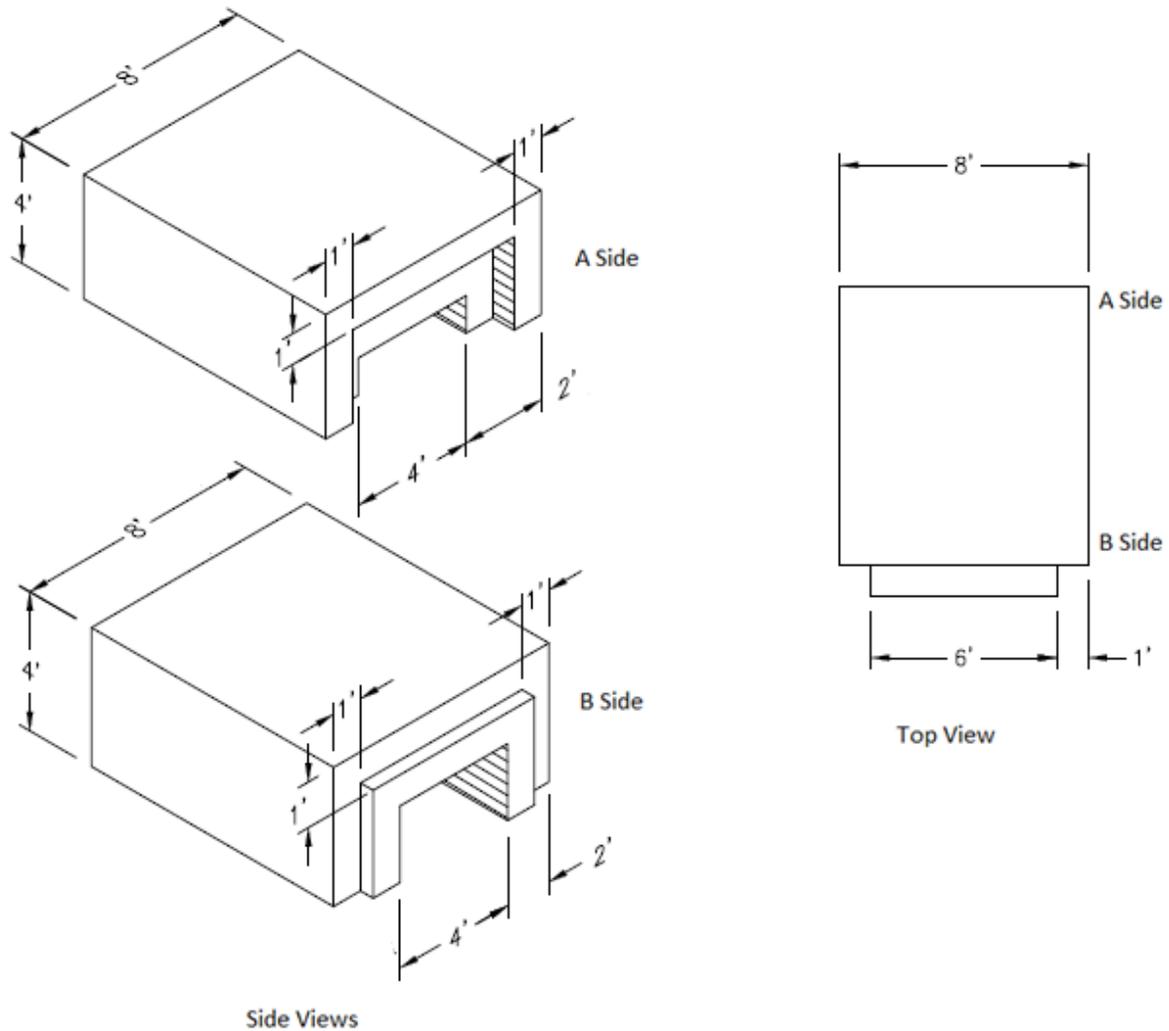
The hose barns must be designed to shield continuously along the length of the hose path, minimizing radiation at the cracks between barn segments. Hose barns currently in use at the Hanford Site are fabricated similarly to the design shown in Figure 3-1, where the barn segments have overlapping male and female ends. This specification assumes that a similar design will be developed by the Supplier, however proposed alternate designs may be considered by the Buyer as long as the minimum dimensions indicated are maintained.



**Figure 3-1. Existing Continuously Shielding Hose Barn Design**

## RPP-SPEC-60062, Rev. 0

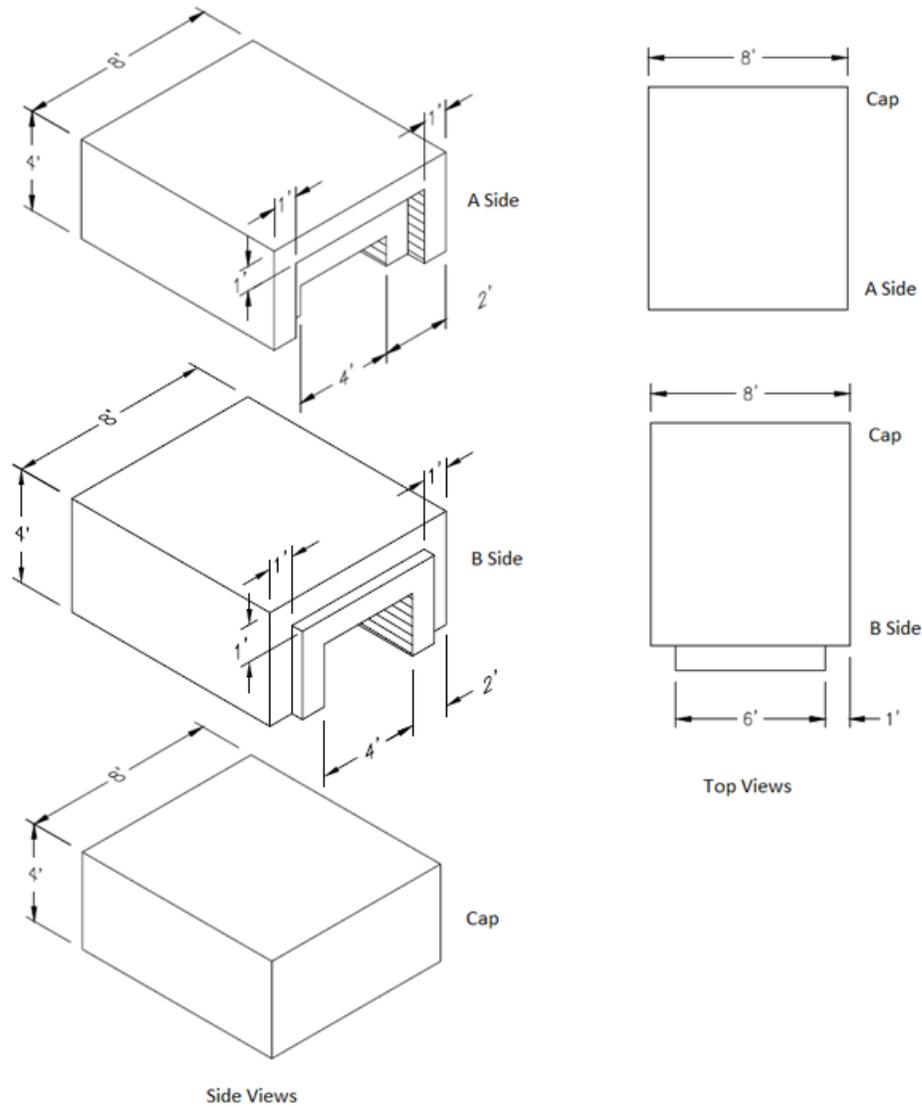
Figure 3-2 illustrates the minimum requirements for the straight sections of hose barn required to house the AY – AP waste transfer lines. Straight hose barn segments shall be purchased as needed to house the entirety of the HIHTL configuration.



**Figure 3-2. Hose Barn Straight Segment**

## RPP-SPEC-60062, Rev. 0

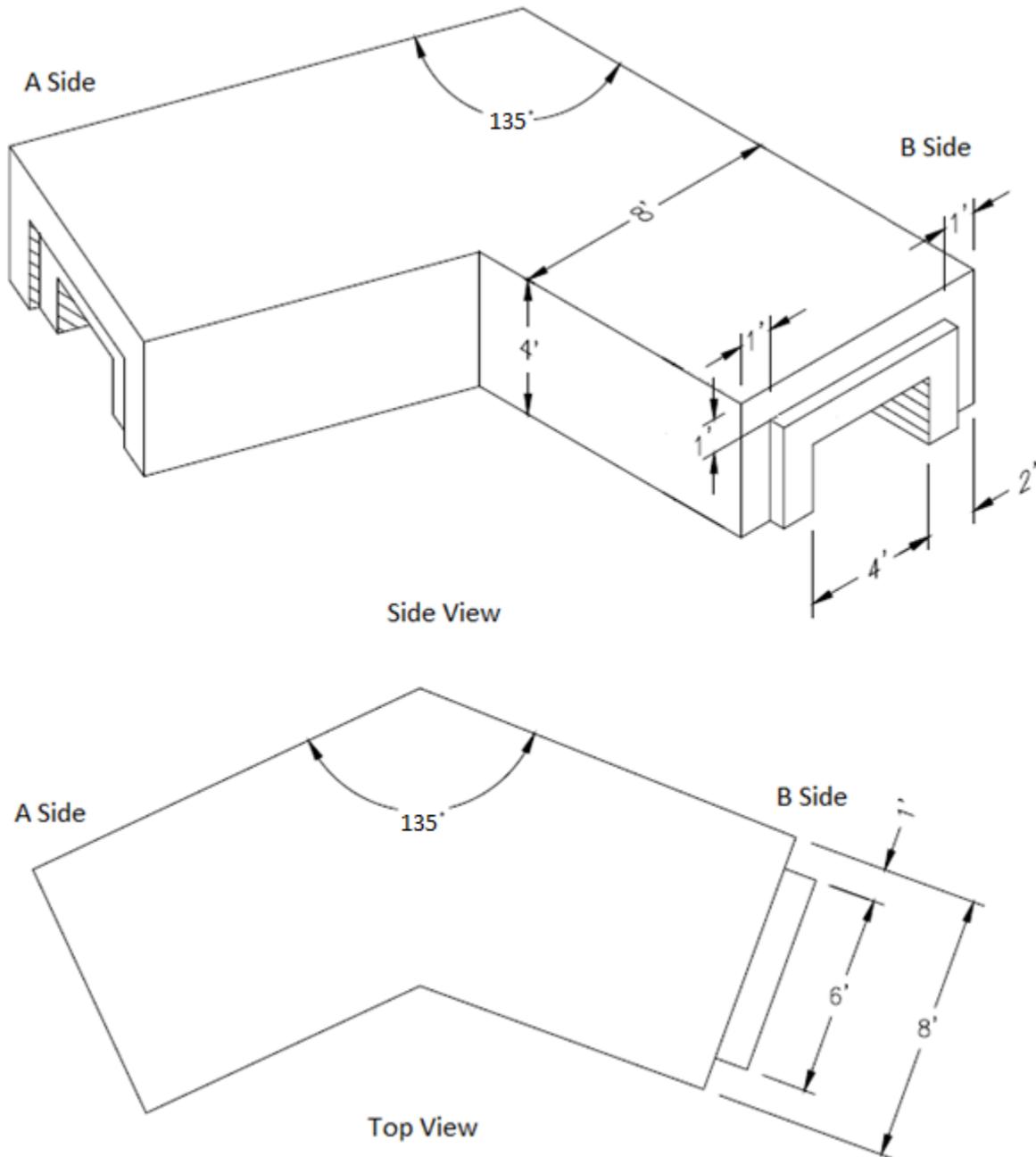
Figure 3-3 illustrates the minimum requirements for the end cap sections of hose barn required to house the AY – AP waste transfer lines. If an overlapping segment design is chosen, one end cap may require a male end and the other a female end. Two end caps will be purchased to house the HIHTL configuration.



**Figure 3-3. Hose Barn End Cap Segments**

## RPP-SPEC-60062, Rev. 0

Figure 3-4 illustrates the minimum requirements for the angled sections of hose barn required to house the AY – AP waste transfer lines. If an overlapping segment design is chosen, the design may specify different orientation of the male and female ends from that shown as long as the minimum dimensions indicated are maintained. Two angled sections will be purchased to house the HIHTL configuration.



**Figure 3-4. Hose Barn Angled Segment**

## RPP-SPEC-60062, Rev. 0

Figure 3-5 illustrates the minimum requirements for the junction cap sections of hose barn required to house the AY – AP waste transfer lines. Junction caps will be placed such that they fit over gapped hose barn segments at HIHTL junction locations. Each junction cap must contain a sample port at the center of longitudinal length. It is suggested that the sample port consist of 5/8" tubing and a 5/8" Eaton Hansen 2KLF Stainless Steel Hydraulic Fitting. Junction cap hose barn segments shall be purchased as needed to house the entirety of the HIHTL configuration.

If an overlapping segment design is chosen, the design may specify different orientation of the A and B sides from that shown as long as the minimum dimensions indicated are maintained.

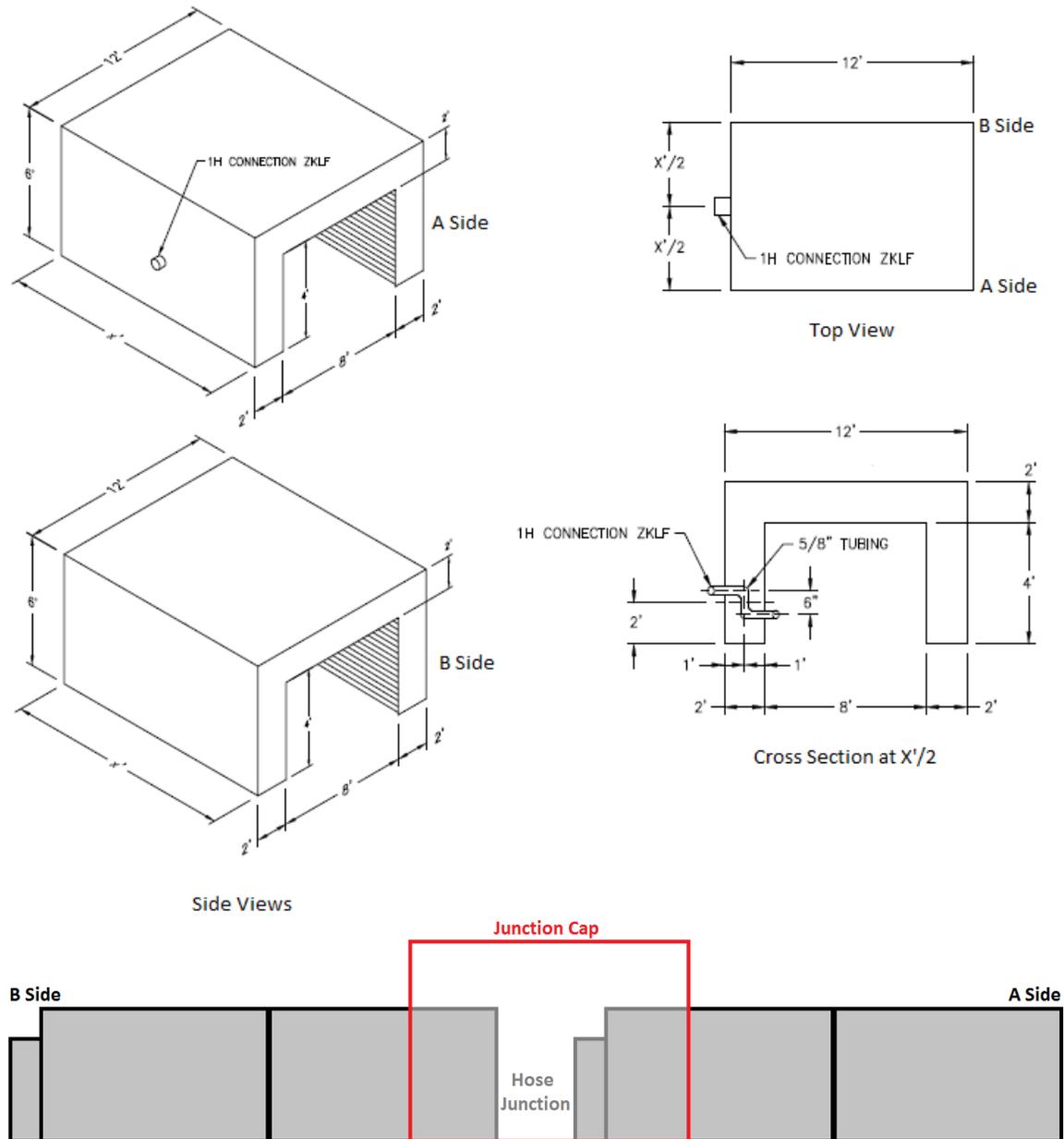
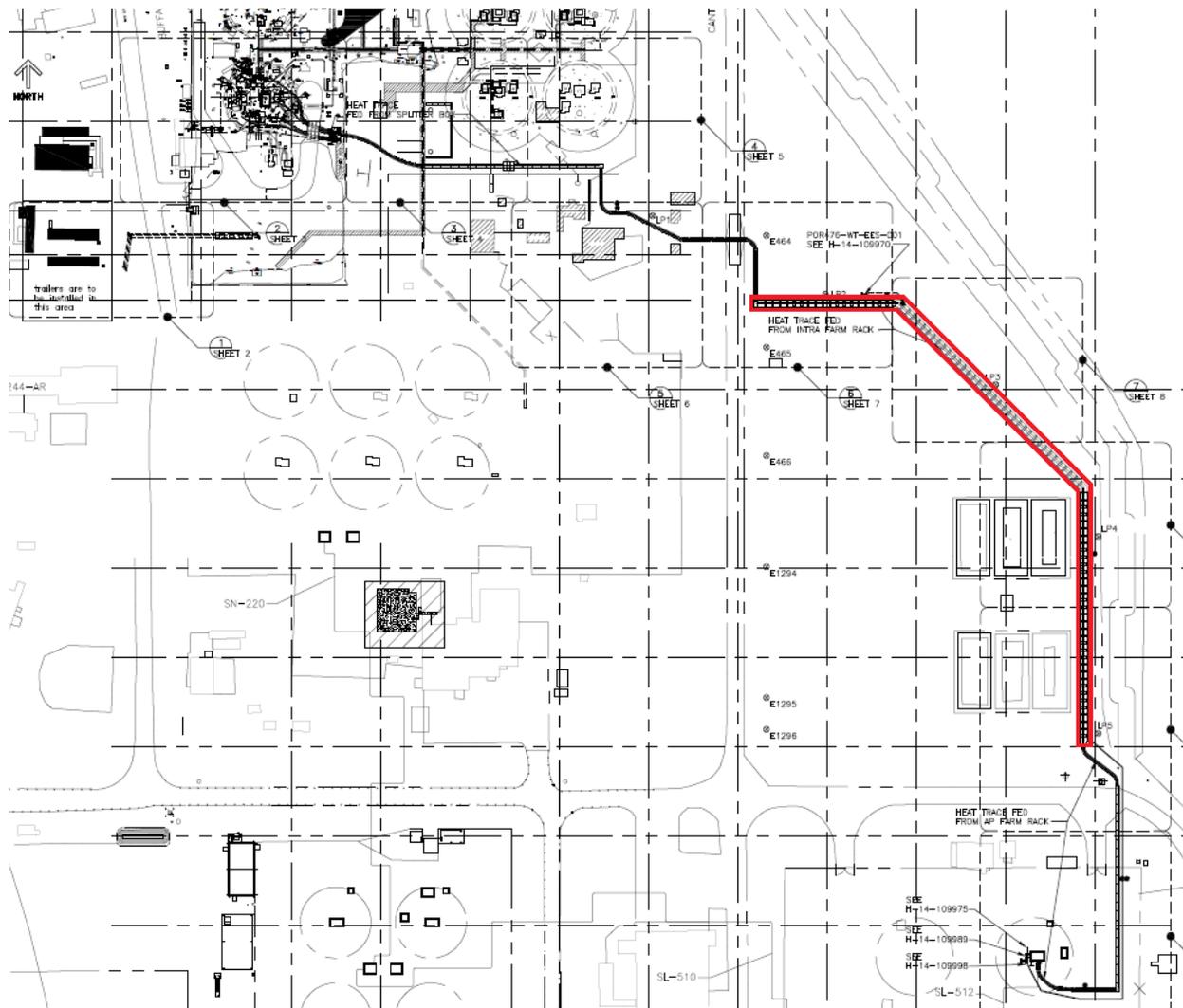


Figure 3-5. Hose Barn Junction Cap Segment

## RPP-SPEC-60062, Rev. 0

### 3.1.2 Interface Definition

The hose path will generally be configured as shown in Figure 3-6, with straight segments divided by two 45° angled segments and end caps at each termination point. Junction caps will be placed at HIHTL junctions as needed.



**Figure 3-6. Approximate HIHTL Path**

## RPP-SPEC-60062, Rev. 0

## 3.2 CHARACTERISTICS

### 3.2.1 Functional Characteristics

Hose barns shall be designed based on the environmental requirements contained in TFC-ENG-STD-02 for Performance Category 2 (PC-2). The following is a list of general requirements from the standard.

- Tank Farm facilities SSCs shall be designed for the temperature extremes from -25°F to 115°F.
- Tank Farm SSCs shall be designed for the rainfall precipitation load of 2.5 in. with a probability of  $5 \times 10^{-1}$ .
- Tank Farm SSCs shall be designed for the humidity ranging from near 0 to 100%.
- Tank Farm SSCs shall be capable of operation in a solar radiation environment of 900 Langleys.

Hose barns shall be designed based on the design loads contained in TFC-ENG-STD-06 for Performance Category 2 (PC-2). The following is a list of general requirements from the standard.

- **Dead Loads.** Dead loads shall include the weights of all permanent materials and equipment, including the structures own weight.
- **Snow Loads.** Normal annual snowfall at the Hanford Meteorology Station is 15.4 inches. Tank Farm SSCs shall be designed for ground snow loads,  $p_g$ , of 15 lb/ft<sup>2</sup> in accordance with the IBC<sup>®</sup>. Unbalanced snow loads resulting from drifting or sliding shall be considered.
- **Wind Loads:** Wind design load shall be in accordance with the IBC and shall use the Basic Straight Wind Design Speed obtained from Table 3-1.

## RPP-SPEC-60062, Rev. 0

**Table 3-1. Wind Load**

Basic Straight Wind Design Speed (3-Second Gust), V	Nominal <sup>(a)</sup>	85 mi/h
	Ultimate <sup>(b)</sup>	110 mi/h
Importance Factor, I		1.0
Exposure Category		C <sup>(c)</sup>
Missile (horizontal)		N/A

- (a) For use with IBC<sup>®</sup> 2009, ASCE 7-05, and other compatible codes and standards.
- (b) For use with IBC<sup>®</sup> 2012, ASCE 7-10, and other compatible codes and standards.
- (c) Exposure “C,” flat and generally open terrain, should be used for all construction unless it can be shown that the necessary

- Seismic Loads: Earthquake design loads shall comply with the IBC for Occupancy Category IV (Seismic Design Category D) requirements (with Importance Factor = 1.5 per ASCE 7). Response spectra values are identified in Table 3-2.

**Table 3-2. Seismic Design Parameters**

Seismic Design Parameters	
Vertical	SDS = 0.346, SD1 = 0.098
Horizontal	SDS = 0.588, SD1 = 0.192

- Load combinations, allowable stresses, and strength requirements for load conditions shall comply with the IBC or ASCE 7.

Hose barns shall be designed to handle vehicle impact loads required by TFC-ENG-STD-27.

- Aboveground transfer system barriers that are not anchored or attached shall be designed and located to dissipate the kinetic energy of a 6,000 lb mass traveling at a velocity of 5 miles per hour.

### 3.2.2 Physical Characteristics

Physical characteristics are defined in Section 3.1.

## RPP-SPEC-60062, Rev. 0

**3.2.3 Reliability**

The hose barn assembly shall have the reliability and availability to support an 18-month retrieval schedule.

The hose barn assembly is expected to be available for up to six months during installation, acceptance testing, and operational readiness verification, followed by a 1-year period of operation to complete waste recovery from AY-102.

The assembly shall have a minimum design life of 2 years, with up to 5 years preferred.

**3.2.4 Maintainability**

The hose barns shall be designed for ease of maintenance and be of a modular design for removal, repair, or replacement wherever practical.

The hose barns must be designed to handle multiple installation and removal sequences without damage (i.e. cracking, etc.)

**3.2.5 Transportability and Storage**

The hose barn assembly shall be designed for ease of equipment transport, installation in the field, and dismantling. The assembly shall be modular to the extent practical, and shall be designed to be transportable using existing Hanford Site rigging and transport equipment.

**3.3 DESIGN AND CONSTRUCTION****3.3.1 Materials**

Materials of construction (concrete materials and mixtures, reinforcing bars, cast in anchors, inserts, plates, etc.) shall be selected by the Seller based on acceptable performance when subjected to the design requirements in Sections 3.2. The concrete shall have a minimum density of 150 lb/ft<sup>3</sup>. The following information shall be provided for approval prior to fabrication.

- Product Data: For each type of product indicated.
- Design Mixtures: For each precast concrete mixture.
- Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and size, location, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.
  - Detail loose and cast-in hardware, lifting and erection inserts, connections, etc.

## RPP-SPEC-60062, Rev. 0

- Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
- Design Calculations.

### **3.3.2 Drawings and Material Lists**

As built, detailed, dimensioned assembly drawings shall be submitted to the Buyer for approval. Drafting shall be done according to applicable ASME Y14 series standards (ASME Y14.1, Y14.2M, Y14.3M, Y14.5M and Y14.38).

All component parts shall be listed in the bill of materials, referring to the applicable material specifications or manufacturer and part number or supplier's fabrication drawing.

### **3.3.3 Fabrication/Assembly Processes**

The hose barns shall be constructed in accordance with the manufacturer's standard practices and approved design and fabrication details.

If required for fabricating hoisting inserts, lifting lugs, welding of structural members, etc, as well as any repairs to such parts, shall be performed in accordance with the applicable AWS welding standard (i.e. AWS D1.1 for steel or AWS D1.6 for stainless steel).

### **3.3.4 Cleaning**

Before delivery to the site, the components shall be clean to the extent that extraneous materials are not present.

### **3.3.5 Special Tools**

Special tools and fixtures required to ship, lift and install the hose barns shall be included in the quotation and furnished with delivery of the system.

### **3.3.6 Interchangeability**

The hose barns shall be of a modular design to facilitate removal, repair, or replacement wherever practical. The assembly design shall standardize like-function components to the extent practical; to simplify maintenance and spare parts inventories. The design shall incorporate existing Tank Farm equipment and components to the extent feasible.

### **3.3.7 Identification and Marking**

All equipment that is designed to be mechanically lifted shall have lifting points, the center of gravity, and the lifting weight marked. All specialized lifting devices shall be marked in accordance with DOE/RL-92-36.

## RPP-SPEC-60062, Rev. 0

**4.0 QUALITY ASSURANCE REQUIREMENTS****4.1 QUALITY ASSURANCE PROGRAM**

The Seller shall comply with the quality assurance requirements stated in the Procurement Documents.

**4.2 QUALIFICATIONS****4.2.1 Welding Personnel and Procedures**

Personnel and procedures for welding structural components shall have been qualified in accordance with the applicable AWS welding standard (i.e. AWS D1.1 for steel or AWS D1.6 for stainless steel) prior to the start of welding (welding qualifications and procedures per ASME B&PVC, Section IX are acceptable). A copy of welder performance qualification test results and renewal of qualification documentation shall be maintained at the jobsite for the Buyer's evaluation, if desired. A copy of the Weld Procedure Specifications, Procedure Qualification Records, and Supporting Demonstration Records, as applicable, shall be maintained at the jobsite for the Buyer's evaluation, if desired.

**4.2.2 Welding Inspectors and Procedures**

Visual weld examinations shall be performed and appropriate documentation prepared by Certified Welding Inspectors who have received certification in accordance with AWS QC1. Certified Associate Welding Inspectors, certified in accordance with AWS QC1, may perform examinations when under immediate direction of Certified Welding Inspectors.

Personnel performing nondestructive examination shall be certified in accordance with Seller's written practice, which shall meet requirements of ASNT SNT-TC-1A. Level II or III personnel shall be used to interpret test results.

The Seller shall maintain a file containing personnel certifications and nondestructive examination performance procedures as applicable at the fabrication site for Buyer's evaluation, if desired.

**4.3 INSPECTIONS AND TESTS**

The Buyer reserves the right to witness all tests and shall be given a minimum of five (5) working days written notice prior to each test date (not required for weld inspection and examination).

**4.3.1 Weld Inspection and Examination**

Inspection and examination of structural welds shall be performed in accordance with the applicable AWS welding standard (i.e. AWS D1.1 for steel or AWS D1.6 for stainless steel).

## RPP-SPEC-60062, Rev. 0

All welds shall be visually inspected as a minimum. Weld maps shall be prepared and submitted. Non-destructive examinations, including Visual, Penetrant Test, Radiographic Testing, or Magnetic Particle Test examinations, shall be recorded and submitted. Radiographic Testing film shall be included as part weld documentation submittal if Radiographic Testing was performed.

#### **4.3.2 First Article Inspection and Tests**

First article inspection shall include:

- (a) Verification that the first article conforms to the agreed upon design drawing for configuration and dimensional requirements.
- (b) Performance of a Lift Test of the first article as required.
- (c) Performance of a qualification fit up test of the first article to ensure configurations fit together as designed.

The performance of such tests and inspections does not limit the right of the Buyer to conduct other such tests and inspections as the Buyer deems necessary at the Supplier's facility, or otherwise, to assure that all items are in conformance with all requirements of this Specification or to assure validity of the Supplier's inspection.

### **5.0 DOCUMENT SUBMITTAL**

Required submittals are identified and listed on the procurement Master Submittal Register (MSR) in addition to Table 5-1 below. The MSR identifies the minimum submittals required by this specification and identifies when the submittals are required to be submitted in the procurement process. The MSR included with the purchase order will constitute the governing MSR.

Submittals shall be provided using the TOC Incoming Letter of Transmittal (form A-6005-315). All transmittal subject headings shall contain, at a minimum, the subcontract number, submittal number identified by the MSR, and submittal description.

Submittals shall be provided in electronic format unless available only as a hard copy. Electronic submittals may be sent to TOCVND@rl.gov or delivered via a WRPS designated File Transfer Protocol (FTP) site. Electronic formats must be non-password protected in one of the following formats:

- Microsoft® Office Compatible
- Moving Picture Expert Group (MPEG)
- Portable Document Format (PDF)
- Extensible Markup Language (XML)

## RPP-SPEC-60062, Rev. 0

- Tagged Image File Format (TIFF)
- Graphics Interchange Format (GIF)
- Joint Photographic Experts Group (JPEG)
- Windows Media Video (WMV)
- HyperText Markup Language (HTML)
- Comma Separated Values (CSV)
- Text (TXT)

All deliverable documentation shall be complete, accurate, legible, and reproducible. Before delivery, design media and documents shall be reviewed by qualified Subcontractor personnel for technical adequacy and appropriate content in accordance with the Subcontractor's Quality Assurance procedures. The Subcontractor shall attest, in writing, to the accuracy and completeness of the information contained in the final deliverables.

Deliverables shall be subject to approval by the BTR. Deliverables shall comply with this specification and technical basis documents and other requirements identified herein.

**Table 5-1. Summary of Submittals.**

Item	Title	Copies	Purpose	When required
1	Schedule	3	Pre Evaluation	Per MSR (see Section 5.1)
2	Prefabrication Information	3	Approval	Per MSR (see Section 5.1)
3	As-Built Assembly Drawings	3	Approval	Per MSR (see Section 5.1)
4	Weld Inspection and Examination Documentation	3	Approval	Per MSR (see Section 5.1)
5	First Article Inspection and Tests	3	Approval	Per MSR (see Section 5.1)
6	Shipping and Handling Plan	3	Approval	Per MSR (see Section 5.1)

## 5.1 APPROVAL OF SUBMITTALS

All Submittals transmitted shall include the designation in the Master Submittal Register (MSR) per TOC Vendor Processes stated in TFC-BSM-IRM\_DC-C-07. Submittals are divided into two types: 1) those requiring "approval" (e.g., approval data or pre-purchase evaluation data); and 2) those "not requiring approval" (e.g., vendor information data). Submittals "not requiring approval" will be reviewed to verify completeness and adequacy for their intended purposes. A submittal requiring approval that is not approved is identified as: 1) "Not Approved Revise and Resubmit." The submittal is considered technically deficient, or incomplete, and therefore unacceptable. Resubmittal is required, hence the fabrication, procurement, or performance of procedures shall not proceed; or 2) "Approved with Exception." Fabrication, procurement, and performance may proceed, and resubmittal is required to verify incorporation of the exception. Submittals "not requiring approval" that are determined to be incomplete or inadequate will be marked "Resubmit." An explanation of the deficiencies will be included for corrective action by the Seller.

## RPP-SPEC-60062, Rev. 0

Approval by the Buyer does not relieve the Seller of responsibility for accuracy or adequacy of design under this specification.

If any revision has been made to previously submitted items, the Seller shall resubmit updated versions of said items for approval, in addition to the items listed above.

Certified data shall be defined to mean that the design adequacy of a given item (document, drawing, calculation, etc.) be verified by persons other than those who prepared the item. Each deliverable (drawing, calculation, etc.) shall have at least an originator's/preparer's signature and a checked-by or approved-by signature.

## **5.2 LIST OF SUBMITTALS**

This list of submittals along with relevant dates shall be kept as part of the MSR.

- a. (Item 1) Schedule: Submit a schedule showing design, fabrication, assembly, testing and shipment of the equipment after receipt of the order.
- b. (Item 2) Prefabrication Information (see Section 3.3.1).
  - 1) Product Data,
  - 2) Design Mixtures,
  - 3) Shop Drawings, and
  - 4) Design Calculations.
- c. (Item 3) As-Built Assembly Drawings (see Section 3.3.2).
- d. (Item 4) Weld Inspection and Examination Documentation (see Section 4.3.1).
- e. (Item 5) First Article Inspection and Tests (See Section 4.3.2).
- f. (Item 6) Shipping and Handling Plan (see Section 6.0).

## **6.0 PREPARATION FOR DELIVERY**

### **6.1 PRESERVATION AND PACKAGING**

All items shall be protected from dirt, soil, and moisture and packaged for long-term storage in an unprotected exterior environment. Temporary bracing, fixtures, or hardware installed to stabilize furnished items during shipment or handling (excluding packaging materials) shall be tagged or otherwise identified so that it can be removed before installation or operation of the item.

## RPP-SPEC-60062, Rev. 0

**6.2 MARKING**

Packages shall be suitably marked on the outside to facilitate identification of the purchase order, the procurement specification, the package contents, and any special handling instructions.

**6.3 SHIPPING AND HANDLING**

The Seller shall recommend the preferred transportation method and provide protection of the equipment during transit and storage. The Seller shall submit to the Buyer for review and approval of a Shipping and Handling Plan that includes preservation, packaging, shipping, storage, and lifting procedures. Buyer approval of the plan is required before packaging and shipment. If a special type of transportation to protect equipment is required, those devices shall be part of the Seller's package and identified as special equipment