### DOCUMENT RELEASE AND CHANGE FORM

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### 8. Description of Change and Justification

Engineering Work Plan for Installation Design for ETF Waste Transfer Lines Project

### 9. TBDs or Holds

☑ N/A

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Engineering Work Plan Installation Design for ETF Waste Transfer Lines Project

Prepared by:
Matthew Huntington
Washington River Protection Solutions, LLC

Date Published
November 2016

Prepared for the U.S. Department of Energy
Office of River Protection

Contract No. DE-AC27-08RV14800
Engineering Work Plan

Installation Design for ETF Waste Transfer Lines Project

WRPS Design Services

Concurrence

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<th>Role</th>
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<tr>
<td>Project Technical Lead</td>
<td>Bryce Shreeve</td>
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LIST OF TERMS

Abbreviations and Acronyms

DCN Drawing Change Notice
DRCM Design Requirements Compliance Matrix
ECN Engineering Change Notice
EDT Engineering Data Transmittal
ETF Effluent Treatment Facility
EWP Engineering Work Plan
IQRPE Independent, Qualified, Registered Professional Engineer
LERF Liquid Effluent Retention Facility
MT Modification Traveler
P&ID(s) Piping and Instrumentation Diagram(s)
SPF SmartPlant® Foundation
TBD To Be Determined
TOC Tank Operations Contractor
WRPS Washington River Protection Solutions
WTP Waste Treatment and Immobilization Plant

TRADEMARK DISCLOSURE

- SmartPlant® is a Registered Trademark of Intergraph Corporation, Madison, Alabama.
1.0 Introduction

Transfer Lines 200-E-310-PL and 200-E-311-PL will be used to transfer radioactive liquid effluents from the Tank Waste Treatment and Immobilization Plant (WTP) to the Liquid Effluent Retention Facility (LERF). LERF, a Washington River Protection Solutions (WRPS) operated facility, will store the effluents prior to processing by the Effluent Treatment Facility (ETF). These pipelines were installed in 2001, as a part of Project W-519, but were not assigned to a Hanford Prime Contractor. This project will focus on upgrades necessary to 200-E-310-PL and 200-E-311-PL to allow for permitting and placing them into service with the installation of new leak detection devices at several locations. The six interfaces are:

Interface 1 - LERF Basin 42
Interface 2 - LERF Basin 43
Interface 3 - PC-5000 Caisson 200-E-311-PL
Interface 4 - PC-5000 Caisson 200-E-310-PL
Interface 5 - Node 8A (Spool)
Interface 6 - Node 8B (Spool)

This project will occur over multiple fiscal years through FY19.

Figure 1
Current configuration of 200-E-310-PL (primary) and 200-E-311-PL (backup) transfer lines
2.0 Scope of Work

Design scope includes development and approval of all design media required to support the design, procurement, fabrication, and installation of the 200-E-310-PL (primary) and 200-E-311-PL (backup) transfer line upgrades. This includes:

- Modification traveler (MT).
- Engineering drawings.
- Design analysis including calculations.
- Procurement specifications.
- Engineering Change Notices (ECNs).

Design Services will generate all of the engineering documentation required to complete the design and to support the following activities:

- Installation design and field support for the installation of new leak detection controllers including power and control system interfaces.
- Component fabrication including but not limited to the evaluation and incorporation of redline changes (redline changes to be approved by TFP engineering personnel).
- Ecology design review and comment resolution for permit modification of buried transfer lines.
- Field construction activities of the 200-E-310-PL (primary) and 200-E-311-PL (backup) transfer line upgrades including post construction as-building.

Design Services excludes the following documentation as part of the scope; however, recognizes that this task could affect the outcome of design:

- Independent, Qualified, Registered Professional Engineer (IQRPE) design assessment and comment resolution.
  o It is understood that this will be the ETF TFP PMs responsibility to plan, execute, monitor, and control.
  o It is understood that any direction of the IQRPE assessment that would affect the design could potentially cause scope change and schedule delays, and will be assessed as part of the risk management plan for the project.

Task 1:

Design Services shall produce, review, route for approval, and accept a MT for the design work identified in this EWP, per TFC-ENG-DESIGN-C-56, Modification Traveler. The MT shall be updated as the design progresses and output documents are developed. Design Services is responsible for updating the MT as required to ensure applicable fields/blocks are kept up to date (e.g. impacted documents, output documents, etc.).

Prior to the end of the project and as the applicable ECNs are signed as ‘field work complete,’ design services shall incorporate changes made by the Drawing Change Notice (DCN[s]) into the associated drawings for approval and release.

**Deliverables for Review and Approval** (review and approval includes the disposition and incorporation of comments):
• DCN/ECN incorporated drawings at end of project.

Task 2:
The 200-E-310-PL (primary) and 200-E-311-PL (backup) transfer lines require modifications to allow for
the use of thermal dispersion style low point leak detection. This includes pipe modifications, leak
detection “time-to-detect” calculations, and control system upgrades.

Deliverables for Review and Approval (review and approval includes the disposition and incorporation
of comments; all deliverables shall be routed for approval in SPF):

• Justification for the use of low point thermal dispersion type leak detection on the 200-E-310-PL
  (primary transfer line) and 200-E-311-PL (backup transfer line).
  o One calculation (RPP-CALC-XXXXX)

• Installation design media for low point thermal dispersion type leak detection on the 200-E-310-
  PL (primary transfer line) and if required 200-E-311-PL (backup transfer line).
  o One mechanical Engineering change notice (ECN-XXXXX)
  o One electrical Engineering change notice (ECN-XXXXX)
  o One Controls System Engineering change notice (ECN-XXXXX)

• Support to the project for new or revised equipment procurement specifications and/or
  fabrication drawings/details to include the following equipment:
  o Thermal dispersion style leak detector
  o Dam/leak collection aids
  o Valves (if required)
  o Sight Glasses (if required)
  o All lifting and transport devices (if required)
  o Equipment adapters (if required)

• Technical evaluations to support equipment operation (e.g. ignition source control equivalent
  safety evaluations, waste leak path evaluations, etc.).

• Support of thermal dispersion style low point leak detection installation
  o WA ECN(s), Redline ECN(s)
  o As-built DCN(s)

• Engineering calculations and analysis documents MAY include the following:
  o ASME B31.3 analyses (pressure system analysis including water hammer and flow
    transients analysis and fluid expansion analysis)

• Install hardware and software in TOC owned control rooms and simulators that are necessary to
  support effluent transfer from WTP to LERF. This task will be mixed scope between Design
  Services and a subcontracted organization.
  o TBD
• Support of Independent, Qualified, Registered Professional Engineer (IQRPE) assessment of the as-installed piping as well as necessary assessments resulting from leak detection modification on the aforementioned lines.

• Support of permitting revisions necessary to support TOC ownership of the 200-E-310-PL (primary) and 200-E-311-PL (backup) transfer lines.

• Support of integrity testing of the transfer lines and ancillary piping are to be performed by the WTP project per ICD-06.

The following items are exclusions of Design Services’ scope, beyond providing informational support:

• The direct services/subcontract of the Independent, Qualified, Registered Professional Engineer (IQRPE) design assessment and comment resolution.
  
  o It is understood that this will be the ETF TFP PMs responsibility to plan, execute, monitor, and control.

• Procurement Specification, requirements flow down to the Vendor, Vendor submittal review for technical accuracy, and applicable Codes and Standards compliance [Belongs to Project Manager/Project Engineer]

• Analysis Instrumentation selection, accuracy requirements, and testing and performance requirements [Belongs to Instrument & Control Engineering Organization]

• Software selection, development, and testing [Belongs to Instrument & Control Engineering Organization]

  Functional System Testing, Operational Testing and Commissioning [Belongs to Commissioning Organization]

3.0 Physical Description

Leak detectors will be installed in the following locations:

1. 200-E-310-PL Primary Waste Transfer Line (4” diameter inner piping encased in 8” diameter outer piping) will have one (1) leak detection probe installed at LERF Basin 42.

2. If required by time-to-detect calculation or other regulatory body, at 200-E-311-PL Secondary Waste Transfer Line (3” diameter inner piping encased in 6” diameter outer piping) one (1) leak detection probe installed at the tie-in point of the PC-5000 waste transfer line.

3. The PC-5000 line may have two (2) leak detection probe(s) installed. One of the leak detectors will be at LERF Basin 43. The second, if required by time-to-detect calculation or other regulatory body, will be at the tie-in point of the PC-5000 waste transfer line.

Applicable Codes and Standards

Modification Traveler (MT-50373, 310/311 Waste Transfer Lines Leak Detection) contains all applicable codes and standards. Note, MT-50373 is not approved at the time of this writing.
### 4.0 Organization

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<td>Foster</td>
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<td><a href="mailto:James_J_Foster@rl.gov">James_J_Foster@rl.gov</a></td>
</tr>
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</table>
5.0 Engineering Tasks

Design Services will provide the installation design documentation and the design verification. All TBDs will be filled in at a later update of this document.

**Design Documentation**

**Mechanical Discipline Deliverables:**
- ECNs **TBD** for tie in modifications
- EDT **TBD**
- RPP-CALC-62638
- FLUID TRANSIENT CALCULATION **TBD**
- P&ID’S **TBD**

**Structural Discipline Calculations:**
- Civil report **TBD**
- RPP-CALC **TBD**

**Electrical and Instrumentation & Control Deliverables:**
- ECNs **TBD** for tie in to power and controls systems
- EDT **TBD**
- RPP-CALC **TBD** for power load requirements

**Design Verification Documentation**

Design Services will develop a Design Requirements Compliance Matrix (DRCM) in accordance with TFC-ENG-DESIGN-C-42 and TFC-ENG-DESIGN-P-17, and used as a design verification tool for the project.

**Procurement Documentation**

Design Services will assist in the development of Procurement Specifications, requirements flow down to the Vendor, Vendor submittal review for technical accuracy, and applicable Codes and Standards compliance.
6.0 Verification

Project Engineer will work closely with Design Services during development to assure all aspects of the Project are addressed.

Weekly status meetings lead by the Project manager will be used to maintain schedule and identify and resolve critical design issues.

Design Verification will be performed in accordance with TFC-ENG-DESIGN-P-17. All engineering outputs will be verified by a qualified discipline engineer at the document approval level.

A Design Requirements Compliance Matrix (DRCM) will be developed in accordance with TFC-ENG-DESIGN-C-42 and TFC-ENG-DESIGN-P-17, and used as a design verification tool for the project.

7.0 Interface Management

Interfacing with outside vendors for the project will be established by the Project Manager.

Internal WRPS Interface Management will be controlled by scheduled meetings called by the Project Engineer with impacted organizations (minimum frequency: bi-weekly).

Configuration interfaces with equipment or infrastructure under the responsibility of various organizations will be controlled at the document approval level in SPF under assignment by the Design Authority.

8.0 Procurement Management

Technical requirements (including Codes and Standards) that are applicable to procurement of the ETF Waste Transfer Lines project will be developed and disseminated to the Vendor by the Project Manager/Project Engineer. (Reference TFC-ENG-DESIGN-C-34.)

The Project Engineer is responsible for identifying upsets in the procurement schedule and reporting them to the Project Manager.

Vendor submittals must be distributed to Design Services, and issues with submittals identified by Design Services must be returned to the Project Engineer for resolution in a timely manner to assure schedule is met.

9.0 Deliverables

Design Services will provide calculations, drawings, and facility drawing changes in sufficient detail to advance the construction of the System. Design Services will provide design verification documentation in the form of a Design Requirements Compliance Matrix DRCM).
10.0 References

1. ASME B31.3
2. ICD-06, 24590-WTP-ICD-MG-01-006, Rev 7
3. TFC-ENG-DESIGN-C-34, *Technical Requirements for Procurement*
4. TFC-ENG-DESIGN-C-42, *Design Requirements Compliance Matrix*
5. TFC-ENG-DESIGN-C-56, *Modification Traveler*
6. TFC-ENG-DESIGN-P-17, *Design Verification*