

**Idaho National Laboratory**

<b>EXCAVATION OF LOADED LINERS</b>	Identifier: RSWF-OI-012
	Revision: 5
	Effective Date: 10/14/13 <span style="float: right;">Page: 1 of 23</span>

Materials and Fuels Complex	Laboratory Instruction	<b>USE TYPE 2</b>	eCR Number: 615794
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Manual: MFC RSWF Operating Instructions (OI)

# TSR RELATED PERMIT RELATED

PROCEDURE REVIEW REQUIREMENTS PER SP-20.1.4					
DISCIPLINE	REVISION	CHANGE	DISCIPLINE	REVISION	CHANGE
NUC OPS MAINTENANCE	N/A	N/A	F&SS	N/A	N/A
MFC FACILITY ENGINEERING	N/A	N/A	FCF OPERATIONS	N/A	N/A
TRAINING	N/A	N/A	HFEF OPERATIONS	N/A	N/A
NUCLEAR SAFETY REVIEW	*	*	EML	N/A	N/A
PROJECTS	N/A	N/A	FASB	N/A	N/A
SSPSF OPERATIONS	N/A	N/A	RCL	N/A	N/A
TREAT OPERATIONS	N/A	N/A	FMF OPERATIONS	N/A	N/A
TREAT WAREHOUSE OPERATIONS	N/A	N/A	ZPPR OPERATIONS	N/A	N/A
HOISTING AND RIGGING	*	*	NRAD OPERATIONS	N/A	N/A
QUALITY	*	*	ANALYTICAL LAB	N/A	N/A
TSD FACILITIES OPERATIONS (CESB and RSWF)	X	X	RADIOLOGICAL CONTROLS	*	*
ENVIRONMENTAL	*	*	INDUSTRIAL SAFETY	*	*
INTER-FACILITY TRANSFERS	N/A	N/A	INDUSTRIAL HYGIENE	*	*
OUTSIDE REVIEW	N/A	N/A	FIRE PROTECTION	*	*
CUI REVIEW	N/A	N/A	SAFEGUARDS AND SECURITY	*	*
WASTE GENERATOR SERVICES	N/A	N/A	PACKAGING & TRANS.	N/A	N/A

\* QUALIFIED REVIEWER SHALL DETERMINE THE NEED FOR THESE REVIEWS BASED UPON THE SCOPE OF THE CHANGE



<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 3 of 23

**CONTENTS**

1. PURPOSE/SCOPE/APPLICABILITY.....5

2. RISK AND CONTROLS.....6

    2.1 Training Required .....11

        2.1.1 All Personnel .....11

        2.1.2 Material Services (MS) (as applicable to task performed).....11

        2.1.3 Health Physics Technicians.....11

        2.1.4 Shift Supervisor (SS).....11

    2.2 Precautions and Limitations.....11

    2.3 TSR Requirements .....13

3. PREREQUISITES .....13

    3.1 General .....13

    3.2 Planning and Coordination .....13

    3.3 Special Tools and Equipment .....14

4. FACILITY CONDITIONS .....15

5. INSTRUCTIONS.....16

    5.1 Preparatory Procedures .....16

    5.2 Liner Excavation.....16

6. POST-PERFORMANCE ACTIVITIES.....19

    6.1 Job Completion.....19

    6.2 Data Review.....19

7. ABNORMAL OPERATIONS.....19

8. RECORDS .....19

9. REFERENCES .....20

10. APPENDIXES .....21

    Appendix A Figure .....23

**Idaho National Laboratory**

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13
		Page: 4 of <b>23</b>

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<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 5 of 23

## 1. PURPOSE/SCOPE/APPLICABILITY

This procedure provides instructions for excavating a loaded liner at the Radioactive Scrap and Waste Facility (RSWF) and welding a lifting lug to the liner so that it can be retrieved per RSWF-OI-010, "Retrieval of Loaded Liners."

The RSWF provides underground storage locations for:

- Spent fuel from Experimental Breeder Reactor II
- Remote-handled, radioactive waste
- Mixed waste regulated under the Resource Conservation Recovery Act (RCRA).

RSWF is operated under a RCRA permit issued and regulated by the State of Idaho Department of Environmental Quality and by SAR-407, "Safety Analysis Report for the Radioactive Scrap and Waste Facility," and TSR-407, "Technical Safety Requirements for the Radioactive Scrap and Waste Facility," governing the nuclear facility operations. Each of these documents contains a set of assumptions concerning how the facility is maintained and the material conditions that are part of that safety bases.

The performers of this procedure are identified in the individual performance steps.

The activities directed by this procedure have been designated Quality Level 2 per Quality Level Determination MFC-000249.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	Page: 6 of 23
	Revision:	5	
	Effective Date:	10/14/13	

**2. RISK AND CONTROLS**

Sequence of Basic Activities	Potential Hazard	Hazard Control
1. Excavation of liners.	1. Radiation/contamination	1. 1) A radiological work permit (RWP) will be in place for work performed in this procedure. 2) Temporary/ALARA shielding will be put in place when necessary to protect workers. 3) An extended boom will be used to minimize exposure to the crane operator.
2. Heavy equipment operation.	2a. Damage to equipment	2a. 1) Equipment operations must be performed by Materials Services personnel. 2) A spotter is required for equipment operations within RSWF. 3) Maintain loads close to the ground during movement.
	2b. Personnel injury	2b. 1) Maintain contact with the forklift or crane operator during use. 2) Ensure high visibility garments are worn by persons in proximity to operating equipment. 3) Wear leather gloves if performing excavation operations.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	Page: 7 of 23
	Revision:	5	
	Effective Date:	10/14/13	

Sequence of Basic Activities	Potential Hazard	Hazard Control
		4) Wear safety glasses with side shields and a face shield when using air lance.  5) Wear hard hats if head bump injuries are possible due to overhead hazards and from working under or in close proximity to heavy equipment.
	2c. Exposure to high noise levels	2c. Hearing protection is required when working in the vicinity of an operating vacuum excavator.
3. Hazardous/uneven walkways.	3. Falls, slips, and trips	3. 1) Watch for uneven ground, aboveground liners, and concrete rows.  2) Observe and be aware of potential tripping hazards presented by positioning devices, liners, retrieval cables, concrete rows, and heavy equipment.  3) Remove excess snow in work area and wear proper footwear for slick surfaces.
4. Weather conditions.	4. Personnel injury, slips, and falls/exposure to extreme temperatures	4. 1) Use extra caution when using heavy equipment.  2) Discontinue work and seek shelter during lightening storms.  3) Supervisor shall establish heat/cold stress stay times (when necessary) per LWP-14606, "Heat and Cold Stress."

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13

Page: 8 of 23

Sequence of Basic Activities	Potential Hazard	Hazard Control
5. Working in RSWF.	5. Snake/insect bites or stings	5. 1) Contact the TSD Facilities Manager or Industrial Safety to have any rattlesnakes found removed from the work area. 2) Use caution when moving material that has been lying on the ground undisturbed. Do not reach under material until you know what is under it.
6. Activities requiring soil excavation.	6. Radiation/contamination	6. A RWP will be in place for work performed in this procedure.
7. Excavations.	7. Personal injury/falls	7. 1) Control access to excavation area per LRD-14102, "Excavation and Surface Penetration," and ensure proper protective actions are taken for open excavation. 2) If digging is to be performed greater than 6 in. (mechanical excavation) or 12 in. (hand excavation), complete Form 432.A47, "INL Subsurface Investigation" in accordance with LWP-7202, "Subsurface Investigations." 3) Place a cover over, or barriers around, the excavated liner.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	Page: 9 of 23
	Revision:	5	
	Effective Date:	10/14/13	

Sequence of Basic Activities	Potential Hazard	Hazard Control
8. Waste disposal.	8. Improper disposition of generated waste	8. 1) Bag low-level radioactively-contaminated material and place in the radioactive waste laydown area. Complete Form 435.42, "Radioactive Waste Inventory Sheet."  2) If a lead blanket becomes contaminated or requires disposal, the blanket must be placed in a temporary accumulation area as directed by Waste Generator Services.
9. Hoisting and rigging (H&R).	9. Personal injury and equipment damage	9. 1) Rigging tackle inspected for defects by qualified Material Services (MS) Rigger prior to use.  2) H&R equipment annual inspection certification verified prior to use.  3) Personnel must wear safety shoes, hardhats, and leather gloves and keep hands clear of pinch points.  4) Make sure the load is attached securely and that the correct lifting equipment is used.  5) Never travel suspended loads over personnel.  6) Keep the load as low as practical while over the liners ensuring a height of six (6) ft is not exceeded.  7) A load indication device shall be used to prevent inadvertent equipment overload. Load indication device shall be in current calibration.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13

Page: 10 of 23

Sequence of Basic Activities	Potential Hazard	Hazard Control
		<p>8) All lifts associated with this procedure are designated ordinary lifts.</p> <p>9) At least one person assigned to the lift will be the designated leader (DR).</p> <p>10) Hoisting and rigging activities will be evaluated in sustained wind speeds of <b>25 MPH</b> or gusts <b>&gt;35 MPH</b> or crane manufactures recommendation, whichever is less, to determine if it is safe to continue work.</p>

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 11 of 23

## 2.1 Training Required

### 2.1.1 All Personnel

- 00INL288, Personal Protective Equipment  
OR  
QLHAZ24T, 24-HR TSD WKR (OSHA HAZWOPER)

**NOTE:** *Personnel without Rad Worker training may be allowed entry onto the RWP under escort with approval of the facility RadCon Manager.*

- QN00RAD1, INL Radworker I  
OR  
QN00RAD2, INL Radworker 2, for unescorted access (with exception of Health Physics Technician [HPT])
- 00TRN838, Industrial Ergonomics
- 00TRN606, Heat Stress
- SMTT0010, Cold Stress.

### 2.1.2 Material Services (MS) (as applicable to task performed)

- QNMFHEEO, Heavy Equipment Operator.

### 2.1.3 Health Physics Technicians

- QNMFCHPT, MFC Health Physics Technician.

### 2.1.4 Shift Supervisor (SS)

- QLHAZ24T, 24-HR TSD WKR (OSHA HAZWOPER).

## 2.2 Precautions and Limitations

- 2.2.1 OPS/MS: IF radiological conditions exceed the limiting conditions that void the RWP at any point in this procedure, THEN stop work, place work area in a safe condition, and notify TSD Facilities Manager and RadCon Supervisor.

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 12 of 23

- 2.2.2 Excavating equipment with auger attachment will be used to perform this procedure. A vacuum excavator may also be used instead of, or to supplement the excavating equipment and auger.
- 2.2.3 All heavy equipment operation must be performed by MS personnel.
- 2.2.4 Heavy equipment operations must be in accordance with LWP-14104, "Heavy Industrial Equipment."
- 2.2.5 Heavy equipment, which has not been evaluated for load effects on the storage liners at RSWF per ECAR-1827, "Equipment Loading Adjacent to Liners," must be restricted to the maintained roadway that runs inside the perimeter fence of RSWF.
- 2.2.6 Drilling equipment owned/operated by a private contractor may be used perform excavation activities. Private contract personnel must be escorted by an RSWF representative.
- 2.2.7 This procedure can be used for training and demonstration purposes using an empty container. The requirement for the container ID to be listed on LST-594 does not apply to training and demonstration exercises.
- 2.2.8 The cathodic protection system must be reattached to the liner if it is not retrieved within seven (7) days of excavation. The maximum time the cathodic protection system may remain disconnected from a loaded liner in the ground is seven days.

#### **SAR-407, Safety Analysis Commitment**

- 2.2.9 Throughout the performance of this procedure, keep heavy equipment 6 ft away from 48 in. and 60 in. liners.
- 2.2.10 Throughout the performance of this procedure, heavy equipment that has not been evaluated for load effects on the storage liners at RSWF per ECAR-1827, "RSWF Equipment Loading Adjacent to Liners," must be restricted to the maintained roadway that runs inside the perimeter fence of RSWF.

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 13 of 23

**2.3 TSR Requirements**

2.3.1 The following TSR-407 Limiting Conditions for Operation (LCOs) and Administrative Controls (ACs) are applicable to the work scope addressed in RSWF-OI-012.

<b>TSR</b>	
AC 5.407.5	Soil Excavation Control

**3. PREREQUISITES**

**3.1 General**

3.1.1 SS: Ensure the following minimum qualified staff are present to support excavation activities:

- 1 SS
- 1 Nuclear Facility Operator
- 1 HEO
- 1 EO
- 1 HPT
- 1 Laborer (may be fulfilled by additional EO or NFO)
- 1 Electrician (for cathodic protection system maintenance only).

**3.2 Planning and Coordination**

3.2.1 SS/Subsurface Investigation (SSI) Team Member: Sign the signature box to indicate there is no potential to damage underlying cables or piping during excavation of a liner. Prior approval may be obtained from the SSI and documented by the SS.

Excavation of a liner does not present a potential for damaging underlying cables or piping.			
<b>Subsurface Investigation Team Member:</b>		<b>Date:</b>	
<b>Shift Supervisor:</b>		<b>Date:</b>	

**Idaho National Laboratory**

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 14 of 23

3.2.2 SS/OPS: Perform the following:

- \_\_\_\_\_ 3.2.2.1 Ensure an RWP that covers soil excavation and liner removal has been approved.
- \_\_\_\_\_ 3.2.2.2 Ensure a copy of completed Form 429.01, "Idaho National Laboratory — Weld Data Sheet," has been attached to the working copy of this procedure.

\_\_\_\_\_ 3.2.3 SS: Verify the ID No. of the liner scheduled for excavation is identified on LST-594. Record the liner ID No.

Liner ID No.:			
<b>Signature:</b>		<b>Date:</b>	

\_\_\_\_\_ 3.2.4 SS: Notify the RSWF Material Balance Area (MBA) Custodian that an RSWF liner will be excavated in preparation for retrieval.

3.2.5 RSWF MBA Custodian: Verify proper liner identification number and contents and provide a transfer document to RSWF personnel (if necessary).

I have been notified of the planned excavation/retrieval. Proper liner identification number and contents have been verified and (if necessary) a transfer document provided to RSWF personnel.			
<b>RSWF MBA Custodian/ Safeguards Representative:</b>		<b>Date:</b>	

3.2.6 Verify that the liner has been prepared for excavation per RSWF-OI-002, "Retrieval of Material from 16-in., 24-in., and 26-in. Liners," and RSWF-OI-006, "Maintenance and Surveillance Requirements," **OR** RSWF-OI-009, "RSWF Flanged Liner Activities," as applicable.

**3.3 Special Tools and Equipment**

3.3.1 MS: Obtain the following to be used to excavate the liner, as necessary:

**NOTE:** *The tool list may be augmented as directed by the SS.*

- Excavating equipment with auger attachments
- Vacuum excavator with nozzles
- Bolt cutters

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 15 of 23

- Barricades/excavation cover
- Power supply
- 25-ft measuring tape
- Radiation survey tools
- Lead blankets
- Shovel
- Surrogate liner lifting lugs
- Lifting ears on 16-in. liner
- High intensity spotlight/flashlight.

#### 4. FACILITY CONDITIONS

- 4.1 SS/OPS: Inspect the area adjacent to the liner(s) to ensure it is stable enough to support the equipment.

##### **TSR 407 AC 5.407.5**

- 4.2 SS/HPT: Prior to any soil excavation activities, evaluate and establish required radiation protection controls and monitoring, and ensure an RWP is in place to perform this procedure.

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 16 of 23

**WARNING**

**Personnel are required to wear hard hats if head bump injuries are possible from overhead hazards or working under or in close proximity to heavy equipment.**

**5. INSTRUCTIONS**

**NOTE 1:** *The subsections within Section 5 may be performed independently of each other, or marked "N/A" at the discretion of the SS.*

**NOTE 2:** *The RSWF representative may document step completion (in lieu of the person completing the step) during the performance of steps that must be performed sequentially without interruption.*

**NOTE 3:** *The SS may pre-direct the performance of multiple steps of this procedure.*

**5.1 Preparatory Procedures**

- \_\_\_\_\_ 5.1.1 Welder: Weld on the CWI-provided lifting lug in accordance with the BEA provided lifting ears weld data sheet.
- \_\_\_\_\_ 5.1.2 IF attachment of the lifting lug has removed or obstructed from view the liner ID,  
THEN re-etch/weld the liner ID in the appropriate locations.
- \_\_\_\_\_ 5.1.3 Certified Inspector: Perform a visual inspection of the lifting lug welds, per Appendix A and WDS.
- \_\_\_\_\_ 5.1.4 MS/Contractor: Stage/position the appropriate equipment within the RSWF (e.g., auger, vacuum excavator, etc.) as necessary to perform work activities directed by this procedure.
- \_\_\_\_\_ 5.1.5 SS: Verify all personnel in the facility are on the RWP that covers soil excavation and liner removal activities.
- \_\_\_\_\_ 5.1.6 SS: Ensure any personnel in the vicinity of operating equipment are properly identified with high-visibility garments and proper PPE as specified in hazard table.

**5.2 Liner Excavation**

- \_\_\_\_\_ 5.2.1 HPT: Perform radiological surveys throughout the excavation activities to ensure requirements of the RWP are not exceeded.

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 17 of 23

\_\_\_\_\_ 5.2.2 ELECT: Locate and cut the cathodic protection lead wire that is attached to the liner securing the loose end of the lead away from the liner.

\_\_\_\_\_ 5.2.3 MS/OPS: Hand- or vacuum-excavate about 12 in. down around the liner, if needed.

### CAUTION

**Care must be exercised when using the auger to excavate the soil next to a liner. Contact between the auger and liner may damage the liner. Excavation must be performed incrementally with periodic video inspections to ensure proper auger alignment.**

**NOTE:** *Excavating equipment equipped with an auger and/or the vacuum excavator will be used to excavate the soil around the entire length of the liner.*

\_\_\_\_\_ 5.2.4 Excavate the designated liner as follows:

5.2.4.1 MS/Contractor: Excavate about 2 ft of soil around the liner.

5.2.4.2 OPS: Use a camera (as required) to determine if the excavating equipment is properly aligned around the liner.

5.2.4.3 Repeat Steps 5.2.4.1 and 5.2.4.2 ensuring the auger is not inserted into the soil beyond the appropriate height indicator (height is less for 16-in. liner).

5.2.4.4 MS/OPS/Contractor: WHEN excavation is complete, THEN move the excavating equipment as directed by the SS.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 18 of 23

5.2.5 HPT: Perform the following:

\_\_\_\_\_ 5.2.5.1 Perform radiological surveys on the outside of the liner to the extent possible.

\_\_\_\_\_ 5.2.5.2 Note the highest radiation reading obtained and whether any contamination is detected.

Highest Radiation Reading:	
Contamination detected:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Contamination level (if applicable):	

5.2.6 OPS/SS: Document the liner ID No. below:

Liner ID No.:	
---------------	--

| \_\_\_\_\_ 5.2.7 Welder: IF cathodic protection is required for the excavated liner, as determined by the SS (liner not retrieved within seven [7] days), THEN weld the cathodic protection stinger to the liner in accordance with the weld data sheet.

\_\_\_\_\_ 5.2.8 OPS/ELECT: Attach the cathodic protection lead wire to the stinger. If an electrician is not available, a temporary mechanical connection may be installed from the lead wire to the liner. Notify the TSD Facilities Manager if a temporary connection is utilized.

\_\_\_\_\_ 5.2.9 OPS: Place barricade or excavation cover around/over the excavated liner.

\_\_\_\_\_ 5.2.10 HPT: If necessary, place shielding around/over the excavated liner.

## Idaho National Laboratory

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 19 of 23

**6. POST-PERFORMANCE ACTIVITIES****6.1 Job Completion**

- \_\_\_\_\_ 6.1.1 Contact WGS for disposition of any waste generated.
- \_\_\_\_\_ 6.1.2 SS: Perform a facility walkdown to ensure the integrity of the liners and cathodic protection system.

A facility walkdown to ensure the integrity of the liners and cathodic protection system has been completed.
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<b>Shift Supervisor:</b>		<b>Date:</b>	
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**6.2 Data Review**

- \_\_\_\_\_ 6.2.1 SS: File a copy of the completed procedure in the RSWF files.

**7. ABNORMAL OPERATIONS**

- \_\_\_\_\_ 7.1 IF RWP limits are exceeded,  
THEN immediately place the work site in a safe condition (i.e., use temporary/ALARA shielding or replace excavated soil) as directed by the TSD Facilities Manager and RadCon Supervisor.
- \_\_\_\_\_ 7.2 IF the container CANNOT be safely addressed,  
THEN immediately suspend excavation operations,  
AND immediately establish and maintain a safe distance relative to the liner.
- 7.3 Notify the TSD Facilities Manager and the RadCon Supervisor.

**8. RECORDS**

Executed copies of the following:

RSWF-OI-012, "Excavation of Loaded Liners"

Form 429.01, "Idaho National Laboratory-Weld Data Sheet"

Form 432.A47, "INL Subsurface Investigation"

Form 435.42, "Radioactive Waste Inventory Sheet"

Appendix D of TPR-13442, "Visual Acceptance Criteria for AWS D1.1 Welds and Base Materials"

**Idaho National Laboratory**

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012	
	Revision:	5	
	Effective Date:	10/14/13	Page: 20 of 23

**NOTE:** *LWP-1202, “Records Management,” the INL Records Schedule Matrix, and associated record types list(s) provide current information on the retention, quality assurance, and/or destruction moratorium requirements for these records. Contact a Records Coordinator for assistance if needed.*

## 9. REFERENCES

Dwg. 765881, “MFC-771, “RSWF RH-TRU Acceleration Project Large Liner Lift Adapter Assembly”

ECAR-1827, “RSWF Equipment Loading Adjacent to Liners”

Forms:

429.01, “Idaho National Laboratory—Weld Data Sheet”

432.A47, “INL Subsurface Investigation”

435.42, “Radioactive Waste Inventory Sheet”

LRD-14102, “Excavation and Surface Penetration”

LRD-14406, “Welding, Cutting, and Other Hot Work”

LWP-1202, “Records Management”

LWP-7202, “Subsurface Investigations”

LWP-14104, “Heavy Industrial Equipment”

LWP-14606, “Heat and Cold Stress”

RSWF-OI-002, “Retrieval of Material from 16-in., 24-in., and 26-in. Liners”

RSWF-OI-006, “Maintenance and Surveillance Requirements”

RSWF-OI-009, “RSWF Flanged Liner Activities”

SAR-407, “Safety Analysis Report for the Radioactive Scrap and Waste Facility”

STM-PS-73, “Operation of the Hurricane Industrial Vacuum”

TPR-13442, “Visual Examination”

TSR-407, “Technical Safety Requirements for the Radioactive Scrap and Waste Facility (MFC-711)

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13

**10. APPENDIXES**

| Appendix A, Figure

**Idaho National Laboratory**

<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13 <span style="float: right;">Page: 22 of 23</span>

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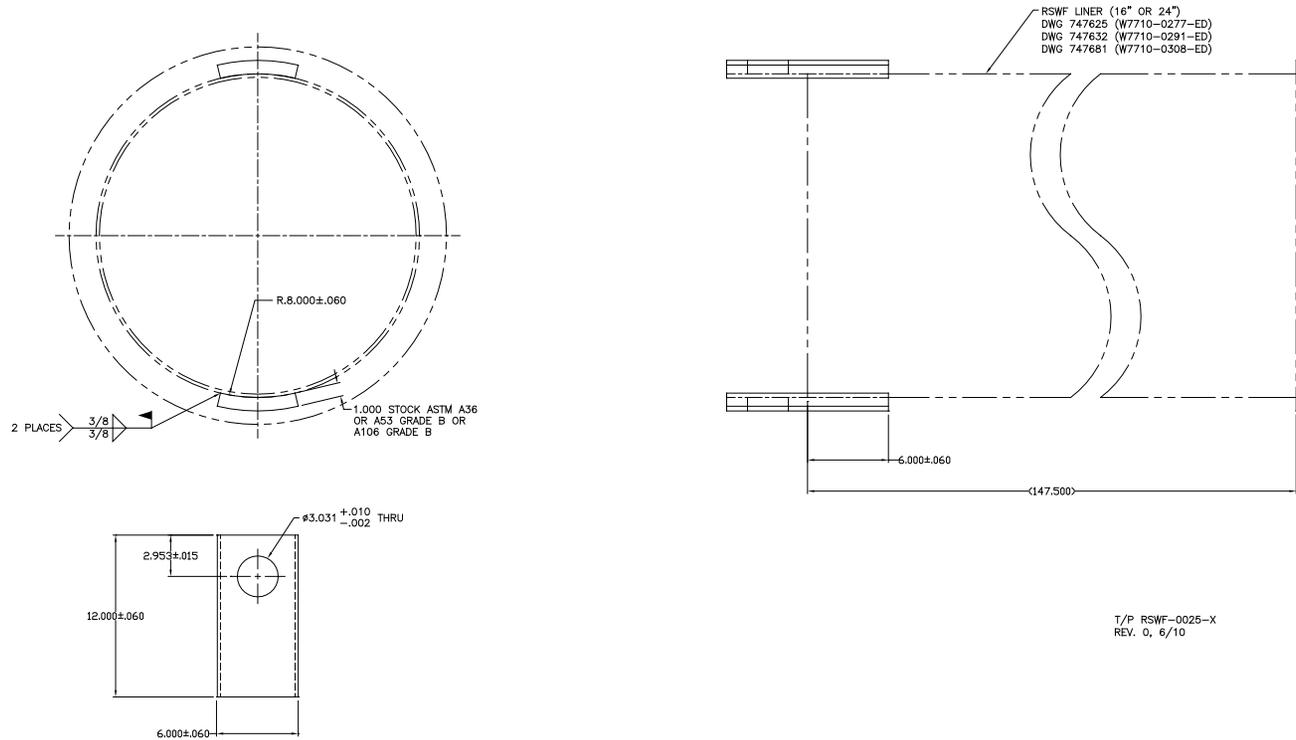
<b>EXCAVATION OF LOADED LINERS</b>	Identifier:	RSWF-OI-012
	Revision:	5
	Effective Date:	10/14/13

Appendix A

Figure

NOTES:

1. WELD SYMBOLS PER AWS A2.43.
- ① 2. WELD SHALL BE PERFORMED IN ACCORDANCE WITH AWS D1.1-2008, SECTION 5. ALL WELDS SHALL BE VISUALLY INSPECTED IN ACCORDANCE WITH AWS D1.1-2008, SECTION 6. WELD ACCEPTANCE CRITERIA PER AWS D1.1-2008, SECTION 6, PART C.
- ① 3. LIFTING LUG CAPACITY = 20,000 LBS EACH (40,000 LBS TOTAL).
- ① 4. IF TOP CLOSURE PLATE IS NOT INSTALLED THEN INSTALL SNUG FIT 2" X 4" SUPPORT AT TOP OF LINER BETWEEN LIFTING LUGS. (A SHIELD PLUG MAY BE INSTALLED INSTEAD OF 2" X 4").
- ① 5. REFER TO ECAR-938.



T/P RSWF-0025-X  
REV. 0, 6/10

Figure 1. RSWF liner lifting lug installation.