

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605
	Revision*: 13
	Page: 1 of 19

INTEC	Technical Procedure	For Additional Info: http://EDMS	Effective Date: 09/12/12
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Manual: INTEC FSV3

USE TYPE 2Change Number: 337144

*The current revision can be verified on EDMS.

1. INTRODUCTION

1.1 Purpose

To demonstrate that the Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI) Container Handling Machine (CHM) is fully operable by performing periodic inspection and preventive maintenance of the CHM raise/lower mechanism.

1.2 Scope and Applicability

The raise/lower mechanism is comprised of three main components: the raise/lower mechanism, the top sprockets, and the electrical cable reeling system. This procedure specifies the actions necessary to perform a visual inspection and preventive maintenance of the CHM raise/lower mechanism located at the FSV ISFSI. (TS LCO 3.2.1/SR 3.2.1.1)

2. PRECAUTIONS AND LIMITATIONS

- 2.1 Personnel must follow the applicable hazard mitigations detailed in Appendix B, "Procedure Hazard Analysis."
- 2.2 Visual and functional inspection must be performed within 31 days prior to commencing HANDLING OPERATIONS (see Technical Specification 1.1, "Definitions") and every 31 days during HANDLING OPERATIONS. (SR 3.2.1.1)
- 2.3 Visual and functional inspection must be performed annually during STORAGE OPERATIONS and must be performed following a tornado or seismic event.
- 2.4 Preventive maintenance must be performed annually.
- 2.5 The FSV ISFSI Manager must be contacted for any activity involving the usage of chemicals.
- 2.6 A Certified Fuel Handler (CFH) or other Cognizant Individual (CI) (designated by the ISFSI Manager) is considered qualified to perform this procedure. Any deficiencies identified should be reported to the ISFSI Manager for evaluation by the appropriate engineering support personnel.

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 2 of 19

- 2.7 The inspection is documented on Appendix A, Tables A-1 and A-2. Preventive Maintenance is documented on Appendix A, Table A-3. Any deficiency, hazard, or abnormal condition noted during the performance of this procedure and the resolution must be entered in the table and reported verbally to the ISFSI Manager.
- 2.8 Upon completion, procedure reviews must be documented on Appendix A.
- 2.9 Rated load tests must be carried out where maintenance procedures have altered the raise/lower mechanism and must comply with the requirements of Code of Federal Regulations 29 CFR 1910.179(l) and NOG 7423.

3. PREREQUISITES**3.1 Planning and Coordination**

- 3.1.1 FSV ISFSI Manager: As a minimum, ensure a Certified Fuel Handler (CFH) or Cognizant Individual (CI) is available to perform this procedure.
- 3.1.2 FSV ISFSI Manager/Facility Safety Officer (FSO): Conduct a pre-job briefing (use Forms 434.14, “Pre-Job Briefing Checklist,” and 434.15, “Pre-Job Briefing Attendance Record” if needed) with personnel conducting this procedure and complete the following items:
- A. A discussion of safety precautions and emergency action associated with the conduct of this procedure
 - B. A review of Section 4 of this procedure
 - C. Ensure that the training and qualification of personnel is current
 - D. RCT coverage has been assigned to provide radiological control surveillance when required during the performance of this procedure.
- 3.1.3 CFH: Verify current revision number of this procedure to ensure it is the current issue.

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 3 of 19
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3.2 Performance Documents

3.2.1 The following forms are available:

- A. Form 230.01, “Non-Conformance Report Form” (if used)
- B. Form 434.14, “Pre-Job Briefing Checklist”
- C. Form 434.15, “Pre-Job Briefing Attendance Record” (if used)
- D. Form 433.24, “Task Evolution Feedback Form” (if used)
- E. Form 441.49, “ICP Radiation Work Permit” (if used).

3.3 Special Tools, Equipment, Parts, and Supplies

3.3.1 CFH: Ensure the following is available:

Material and Equipment List			
Item	Description	Remarks	Quantity
1	Fall protection equipment	Approved and inspected per PRD-5096	As Required (A/R)
2	Ladder/work platform		A/R
3	Lead screw grease – coordinate with the INL Chemical Management System	ROCOL TUFGEAR or Acheson Colloids Molydag 204 P/N 362P0252 item 180	A/R
4	Raise/lower mechanism grease – coordinate with the INL Chemical Management System	Shell Alvania R3 P/N 362P0252 item 179	A/R
5	Chain grease – coordinate with the INL Chemical Management System	Acheson Colloids Dag 504	A/R
6	Powderless latex or nitrile gloves	Use when working with lead screw, lead screw grease, or chain grease	A/R
7	Approved cleaner – coordinate with the INL Chemical Management System	Use for removing lead screw or chain grease	A/R
8	Gap measuring device	Capable of measuring from 0.1 to 0.3 in.	1

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 4 of 19

3.4 Training

3.4.1 Ensure the training requirements in Appendix B are met.

3.5 Field Preparations

3.5.1 FSO: Install lockout/tagout per current lockout/tagout procedure.

3.6 Approvals and Notifications

3.6.1 FSV ISFSI Manager: Perform the following:

3.6.1.1 Ensure prerequisites have been completed.

3.6.1.2 Log the inspection procedure in the FSV Daily Operations Log and release it to commence work.

4. INSTRUCTIONS

4.1 Perform inspection and maintenance of the CHM raise/lower mechanism (SR 3.2.1.1).

NOTE 1: *Unless designated in front of step, Certified Fuel Handlers (CFH) or CI are personnel performing steps.*

NOTE 2: *Any deficiencies are reported to the appropriate engineering support personnel for disposition and resolution.*

NOTE 3: *All areas of corrosion should be removed and repaired or repainted.*

NOTE 4: *When performing Steps 4.1.1 through 4.1.20, steps may be marked "Not Applicable (N/A)," when necessary.*

NOTE 5: *The functional inspection of the CHM Raise/Lower mechanism components can be completed by the successful performance of TPR-5653 or TPR-5655.*

4.1.1 Perform a visual and functional inspection and preventive maintenance of the CHM raise/lower mechanism.

4.1.1.1 Record results of visual inspection in Appendix A, Table A-1.

4.1.1.2 Record results of functional inspection in Appendix A, Table A-2.

4.1.1.3 Record results of preventive maintenance in Appendix A, Table A-3.

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 5 of 19

4.1.2 Remove protective covers from lead screw.

NOTE: *Wear of the lead screw or nuts may be assessed by measurement of the gap between the flange of the backup nut (Item 15 of GEC Technical Specification 362F0152) and the nut block (item 65 of GEC Technical Specification 362F0152). Comparison with the “as-built” gap (0.148 inch), stamped/dated on the nut, will indicate the amount of wear. Should this wear exceed 0.070 inch (total gap of greater than 0.218 inch), the worn component(s) should be replaced.*

4.1.3 Inspect lead screw for metal particle contamination of lubricants and inadequate lubrication on the raise/lower mechanism chain.

4.1.3.1 Report all deficiencies to the ISFSI Manager for evaluation by the appropriate engineering support staff.

4.1.4 IF the lead screw grease does NOT require replacement, THEN do the following:

4.1.4.1 Mark Steps 4.1.5 through 4.1.10 as N/A.

4.1.4.2 GO TO Step 4.1.11, and continue procedure, WITHOUT RETURNING TO this step.

4.1.5 IF the lead screw grease requires replacement, THEN replace lead screw grease per Steps 4.1.6 through 4.1.10.

4.1.6 Contact the FSV ISFSI Manager to coordinate with the Idaho National Laboratory Chemical Management System requirements for cleaner and grease.

4.1.7 Remove old grease from lead screw using approved cleaner.

4.1.8 Inspect lead screw for degradation.

4.1.9 IF deficiencies are identified, THEN notify the ISFSI Manager for evaluation by the appropriate engineering support staff.

4.1.10 Replace lubricant on lead screw with approved grease.

4.1.11 IF the raise/lower mechanism chain grease does NOT require replacement, THEN do the following:

4.1.11.1 Mark Steps 4.1.12 through 4.1.17 as N/A.

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 6 of 19

- 4.1.11.2 GO TO Step 4.1.18 and continue procedure,
WITHOUT RETURNING TO this step.
- 4.1.12 IF the raise/lower mechanism chain grease requires replacement
THEN replace raise/lower mechanism chain grease per Steps 4.1.13
through 4.1.17.
- 4.1.13 Contact the FSV ISFSI Manager to coordinate with the Chemical
Management System requirements for cleaner and grease.
- 4.1.14 Remove old grease from raise/lower mechanism chain using approved
cleaner.
- 4.1.15 Inspect raise/lower mechanism chain for degradation.
- 4.1.16 IF deficiencies are identified,
THEN notify the ISFSI Manager for evaluation by the appropriate
engineering support staff.
- 4.1.17 Replace lubricant on raise/lower mechanism chain with approved grease.
- 4.1.18 Replace protective covers over raise/lower mechanism chain.
- 4.1.19 Remove lockout/tagout of CHM.
- 4.1.20 Dispose of cleaning materials and old grease as directed by the FSV
ISFSI Manager.
- 4.2 Perform post-performance activities.
- NOTE:** *Any deficiencies are reported to the appropriate engineering support
personnel for disposition and resolution.*
- 4.2.1 Facility Safety Officer: Document completion of the procedure on the
Daily Operations Log.
- 4.2.2 Document the following by signature on Appendix A:
- 4.2.2.1 Review the results of the inspection/maintenance.
- 4.2.2.2 Verify the necessary deficiency recording documents and
corrective plan have been generated.
- 4.2.3 FSV ISFSI Manager: Document the following by signature on
Appendix A:
- 4.2.3.1 Verify procedure complete.
- 4.2.3.2 Verify corrective actions (if applicable) completed.

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 7 of 19

5. RECORDS

Completed copy of procedure and associated corrective action documentation.

Forms:

230.01, “Non-Conformance Report Form,” (if any)

433.24, “Task Evolution Feedback Form” (if used)

434.14, “Pre-Job Briefing Checklist”

434.15, “Pre-Job Briefing Attendance Record,” (if any)

441.49, “ICP Radiation Work Permit,” (if used)

Field Changes (if any)

NOTE: [MCP-557, “Records Management,”](#) the [INL Records Schedule Matrix,](#) and associated NRC [record types list](#) provide current information on the storage, turnover, and retention requirements for these records.

6. REFERENCES

Manual 14A, *Safety and Health*, PRD-5096, “Fall Protection”

Safety Analysis Report for the Fort St. Vrain Independent Spent Fuel Storage Installation

General Electric Company (GEC) Dwg. No. 362 A 0035, “Layout of Container Handling M/C”

GEC Dwg. No. 362 A 0036, “Container Handling Machine Hoist Switch”

GEC Dwg. No. 362 A 0097, “Hoist Assy. Scheme”

GEC Dwg. No. 362 A 0151, “CHM Hoist Top Assembly”

GEC Technical Specification No. 362 F 0152, “Fort St. Vrain Maintenance, Inspection and Monitoring Requirements”

GEC Dwg. No. 362 A 0200, “Container Handling Machine Assembly”

GEC Dwg. No. 362 A 0204, “Raise Lower Mechanism”

GEC Dwg. No. 362 A 0209, “Top Plate Equipment-Raise/Lower Mechanism”

GEC Technical Specification No. 362 F 0215, “CHM Chain For Raise/Lower Mechanism”

GEC Dwg. No. 362 A 0248, “Lead Screw and Nut”

GEC Dwg. No. 362 L 0245, “Torque Limiter”

GEC Dwg. No. 362 A 0246, “Standby Brake”

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605

Revision*: 13

Page: 8 of 19

GEC Dwg. No. 362 L 0247, “Gearbox”

GEC Dwg. No. 362 A 0252, “Raise/Lower Mech. Assembly”

GEC Dwg. No. 362 L 0254, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 A 0257, “Raise/Lower Mech. Frame Assembly”

GEC Dwg. No. 362 L 0258, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 A 0259, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 L 0260, “Nut Block”

GEC Dwg. No. 362 A 0263, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 L 0264, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 A 0265, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 L 0266, “Raise/Lower Mech. Details”

GEC Dwg. No. 362 A 0267, “Raise/Lower Mech. Details”

GEC Technical Specification No. 362 F 0275, “Erection for CHM”

GEC Dwg. No. 362 A 0287, “Tight Cable Indicator Details”

GEC Dwg. No. 362 A 0289, “Tight Cable Indicator Details”

GEC Technical Specification No. 362 F 0332, “CHM Assembly Notes For Raise/Lower”

GEC Technical Specification No. 362 F 0366, “CHM Site Assy Spec”

FSV ISFSI Technical Specifications 3.2.1

Engineering Design File (EDF)-8348

29 CFR 1910.179(l)

NOG 7423 (contained in NOG 1, “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)”).

7. APPENDIXES

Appendix A,

Table A-1, “CHM Raise/Lower Mechanism Visual Inspection Results,”

Table A-2, “CHM Raise/Lower Mechanism Functional Inspection Results,” and

Table A-3, “CHM Raise/Lower Mechanism Preventive Maintenance”

Appendix B, Procedure Hazard Analysis

Appendix C, Procedure Basis

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 9 of 19
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Appendix A

Table A-1. CHM Raise/Lower Mechanism Visual Inspection Results

Individual performing inspection (CFH or other CI designated by the ISFSI Manager): Initial and date “yes” or “no” and enter comments/deficiency description/location as applicable.

Inspection items may be completed in any order.

ISFSI Manager: If deficiencies are observed, enter corrective actions/deficiency tracking information.

Criteria	Deficiencies Observed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
Deterioration (discoloration or change in consistency) or leakage of lubricant (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				
Load carrying feature for deformation, cracks or excessive wear (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				
Wear of the lead screw/nuts exceeding 0.070 inch (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 10 of 19
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Criteria	Deficiencies Observed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
Deformed, cracked or corroded members (annual during STORAGE OPERATIONS)				
Loose bolts and/or loss of bolts and fittings (annual during STORAGE OPERATIONS)				
Cracked or worn sprockets (annual during STORAGE OPERATIONS)				
Excessive brake wear (annual during STORAGE OPERATIONS)				
Excessive chain wear (annual during STORAGE OPERATIONS)				
Electrical apparatus for signs of pitting or any deterioration of controller contactors, limit switches and push buttons (annual during STORAGE OPERATIONS)				

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 11 of 19
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Table A-2. CHM Raise/Lower Mechanism Functional Inspection Results

Individual performing inspection (CFH or other CI designated by the ISFSI Manager): Initial and date “yes” or “no” and enter comments/deficiency description/location as applicable.

Inspection items may be completed in any order.

Inspection items may be completed by the successful performance of TPR-5653 or TPR-5655

ISFSI Manager: If deficiencies are observed, enter corrective actions/deficiency tracking information.

Criteria	Deficiencies Observed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
All functional operating mechanisms for maladjustment interfering with proper operation (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				
Confirm operation of all operating functions (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				
Confirm all alarm functions (annual during STORAGE OPERATIONS)				

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 12 of 19
---	---

Criteria	Deficiencies Observed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
Demonstrate all operating functions and control devices (annual during STORAGE OPERATIONS)				

Table A-3. CHM Raise/Lower Mechanism Preventive Maintenance

Individual performing preventive maintenance (PM) (CFH or other CI designated by the ISFSI Manager): Initial and date “yes” or “no” and enter comments/deficiency description/location as applicable.

Preventive maintenance items may be completed in any order.

ISFSI Manager: If deficiencies are observed, enter corrective actions/deficiency tracking information.

Criteria	PM completed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
Inspections per Table A-1 and Table A-2 completed (monthly during HANDLING OPERATIONS and annual during STORAGE OPERATIONS)				

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605
Revision*: 13
Page: 13 of 19

Criteria	PM completed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
All moving parts and bearings must be cleaned if necessary, inspected for wear and damage, and then relubricated if necessary as specified on the relevant drawing (annual during STORAGE OPERATIONS)				
Worn parts must be repaired, adjusted or replaced, if considered likely to fail prior to next scheduled maintenance (annual during STORAGE OPERATIONS)				
Paintwork must be inspected for damage and made good (annual during STORAGE OPERATIONS)				

**INSPECTION OF FSV ISFSI CONTAINER HANDLING
MACHINE RAISE/LOWER MECHANISM**

Identifier: TPR-5605
Revision*: 13
Page: 14 of 19

Criteria	PM completed		Comments/deficiency description/location	Corrective actions/deficiency tracking information.
	Yes	No		
All instrumentation, limit switches, actuating devices and securing screws must be checked for tightness and operation (annual during STORAGE OPERATIONS)				
All proprietary equipment (e.g. gearboxes, brakes, clutches) must be maintained in accordance with manufacturer's recommendations (annual during STORAGE OPERATIONS)				

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 15 of 19
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A.1 Facility Safety Officer: Perform the following:

A.1.1 Review the results of the inspection.

A.1.2 Request all personnel signing or initialing steps in this procedure to complete the information in the table below:

Printed Name	S Number	Job Function	Initials	Signature

A.1.3 Verify the necessary deficiency recording documents and corrective plan have been generated.

Signature _____
Date

A.2 FSV ISFSI Manager: Document the following:

A.2.1 Verify procedure complete.

A.2.2 Verify corrective actions (if applicable) completed.

A.2.3 Attach corrective action documentation as appropriate.

Signature _____
Date

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 16 of 19
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Appendix B

Procedure Hazard Analysis

Highly Hazardous Activity? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	HPSC No.: TPR-5605
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Disciplines (SMEs) involved in hazard analysis: (Checking the box indicates discipline is/was involved in the hazard analysis for the procedure.)

	Discipline		Discipline		Discipline
<input checked="" type="checkbox"/>	Industrial Safety	<input type="checkbox"/>	RCT/RAD Eng.	<input type="checkbox"/>	Engineering
<input type="checkbox"/>	Industrial Hygiene	<input type="checkbox"/>	Env. Protection	<input checked="" type="checkbox"/>	Operations
<input type="checkbox"/>	Fire Protection	<input checked="" type="checkbox"/>	Quality Assurance	<input type="checkbox"/>	Other:

Required Job Training/Required Personal Protective Equipment	
Training	PPE
Certified Fuel Handler	Substantial footwear
Fall protection (for at-risk workers)	Leather, powderless nitrile, or latex gloves
Ladder safety (for ladder work)	Hard hats
Industrial Ergonomics	

Sequence Of Basic Job Steps	Potential Hazards	Hazard Control/PPE
1. General to all procedure	1a. Uneven surfaces	1a. Personnel must wear substantial footwear
	1b. Slip/trip/fall	1b. Personnel must wear substantial footwear
	1c. Fall hazard	1c. Personnel must follow the current FSV FHPA requirements
	1d. Chemical exposure to skin	1d. Personnel must wear powderless nitrile or latex gloves
	1e. Overhead hazard	1e. Personnel must wear hard hat
	1f. Stored energy	1f. Personnel must use lockout/tagout
	1g. Hand hazards	1g. Personnel must wear leather gloves

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 17 of 19
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Appendix C

Procedure Basis

Procedure Review Table							
Review Discipline	Rev.	DFC Intent ^b Change	DFC Nonintent ^c Change	Review Discipline	Rev.	DFC Intent ^b Change	DFC Nonintent ^c Change
Operations Management	X ^a	X	X	Industrial Safety	X	X	X
Qualified Operator	X	X	X	Engineering			
Radiological Engineering				Industrial Hygiene			
Environmental				Other:			
Quality	X ^a	X	*				

a. X = review required.
 b. Reviews for intent DFCs require the same discipline reviews required for a revision.
 c. Reviews for nonintent DFCs can be performed with only Operations management and a qualified operator’s review and then implemented for immediate use. However, the remaining discipline reviews, as indicated by an asterisk (*), must be obtained within two (2) weeks. See MCP-2985, “Chapter XVI – Operations Procedures,” for definitions of intent and nonintent changes.

Step	Step	Source	Citation
2.1	Personnel must follow the applicable hazard mitigations detailed in Appendix B.	Procedure hazard analysis	
2.2	Visual and functional inspection must be performed within 31 days prior to commencing HANDLING OPERATIONS (see Technical Specification 1.1, “Definitions”) and every 31 days during HANDLING OPERATIONS.	SR 3.2.1.1	
2.3	Visual and functional inspection must be performed annually during STORAGE OPERATIONS and must be performed following a tornado or seismic event.	GEC Technical Specification 362F0152	6.1.7.2

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 18 of 19
---	---

Step	Step	Source	Citation
2.4	Preventive maintenance must be performed annually.	Management best practice	
2.5	The FSV ISFSI Manager must be contacted for any activity involving the usage of chemicals.	Management best practice	
2.6	A Certified Fuel Handler (CFH) or other Cognizant Individual (CI) (designated by the ISFSI Manager) is considered qualified to perform this procedure. Any deficiencies identified should be reported to the ISFSI Manager for evaluation by the appropriate engineering support personnel.	Management best practice	
2.7	The inspection is documented on Appendix A, Tables A-1 and A-2. Preventive Maintenance is documented on Appendix A, Table A-3. Any deficiency, hazard, or abnormal condition noted during the performance of this procedure and the resolution must be entered in the table and reported verbally to the ISFSI Manager.	Management best practice	
2.8	Upon completion, procedure reviews must be documented on Appendix A.	Management best practice	
2.9	Rated load tests must be carried out where maintenance procedures have altered the raise/lower mechanism and must comply with the requirements of Code of Federal Regulations 29 CFR 1910.179(l) and NOG 7423.	Code of Federal Regulations 29 CFR 1910.179(l) and NOG 7423.	
3.3.1	Supplies needed: Powderless latex or nitrile gloves.	Procedure hazard analysis	
3.4.1	Ensure training requirements of Appendix B have been met.	Procedure hazard analysis	
4.1	CHM operability is required to ensure proper handling of the fuel storage containers.	FSV ISFSI Technical Specification 3.2.1	

INSPECTION OF FSV ISFSI CONTAINER HANDLING MACHINE RAISE/LOWER MECHANISM	Identifier: TPR-5605 Revision*: 13 Page: 19 of 19
---	---

Step	Step	Source	Citation
4.1	Inspection program	GEC Technical Specification 362F0152 EDF-8348 29 CFR 1910	6.1.7.2.1, 6.1.7.2.2 1910.179(j)(1/2/3)
4.1	Preventive maintenance program	GEC Technical Specification 362F0152 EDF-8348 29 CFR 1910	6.1.7.2.3 1910.179(l)(3)
Note 4 for 4.1	Steps may be marked “Not Applicable” or “N/A”, when necessary.	Response to ICARE 104097/DOE-ID Surveillance 09-ISFSI-S-001	Concern 09-ISFSI-S-001-C-002
3.5.1	Perform lockout/tagout on CHM	Procedure hazard analysis	
4.1.19	Remove lockout/tagout of CHM.	Procedure hazard analysis	