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MAY 02 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
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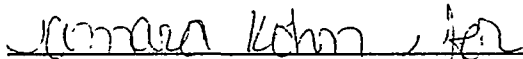
Document Title: Test Procedure for the Master-Lee and the Modified
Champion Four Inch Hydraulic Cutters

Release Date: May 2, 1995

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:


Chris Willingham

May 2, 1995

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SUPPORTING DOCUMENT

1. Total Pages **31**

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Test Procedure for the Master-Lee and the Modified
Champion Four Inch Hydraulic Cutters

3. Number

WHC-SD-SNF-DTP-001

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6. Author

Name: **J. B. Crystal**

Signature *J. B. Crystal*

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7. Abstract

This document is a developmental test procedure for the hydraulic cutters used to reduce the size of debris in the 100K Fuel Basins for eventual removal and disposal. Testing will be conducted in the 305 Cold Test Procedure.

8.

RELEASE STAMP

OFFICIAL RELEASE
BY WHC

DATE

MAY 02 1995

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Conclusions

Preliminary multiple-regression analysis of 3D seismic attributes has not yielded results that appear to be fully reliable. However, additional work may yield break-through methods that can be applied to the Sooner Unit. Seismic mapping of hydrocarbon-porosity thickness would allow for comprehensive, volumetric-reserve calculations and improved reservoir management. At the Sooner Unit, seismic-attribute mapping provides a good predictive capability for mapping of gross and net-sand thickness. Unfortunately, determination of hydrocarbon pore-feet thickness from seismic data appears to be poorly constrained.

Seismic mapping of reservoir attributes from other surveys in the "D" Sand to the south of Sooner Unit show a greater correlation of gross and net-sand thickness with reservoir quality. The lack of a strong correlation between gross and net-sand thickness and reservoir pay at the Sooner Unit may indicate a more complex reservoir and depositional setting. The geological setting at Sooner Unit is in transition from a classical incised valley to a tidally influenced marine setting which may result in clay content playing a greater role in reservoir quality than sandstone thickness. Other 3D seismic studies of "D" Sand reservoirs in the D-J Basin indicate that greater "D" Sand isolith thickness equates to more quality reservoir development. This does not appear to be the case at the Sooner Unit where gross isolith thickness correlates poorly with net pay and effective hydrocarbon-porosity development.

Recommended Future Work

Recommended future work with statistical analysis and 3D seismic reservoir characterization would encompass two topics. Additional seismic attributes would be calculated and measured in an attempt to identify attributes with higher correlation to reservoir properties. New 3D seismic attribute-mapping software allow the calculation of component attributes such as seismic energy, bandwidth, threshold, magnitude and others. Additionally, the ability to measure all seismic attributes within a horizon or time window may lead to improvements in statistical analysis and reservoir property prediction. The other topic for future work is the application of geostatistical methods such as co-location co-kriging which is currently available in commercial software packages. Geostatistical methods allow for more robust correlation and mapping by honoring values at specific data locations. One of the limitations of the current multiple-regression methodology is that the resultant is an average of the data variability and does not consider the spatial distribution of the data. Multiple linear-regression methods rely on population statistical assumptions while geostatistical methods rely on the spatial distribution of data. Co-location co-kriging methods have numerous advantages to standard population statistical methods such as calculation of estimation error and mapping of prediction probability.

REFERENCES

G.P. Allen and H.W. Posamentier, "Sequence Stratigraphy and Facies Model of an Incised Valley Fill: The Gironde Estuary, France", Journal of Sedimentary Petrology, Vol. 63, No. 3, May 1993, p. 378-391.

**TEST PROCEDURE
FOR THE MASTER-LEE AND THE MODIFIED CHAMPION 4 INCH HYDRAULIC CUTTERS**

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The Master-Lee and the modified Champion 4 Inch hydraulic cutters are being retested to gather and document information related to the following:

- Determine if the Master-Lee cutters will cut the trunnions of an Aluminum fuel canister and a Stainless Steel fuel canister.
- Determine if the Master-Lee cutters will cut 1½"φ fire hose.
- Determine if the modified Champion 4 inch blade will cut sections of piping.
- Determine the effectiveness of the centering device for the Champion 4 Inch cutters.

The scope of this document includes feature testing activities.

1.2 BACKGROUND

Determining the limitations of the hydraulic cutter will aid in the process of debris removal in the K-Basin. The 4" cutter has previously been tested, reference WHC-SD-SNF-ATR-008, *Acceptance Testing Report for the Master-Lee/Champion Hydraulic Cutting Equipment*. Based on this test, the cutters were returned to the manufacturer for modifications. The modifications to the Champion 4 Inch Cutter and further testing of the Master-Lee Cutter are the subject of these feature tests.

The results of these previous tests indicate that the hydraulic cutters are capable of the following:

- The Master-Lee and 4" Champion cutters are capable of cutting metallic piping and structural shapes with a major dimension less than or equal to two inches.
- The Master-Lee cutter is better at cutting smaller material (i.e. Tygon tubing, rubber hose, electrical wire, etc.)

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MASTER

2.0 APPLICABLE/REQUIRED DOCUMENTS

- WHC-SD-SNF-TP-011, *K-Basin Debris Removal Equipment Test Plan*.
- Signature Verification Data Sheet (Appendix A).
- Test Configuration Documentation List (Appendix B).

3.0 TEST CONTROLS

3.1 RESPONSIBILITIES

- 3.1.1 The responsibilities for the conduct of this test procedure are defined in Section 4.0 of WHC-SD-SNF-TP-011, *K-Basin Debris Removal Equipment Test Plan*.
- 3.1.2 The test engineer for this test procedure is _____.
- 3.1.3 Any and all persons responsible for signature verification(s) during testing shall complete a portion of the Signature Verification Data Sheet (Appendix A).

3.2 TEST DATA

- 3.2.1 Data shall be recorded on data sheets as provided by this procedure.
- 3.2.2 All changes to the configuration of tested items will be documented by redline markups to the controlled design documentation. These include pen and ink changes to test procedures, draft operating procedures, and redline drawing markups. All redline changes must receive the final approval of the test engineer. Approvals will be documented by the test engineer's initials and date on the redline item. Lack of immediate redline approval does not constitute a test hold. Continued test progress is at the discretion of the test engineer.
- 3.2.3 A test logbook will be maintained by the test performer(s). The test engineer shall be the designated logbook custodian. All pertinent observations, off-normal events, sketches, photographs, etc., shall be logged. Chronological tests conducted shall also be logged. All logged entries shall be signed and dated. Additional notes or entries relating to a procedure data sheet entry field or information shall be adequately referenced to the appropriate section of this procedure.

3.3 TEST CONFIGURATION

- 3.3.1 Drawings, sketches, figures, and other engineering documents which establish the process equipment test configuration are identified on the Test Configuration Documentation List (Appendix B). The list includes all configuration documentation for major equipment items, ancillary equipment items, and tooling.
- 3.3.2 Listed configuration documentation items are not a part of this document for the purpose of approval unless specifically included as a part of this procedure for approval.
- 3.3.3 Listed configuration documentation are independently approved and controlled by the applicable document control procedure.

- 3.3.4 For the purpose of the control of test configuration, copies of the listed documents which are part of the controlled test procedure package (per Section 3.4) shall be the justification basis for change control or finalization of the listed documents.
- 3.3.5 All items marked "Included" in Appendix B shall be marked as TEST CONTROL COPY and shall be included in the controlled test procedure package for the purpose of conducting the test. The exception to this requirement is for unmodified, manufactured equipment which the configuration documentation is a manufacturer's part number.

3.4 PROCEDURE CONTROL

All items of the completed test procedure shall be date stamped TEST CONTROL COPY prior to completing the test readiness review checklist per Section 7.2. All package deficiencies shall be noted on the review checklist.

3.5 RETEST PROCEDURE CONTROL

- 3.5.1 If retest is required, additional copies of applicable procedure sections or data sheets of this test procedure may be used or new procedures per Section 7.0 may be used.
- 3.5.2 The addition of procedure sections to be used for retest shall be added as Appendix F (Retest Procedure and Data Sheets), noted in the test, and concurred with by the WHC QA representative. All additions shall be marked TEST CONTROL COPY.
- 3.5.3 Minor procedure changes such as editorial changes to a step, clarification of a step or steps, or limited sequential changes of steps, and changes which do not fall in the categories of Section 7.0, shall be noted in the procedure by redline entries, noted in the test giving the reason for the change, and initialed and dated by the test engineer. Elimination or addition of a step which requires QC verification signature will require a hold point for QA review and approval.
- 3.5.4 Documentation not marked TEST CONTROL COPY shall not be used for testing and shall not be present in the test area.

3.6 OPEN ITEMS

Items and actions identified during the conduct of testing which require future resolution/completion shall be noted on data sheets and in the test logbook. Identified open items shall subsequently be entered into the test completion report to assure final closeout.

4.0 TEST DESCRIPTION

The Master-Lee and Champion 4 hydraulic cutters consist of the following components:

- Master-Lee Pump and Model 2009 Cutter.
- Master-Lee Pump and Champion 4 Inch Rescue Cutter with new blade and centering device.
- Miscellaneous equipment. Master-Lee poles for holding the cutters, and collection box if test is to be run in the test basin.

The system will be operated under various conditions to determine:

- The limitations of each cutter while trying to cut specific material and items.
- Gain operational experience using the hydraulic cutters for potential use in the K-Basin.

4.1 EQUIPMENT LIST

The following equipment is required for the performance of the test(s) described by this procedure:

4.1.1 Pump, Hydraulic Cutters, and Ancillary Equipment

- Master-Lee high pressure hydraulic pump with integral hydraulic fluid reservoir.
- Greenlee Fairmont Control Valve Assembly.
- Hose assembly: Pump to Control Valve, 10' long.
- Hose assembly: Control Valve to Cutter Head, 50' long.
- UCON Hydraulic Fluid WS-34
- Master-Lee Model 2009 Cutter Head Assembly complete with cutter wrist to adapt head to air grip masts, "pool poles."
- Champion Rescue Cutter, Cutter Head Assembly complete with cutter wrist to adapt head to air grip masts, "pool poles."
- Master-Lee Pool Poles

Figure 1 shows the Hydraulic Flow Schematic for the test equipment.

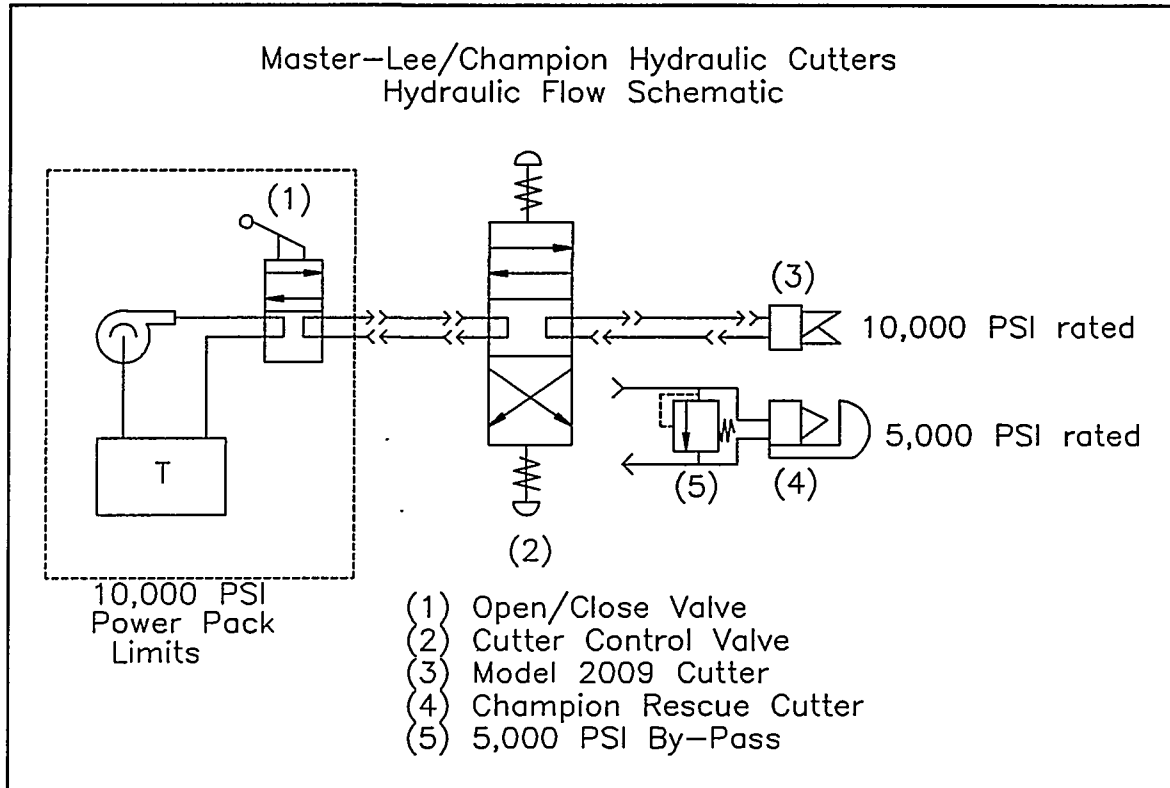


Figure 1

4.1.2 Collection Box

- 4' x 4' x 1' Stainless Steel Collection Box if the test is to be performed in the test basin.

4.1.3 Test Specimens

- 1½"φ Fire Hose
- 2" Schedule 40 Stainless Steel Pipe
- Mark 0 Aluminum Fuel Canister
- Mark II Stainless Steel Fuel Canister

4.1.4 Air operated tools for moving test material.

5.0 TEST FACILITY

Testing of the Master-Lee and Champion 4 Inch hydraulic cutters will be conducted in the Building 305 Cold Test Facility. After feature testing has been completed and approved, some system components may be relocated to 105-KE Basin for installation and use.

6.0 SAFETY

- The applicable JHAs for this test are listed in Appendix D (Job Hazard Analysis and Material Safety Data Sheets).
- The applicable Material Safety Data Sheets (MSDSs) for this test are listed in Appendix D.
- All applicable JHAs and MSDSs shall be posted or located in the test facility test area.
- All test area personnel shall observe all safety precautions outlined in the MSDS and JHA.
- Pre-job briefings for personnel involved in testing shall be conducted and documented in Appendix G.

7.0 TEST PROCEDURE

7.1 TEST PERFORMER ASSIGNMENT

The test performer for this test procedure is _____.

7.2 TEST READINESS REVIEW

Prior to proceeding with Section 7.3, complete the test readiness review per the checklist in Appendix C (Test Readiness Review Checklist).

7.3 TEST PROCEDURE STEPS

Traveler forms, as required by the following procedure steps, are included in Appendix E.

Generally, Sections 7.3.1 through 7.3.8 are to be accomplished in sequence.

7.3.1 Perform the pre-operational checkout steps per test procedure traveler operation 1.0, "Pre-operational Checkout."

Completed: _____ _____
 Test Performer Date

7.3.2 Perform calibration steps per test procedure traveler operation 2.0, "Calibration Checks."

Completed: _____ _____
 Test Performer Date

7.3.3 Verify equipment list per test procedure traveler operation 3.0.

Completed: _____ _____
 Test Performer Date

7.3.4 Perform equipment setup per test procedure traveler operation 4.0.

Completed: _____ _____
 Test Performer Date

7.3.5 Perform the test per test procedure traveler operation steps listed after traveler operation 5.0.

7.3.6 Perform 305 test procedure traveler final verification (last operation in traveler).

Completed: _____ _____
 Test Performer Date

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

- Item: This may be major equipment, tooling, instrumentation, facility, etc. Use equipment name (and number if assigned).
- Document Title: Title of drawing, sketch, figure, publication, vendor information, etc. More than one document may be applicable to a given item. List each document separately.
- Document Number: Drawing, sketch, figure, vendor publication numbers, etc. Include revision if released.
- Released: Enter YES, NO, or N/A (Not Applicable).
- Included: Enter YES or NO. Copies of all documents not released shall be included.

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED

APPENDIX C

TEST READINESS REVIEW CHECKLIST

APPENDIX C

TEST READINESS REVIEW CHECKLIST

Date _____

REVIEWERS

NAME (PRINT)	POSITION	SIGNATURE	DATE

CHECKLIST

1. Is this test procedure released?

Yes _____ No _____

Comments _____

2. Are there any open items which need to be addressed prior to start of testing?

Yes _____ No _____

Comments _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

3. Is the test procedure package per Section 3.4 complete and are all pages, attachments, etc., marked TEST CONTROL COPY?

Yes _____ No _____

Comments _____

4. Are all JHAs and MSDSs required by the procedure posted or located in the test area?

Yes _____ No _____

Comments _____

5. Is all equipment per Section 4.1 available at the test area for installation?

Yes _____ No _____

Comments _____

6. Are all test materials per Section 4.2 available at the test area?

Yes _____ No _____

Comments _____

7. Are the facility support systems available in the test area?

Yes _____ No _____

Comments _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

8. Pre-job briefing complete.

Yes ____ No ____

Comments _____

APPENDIX D

**JOB HAZARD ANALYSIS
AND
MATERIAL SAFETY DATA SHEETS**

APPENDIX E

TRAVELER FORM

	TEST TRAVELER	Page 1 of 4	Number
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Job Description Testing of the Master-Lee and Modified Champion 4 Inch Hydraulic Cutters	Work Order No.	Prepared by J. R. Burdin
--	-----------------------	------------------------------------

System Engineer Approval J. B. Crystal	Phone 6-2618	Date Required	Approval Designator Q	QA Approval See EDT 161575	Date
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System Manager Approval D. S. Takasumi M. J. Wiemers	Phone 2-0249 6-9516	305 Bldg Manager Approval	Date	Safety Approval	Date
---	----------------------------------	----------------------------------	-------------	------------------------	-------------

Operation Number	Test Instruction	Ref. Dwg. Proc. Spec.	Completion Sig/Stamps	Date	Notes
1.0	Pre-Operational Checkout		Q _____ T _____ N NA _____ E _____ C NA _____		
1.1	Verify all test performer blanks in Section 7.0 and Appendixes A,B,C, and D are completed. Also stamp "TEST CONTROL COPY" per Section 3.4 on entire procedure.		Q _____ T _____ N NA _____ E _____ C NA _____		
1.2	Conduct a "pre-job briefing" of operations, including a review of all procedures, drawings and other engineering documents required to complete the test. Signoff Appendix G.		Q _____ T _____ N NA _____ E _____ C NA _____		
1.3	Read the performance criteria that are included as Section 4.0 of the test procedure.		Q _____ T _____ N NA _____ E _____ C NA _____		

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TEST TRAVELER (Continuation Sheet)		Page	Number		
		2 of 4			
Operation Number	Test Instruction	Ref., Dwg., Proc., Spec.	Completion Sig/Stamps	Date	Notes
2.0	Verify the equipment list in Section 4.0.		Q _____ T _____ N NA E _____ C NA		
3.0	Complete and verify the test layout/schematic Section 4.0.		Q _____ T _____ N NA E _____ C NA		
4.0	Assemble the Master-Lee Pump and Model 2009 Cutter per the attached Assembly and Operating Instructions.		Q _____ T _____ N NA E _____ C NA		
4.1	Attempt to cut to cut the trunnion of an Aluminum fuel canister. Time the length of the cut.		Q _____ T _____ N NA E _____ C NA		Yes _____ No _____ Time _____
4.2	If Master-Lee cutters cut the trunnion of an Aluminum fuel canister, then attempt to cut the trunnion of a Stainless Steel fuel canister. Time the length of the cut.		Q _____ T _____ N NA E _____ C NA		Yes _____ No _____ Time _____

TEST TRAVELER (Continuation Sheet)		Page 3 of 4	Number		
Operation Number	Test Instruction	Ref., Dwg., Proc., Spec.	Completion Sig/Stamps	Date	Notes
4.3	Attempt to cut a length of 1½"φ Fire Hose. Time the length of the cut.		Q _____ T _____ N NA _____ E _____ C NA _____		Yes _____ No _____ Time _____
5.0	Assemble the Master-Lee Pump and 4 Inch Champion Rescue Cutter with the new blade and centering device per the attached Assembly and Operating Instructions.		Q _____ T _____ N NA _____ E _____ C NA _____		
5.1	Attempt to cut a length of 2" Schedule 40 Stainless Steel Pipe. Time the length of the cut.		Q _____ T _____ N NA _____ E _____ C NA _____		Yes _____ No _____ Time _____
<p>NOTE</p> <p>THE TEST ENGINEER MAY TEST OTHER MATERIALS AT HIS DISCRETION PROVIDED THEY ARE WITHIN THE LIMITS PRESCRIBED BY THE MANUFACTURER.</p> <p>THE ENGINEER SHALL NOTE THE MATERIAL, CUTTER HEAD AND SUCCESS OR FAILURE BELOW.</p>					

TEST TRAVELER (Continuation Sheet)			Page 4 of 4	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc., Spec.	Completion Sig/Stamps	Date	Notes
7.0	Verify that all steps in this traveler have been completed.		Q _____ T _____ N NA _____ E _____ C NA _____		
<i>List of Required Attachments:</i> 1. Performance Criteria 2. Equipment List 3. Test Layout/Schematic <i>Optional Attachment:</i> 4. Acceptance Criteria for K-Basin Equipment					

E = Engineer

Q = QA Inspector

T = Technician

C = Craft

N = NDE Inspector

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORMS

PRE-JOB SAFETY MEETING FORM		Page 1 of 2																														
Job Description/Title	Date																															
Work Package No.:	Person in Charge (PIC):																															
First Aid Qualified Person:																																
<p>Check Items Discussed</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;"><input type="checkbox"/> Procedures/Plans to be Used</td> <td style="width: 40%;">No.</td> </tr> <tr> <td><input type="checkbox"/> Applicable OSR's</td> <td>No.</td> </tr> <tr> <td><input type="checkbox"/> Radiation Work Permit</td> <td>No.</td> </tr> <tr> <td><input type="checkbox"/> Job Hazard Analysis</td> <td>No.</td> </tr> <tr> <td><input type="checkbox"/> Construction Permit (as needed)</td> <td>No.</td> </tr> <tr> <td><input type="checkbox"/> Additional Permits (i.e., confined space, excavation, etc.)</td> <td>No.</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Review All Applicable Safety Precautions and Prestart Conditions per Procedures/Plans to be used</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Components Locked and Tagged</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> ALARA Considerations (applicable MSDS's)</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Respiratory Protection (fresh air, PAPR's, chemical filters, etc.)</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Radioactive Contamination Containment Device</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Emergency Response and Actions</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Summary of Job Sequence (or steps)</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Work Area Conditions (high/low temperatures, lighting, etc.)</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> All Equipment Functionally Checked and at Work Site</td> </tr> </table>			<input type="checkbox"/> Procedures/Plans to be Used	No.	<input type="checkbox"/> Applicable OSR's	No.	<input type="checkbox"/> Radiation Work Permit	No.	<input type="checkbox"/> Job Hazard Analysis	No.	<input type="checkbox"/> Construction Permit (as needed)	No.	<input type="checkbox"/> Additional Permits (i.e., confined space, excavation, etc.)	No.	<input type="checkbox"/> Review All Applicable Safety Precautions and Prestart Conditions per Procedures/Plans to be used		<input type="checkbox"/> Components Locked and Tagged		<input type="checkbox"/> ALARA Considerations (applicable MSDS's)		<input type="checkbox"/> Respiratory Protection (fresh air, PAPR's, chemical filters, etc.)		<input type="checkbox"/> Radioactive Contamination Containment Device		<input type="checkbox"/> Emergency Response and Actions		<input type="checkbox"/> Summary of Job Sequence (or steps)		<input type="checkbox"/> Work Area Conditions (high/low temperatures, lighting, etc.)		<input type="checkbox"/> All Equipment Functionally Checked and at Work Site	
<input type="checkbox"/> Procedures/Plans to be Used	No.																															
<input type="checkbox"/> Applicable OSR's	No.																															
<input type="checkbox"/> Radiation Work Permit	No.																															
<input type="checkbox"/> Job Hazard Analysis	No.																															
<input type="checkbox"/> Construction Permit (as needed)	No.																															
<input type="checkbox"/> Additional Permits (i.e., confined space, excavation, etc.)	No.																															
<input type="checkbox"/> Review All Applicable Safety Precautions and Prestart Conditions per Procedures/Plans to be used																																
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<input type="checkbox"/> All Equipment Functionally Checked and at Work Site																																
Special Circumstances or COMMENTS:																																
<p>Chairman Signature:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Operations</td> <td style="border-bottom: 1px solid black; width: 80%;"></td> </tr> <tr> <td>Maintenance</td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td>Other</td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>			Operations		Maintenance		Other																									
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