DISTRIBUTION SHEET

To DISTRIBUTION	From DC LARSEN	Page 1 of 1
		Date Nov 16, 1994
Project Title/Work Order LEVEL MAINTENANCE FOR TANK 101-SY MITIGATION-BY-MIXING TEST, REV 3 (WHC-SD-WM-TPI-016)		EDT No. N/A
		ECN No. 617082

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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Page 1 of 41. ECN NO **617082**Proj.
ECN

2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedure ☐ Cancel/Void ☐		3. Originator's Name, Organization, MSIN, and Telephone No. DC LARSEN, TEST ENGINEERING, R1-51, 373-5995		4. Date Nov 16, 1994										
		5. Project Title/No./Work Order No. HYDROGEN MITIGATION	6. Bldg./Sys./Fac. No. 241-SY-101	7. Impact Level SQ										
		8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TPI-016, Rev 2	9. Related ECN No(s). N/A	10. Related PO No. N/A										
11a. Modification Work ☐ Yes (fill out Blk. 11b) ☒ No (NA Blks. 11b, 11c, 11d)		11b. Work Package No. N/A	11c. Modification Work Complete N/A _____ Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A _____ Cog. Engineer Signature & Date										
12. Description of Change <p>Total rewrite of procedure to implement DACS software upgrades and changes related to revision 13 of the LANL Safety Assessment and revision 3 of the WHC Test Plan (WHC-SD-WM-PLN-081)</p>														
13a. Justification (mark one) <table border="0"> <tr> <td>Criteria Change ☐</td> <td>Design Improvement ☒</td> <td>Environmental ☐</td> </tr> <tr> <td>As-Found ☐</td> <td>Facilitate Const. ☐</td> <td>Const. Error/Omission ☐</td> </tr> <tr> <td></td> <td></td> <td>Design Error/Omission ☐</td> </tr> </table>						Criteria Change ☐	Design Improvement ☒	Environmental ☐	As-Found ☐	Facilitate Const. ☐	Const. Error/Omission ☐			Design Error/Omission ☐
Criteria Change ☐	Design Improvement ☒	Environmental ☐												
As-Found ☐	Facilitate Const. ☐	Const. Error/Omission ☐												
		Design Error/Omission ☐												
13b. Justification Details <p>Provides for simplified operation of SY-101 Mixer Pump in preparation for transition to routine operation.</p>														
14. Distribution (include name, MSIN, and no. of copies) See attached distribution sheet				RELEASE STAMP OFFICIAL RELEASE BY WHC 5 DATE DEC 13 1994 <i>Sta. 4</i>										

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1. ECN (use no. from pg. 1)

617082

15. Design Verification Required

☐ Yes☒ No

16. Cost Impact

ENGINEERING

Additional

☐

\$ N/A

Additional

☐

\$ N/A

Savings

☐

\$ N/A

Savings

☐

\$ N/A

CONSTRUCTION

17. Schedule Impact (days)

Improvement

☐

Delay

☐

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☒
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐		☐
Environmental Report	☐	Inspection Plan	☐		☐
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision

Document Number/Revision

Document Number/Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer DC LARSEN <i>D.C. Larsen</i>	<i>11/21/94</i>	PE	
Cog. Mgr. RW REED <i>R. Reed</i>	<i>12-13-94</i>	QA	
QA -TRG <i>M.L. McElroy</i>	<i>12/13/94</i>	Safety	
Safety -TRG <i>L.S. Krogstad</i>	<i>12/12/94</i>	Design	
Security		Environ.	
Environ.		Other	
Projects/Programs -TRG: JW LENTSCH <i>JW Lentsch</i>	<i>11/21/94</i>		
Tank Waste Remediation System -TRG			
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other		Peer Review <i>[Signature]</i>	<i>12-13-94</i>
TRG (C.E. Hanson) <i>C.E. Hanson</i>	<i>11-21-94</i>		
TRG <i>R. Reed</i>	<i>11/21/94</i>		
TRG D.C. LARSEN for DAW. <i>D.C. Larsen</i>	<i>12/13/94</i>		
TRG - PNL <i>F.E. Panisko</i>	<i>Nov. 21, 94</i>		
TRG - LANL <i>NA</i>	<i>11-21-94</i>		

WASTE TANKS ADMINISTRATION
UNREVIEWED SAFETY QUESTIONS

Manual
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15.9, REV 1
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September 3, 1993

APPENDIX B

Unreviewed Safety Question Forms

Figure B-1. Unreviewed Safety Question - Changes Screening Form. (1 Sheet)

REFERENCE ITEM # WHC-SD-WM-ATP-016 REV. 3 _
TITLE LEVEL MAINTENANCE PROCEDURE

Does the referenced item:

- A. Make PROPOSED CHANGES to the facility or procedures which differ from conditions described in the AUTHORIZATION BASIS documentation?
N/A ___ NO X Yes/Maybe ___

Basis: Reference item, WHC-SD-WM-ATP-016 REV. 3, incorporates the changes in the SAFETY ASSESSMENT FOR PROPOSED MIXER PUMP OPERATIONS TO MITIGATE EPISODIC GAS RELEASES IN TANK 241-SY-101 LAUR-92-319 Rev. 13 (SA) Chapter 6, closed tank level I, II, and III, controls and in accordance with the LONG TERM TEST PLAN, WHC-SD-WM-PLN-081 REV. 3.

- B. Make PROPOSED CHANGES that represent conditions that have not been analyzed in the AUTHORIZATION BASIS?
N/A ___ NO X Yes/Maybe ___

Basis: Reference item, WHC-SD-WM-ATP-016 REV. 3, implements changes in the 241-SY-101 mixer pump operating procedures that approved in the SAFETY ASSESSMENT FOR PROPOSED MIXER PUMP OPERATIONS TO MITIGATE EPISODIC GAS RELEASES IN TANK 241-SY-101 LAUR-92-319 Rev. 13 (SA).

- C. Describe tests or experiments which differ from those described in the AUTHORIZATION BASIS documentation?
N/A ___ NO X Yes/Maybe ___

Basis: Reference item, WHC-SD-WM-ATP-016 REV. 3, implements changes described in the authorization basis.

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Manual

WHC-IP-0842

Section

15.9, REV 1

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D. Is a change in a TSR, OSR, or compliance plan to OSR involved?

N/A____ NO X Yes/Maybe____

Basis: Reference item, WHC-SD-WM-PLN-016 REV. 3, implements changes to the operating procedures in accordance with the authorization basis, SAFETY ASSESSMENT FOR PROPOSED MIXER PUMP OPERATIONS TO MITIGATE EPISODIC GAS RELEASES IN TANK 241-SY-101 LAUR-92-319 Rev. 13 (SA).

USQE #1 DC Larsen

Print Name

USQE #2 DW Strasser

Print Name

P. C. Larsen
Signature

12/13/94
Date

Dw Strasser
Signature

12/13/94
Date

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TPI-016, REV.3

Document Title: Level Maintenance for the Tank 101-SY Mitigation-By-Mixing Test

Release Date: December 13, 1994

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz

December 13, 1994

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SUPPORTING DOCUMENT

1. Total Pages *88*

2. Title

Level Maintenance for Tank 101-SY Mitigation-By-Mixing Test

3. Number

WHC-SD-WM-TPI-016

4. Rev No.

3

5. Key Words

Mixing Pump, DACS, Test Director, Test Engineer, Pump Bump, Tank Sweep, Mitigation Test Log, Instrumentation, Range Fires, Circuit Breaker, E STOP, Hydrogen, Ammonia, FTIR, FIC, ENRAF, Safety Assessment.

6. Author

Name: RG Sobocinski

Signature

Organization/Charge Code
Test Engineering/7CH30/N24A2

**APPROVED FOR
PUBLIC RELEASE**

7. Abstract

This document provides the procedure to be followed to implement the requirements of the Mixer Pump Long-Term Operations Plan for Tank 241-SY-101 Mitigation, WHC-SD-WM-PLN-081. The test is divided into 2 distinct sequences, named Single Position Pump Run and Tank Sweep. Instructions for all sequences are defined within the procedure. All safety requirements as defined in LA-UR-92-3196, A Safety Assessment for Proposed Mixing Operations to Mitigate Episodic Gas Releases in Tank 241-101-SY have been implemented into this procedure

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC

DATE **DEC 13 1994**

Ata. 4

5

LEVEL MAINTENANCE

for

TANK 101-SY MITIGATION-BY-MIXING TEST

WHC-SD-WM-TPI-016

Rev. 3

November 16, 1994

LIST OF EFFECTIVE PAGES

All pages Revision 3, November 16, 1994.

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1 TEST SUBJECT IDENTIFICATION

The Phase A, Phase B and Full Scale portions of the Mitigation-By-Mixing Test have demonstrated the effectiveness of a mixer pump to maintain the waste in tank 101-SY in the desired mitigated state. The operation of the 101-SY Mixer Pump for short periods of time results in a controlled release of hydrogen gas in concentrations well below the established safety limits. Additionally, it has been shown that operation of the pump on a regular schedule minimizes the historical generation rate of hydrogen inventory in the waste. Because the generation of hydrogen inventory is exhibited by waste level growth, the purpose of this procedure is to maintain waste level within a range defined as safe by LA-UR-92-3196 Revised, *A Safety Assessment for Proposed Pump Mixing Operations to Mitigate Episodic Gas Releases in Tank 241-101-SY: Hanford Site, Richland, Washington* (referred to herein as the Safety Assessment).

2 GENERAL DESCRIPTION

This procedure implements the applicable requirements of WHC-SD-WM-PLN-081, *Mixer Pump Long-Term Operations Plan for Tank 241-SY-101 Mitigation*, referred to herein as the Test Plan.

2.1 Test Objective

The primary objective of this procedure is to maintain the waste level in tank 241-SY-101 within the safe operating range as defined by the Safety Assessment and the Test Plan.

The secondary objective is to operate the pump on a schedule that maximizes its useful lifespan and prevents the formation of obstructions in the normal flow path of the pump.

2.2 Test Method

This procedure provides a series of operating regimen, based on the Test Plan, and the required tank conditions for choosing a specific regimen. The procedure supports a standard objective method of matching tank conditions with approved operating parameters.

The controlling software for the mixer pump provides a menu of standard pump operating parameters, based on the general guidelines of the Test Plan. The DACS Test Director may choose an appropriate test option from the menu (see Appendix D, Pre-Programmed Mixer Pump Parameters) subject to any limiting tank conditions (as provided in this procedure) and any amplifying instructions from the Test Manager.

The Test Director has the option to choose a set of operating parameters that are equal to or less than the energy input of any parameters previously chosen by the Test Manager. The Test Director shall only exercise this option when conditions exist which prevent running the planned set of parameters (ie, unanticipated time limitations or instrument failures).

[Energy input is defined by the LANL Safety Assessment (Appendix AN) as the speed of the pump (rpm) squared multiplied by the total time of the run (minutes).]

To maintain a hydrogen gas release rate approximately equal to the generation rate it is necessary to operate the mixer pump at least twice per week and no more than 4 days between operations. This basic pump operation consists of running the pump in a single direction for 25 minutes at 1000 rpm. The orientation of the pump nozzles should be advanced to the next position (nominally 30°) for each successive operation, with the intent to operate the pump for 25 minutes in each of 6 different directions within a 2 week span.

Minimum operation, also known as a pump bump is a 1000 rpm pump run for up to 5 minutes in a single direction. This option may be used when time or instrument restrictions prevent a more aggressive regimen. Pump bumping may be used to satisfy the requirement to operate the pump at least once every 4 days, thereby ensuring that the mixer pump nozzles do not clog.

Maximum pump operation, or tank sweep, is the most aggressive mode described by this procedure. Its purpose is to prevent waste level from exceeding the maximum safe operating level. The pump is operated at 750 rpm for 30 minutes in each of 6 predefined orientations. TRG (Test Review Group) approval is required to operate in this mode.

All of the described operating modes are subject to compliance with all applicable pre-requisites and requirements contained within this document.

During the performance of any pump operation, process parameters shall be monitored and compared with predetermined abort criteria. The operation shall be terminated should any of the abort criteria be met.

3 TEST CONDITION LIMITS

The requirements given in Sections 3.1, 3.2, and 3.3 below shall be met prior to and during pump operation.

3.1 Pump Operation Limits

Pump operation shall be conducted in accordance with this procedure. With TRG approval, this procedure may be used to operate the pump multiple times per day, subject to the time and energy limitations of the Safety Assessment and implemented in this procedure by the Worksheet on page 60.

3.2 Abort Criteria

In the event that an abort condition occurs, pump operation shall be terminated and shall only be restarted with required approval in accordance with the Safety Assessment.

If an alarm is received during pump operation, then exit to the applicable Alarm Response Procedure (ARP), which shall be followed in its entirety. Pump operation may continue in parallel with an active alarm if so provided for in the ARP.

Abnormal Operating Procedures (AOPs) are provided for those conditions not covered by Alarm Response Procedures. In addition any abort requires followup in accordance with AOP-008, Test Abort Followup Actions. Pump operation may continue in parallel with an abnormal circumstance if so provided for in the AOP.

Initial verification of the operability of all alarm and abort setpoint values is contained in applicable portions of various acceptance test procedures (ATP) as listed in the Reference section of this procedure.

During the performance of this procedure, the Test Engineers shall notify the West Area Shift Manager immediately of any abnormal conditions that they are aware of. The West Area Shift Manager shall make any notifications to DOE and management outside the Test Engineers' immediate chain of command.

3.3 Precautions and Limitations

- 3.3.1 In the event of any emergency condition described in WHC-IP-0263-TF, *Westinghouse Hanford Company Building Emergency Plan*, the Test Manager and the West Area Shift Manager shall be notified immediately. The West Area Shift Manager is responsible to implement the applicable portion of the Building Emergency Plan (BEP).
- 3.3.2 IF confirmation is not obtained that the pump is running once the pump RUNNING circle on the DACS screen is lit, THEN the pump shall be tripped using the E STOP button. Confirmation that the pump is running requires that both the VSD Keypad speed indication and the independent rpm monitor are in concurrence within 50 rpm.
- 3.3.3 Due to the particular methods of mathematical rounding used by the DACS software, a variance of ± 1.0 is acceptable when verifying any DACS display field without a stated tolerance range.
- 3.3.4 Transition to procedure AOP-006, Contingency Actions shall be made if any of the following conditions occur: tank rollover, hydrogen burn, medical emergency, fire in the DACS Trailer, seismic event, severe weather, or conditions described in the BEP.

4 INSTRUMENTS AND CALIBRATION

All instruments required to be operable prior to and during pump operation are listed in Appendix A, Minimum Instrumentation Checklists. A system, sub-system, train, component, or device shall be considered OPERABLE or as having OPERABILITY when it is capable of performing its specified function. The operability of the required instruments is verified prior to each time the pump is operated. The checklist of Appendix A shall be used for this purpose.

For those instruments which cannot be checked for operability prior to the start of the pump (speed, current, pressure, etc.), the assumption may be made that if instrument response has been satisfactory for all previous pump operations since its last ATP, calibration check, or appropriate operability check, then the instrument is considered operable for the next pump operation until shown otherwise.

Instruments that are connected to the DACS are required to have their DACS alarm and abort values verified according to the applicable ATP.

5 FACILITIES, EQUIPMENT, AND MATERIALS

The Mixer Pump is installed in Double Shell Tank 241-SY-101, which is located in the 200W area of the Hanford site. The DACS trailer, which serves as the Control Area for this procedure, is located immediately adjacent to the S Complex fence.

6 SAFETY

- 6.1 All personnel in the DACS trailer during pump operation shall be provided with appropriate respiratory protection, as defined by TWRS - Industrial Health and Safety. Safety requirements of WHC-SD-WM-HSP-002, *Tank Farm Health and Safety Plan (HASP)* shall be observed.
- 6.2 All requirements set forth in the Safety Assessment for pump operations have been incorporated into this procedure.
- 6.3 Specific Alarm Response Procedures and Abnormal Operating Procedures are available to the Test Engineer and shall be utilized as the need arises.

7 MAINTENANCE AND FAILURES

- 7.1 All instruments required to be operable prior to and during pump bumping are listed in Appendix A. In the event that the requirements of Appendix A cannot be met, pump operation shall not proceed without written TRG approval.
 - 7.1.1 The TRG may provide for specific exceptions to the requirements of Appendix A. Such exceptions shall be in accordance with the requirements of the Safety Assessment and shall be documented. Exceptions may be authorized by telecon in accordance with section 14 of this document.

7.2 For each instrument in Appendix A that is declared inoperable, perform the following:

7.2.1 Make an entry in the Mitigation Test Log describing the circumstances.

NOTE: An inoperable instrument that is not disabled may preclude a pump start. Appendix C, Disabling Inoperable Instruments provides the necessary guidance. Permission to disable an instrument does not invalidate the requirements of step 7.1

7.2.2 Obtain the permission of the Test Manager to disable each inoperable instrument.

7.2.3 Make all applicable entries in the Disabled Instrument List (maintained in the Required Reading Book).

7.2.3.1 All instruments listed in the Disabled Instrument List are assumed to remain disabled until the Returned to Service column is signed off.

8 TEST DATA

8.1 Data collection:

8.1.1 The data collected by the DACS during pump operation will be recorded and transmitted according to the document WHC-SD-WM-PLN-052, *Data Management Plan for Tank SY-101 Hydrogen Mitigation Experiments*.

8.1.2 Data will be automatically stored by the DACS onto the computer hard drive at DACS station 5 computer. Traceability of data is maintained through the use of instrument tag identification numbers. All data recorded by the DACS are automatically referenced to the appropriate tag numbers. In the event that data are recorded manually into the Mitigation Test Log, instrument tag identification numbers shall be used to maintain data traceability.

8.2 Procedure Records:

8.2.1 This procedure is designed as a consumable document and provides an official record of each pump operation. Each pump operation shall start with a blank, verified copy of this procedure.

8.2.2 As a minimum, the official record copy of a pump operation shall include:

- Cover Sheet
- List of Effective Pages
- All chapter 11 sections relevant to the operation
- All worksheets, data sheets, and appendices relevant to the operation (ie, those with recorded data or checkoffs for the operation)
- Comment Sheet, if used

- 8.2.3 Some options in this procedure require TRG authorization for use. This authorization may take any form that is clearly traceable to the TRG, such as official TRG letter file numbers, date of TRG meeting minutes, documented teleconferences, etc. The authorization will be part of the official record of the applicable pump run.
- 8.2.4 A blank Comment Sheet is provided at the end of this procedure to document any additional observations, explanations or clarifications that may be useful for data analysis. Use a blank copy of the Comment Sheet for each pump operation.

9 PERSONNEL REQUIREMENTS

This procedure shall be conducted by qualified Test Directors and Test Engineers assigned by the Test Manager. No other person shall have authority over the conduct of any part of the operation unless specifically stated in this procedure. The Test Engineers, Test Directors, West Area Shift Manager, and the Test Manager have the authority to stop the pump at any time. WHC-SD-WM-MA-014, *Mitigation Test Management Plan* defines personnel responsibilities.

At least one Test Director and one Test Engineer shall be present inside the DACS area at all times during pump operation to ensure that the pump is constantly being monitored and controlled.

Test Directors and Test Engineers on duty shall be aware of the current contents of WHC-SD-WM-PROC-004, *Alarm Response Procedures for Tank 101-SY Mitigation-By-Mixing Test* and WHC-SD-WM-PROC-005, *Abnormal Operating Procedures for Tank 101-SY Mitigation-By-Mixing Test*, as evidenced by their signatures on the Required Reading List maintained by the Test Manager.

During periods when the mixer pump is not being operated it will not be necessary for the DACS to be continuously monitored, provided that the 101-SY Mixer Pump and its controls are disabled, locked out, and tagged to prevent inadvertent pump start. The Test Director or Test Engineer shall remain present in the DACS area for a minimum of 1 hour after pump operation is complete.

10 WITNESSES

A Quality Assurance Representative may witness portions of the pumping effort as necessary to verify that the operation is being conducted as written in this procedure and that data are being recorded as specified. The Quality Assurance Representative shall periodically perform a brief review of the Mitigation Test Log and data sheets during 101-SY Mitigation Testing to verify compliance with this procedure and applicable WHC administrative requirements. The Quality Assurance Representative shall signify completion of these reviews with a signed entry in the Mitigation Test Log and signatures in Chapter 11 where required.

11 PROCEDURES

Each procedure step or substep, with the exception of routing statements, contains a completion box. These take the form of single or double "Initial/Date" boxes, placekeeper boxes or boxes in which to record specified data. Appropriate entry in the box signifies completion of the associated step or substep. Appropriate entries for a placekeeper box include a "✓" or "X". Enter "N/A" in completion boxes for steps that are not applicable because of stated conditions.

All entries shall be made using black, ball-point pen. All qualified personnel authorized to sign or initial portions of this procedure shall have provided, on file, a sample signature and initial to maintain traceability.

Perform all procedure steps in the order specified unless otherwise noted.

Steps requiring **INDEPENDENT VERIFICATION** shall be performed in accordance with WHC-SP-0708, *Westinghouse Hanford Company Conduct of Operations Manual*.

Unless otherwise specified, steps may be verified complete by either a Test Director or a Test Engineer.

The following typeface conventions are used in this procedure to distinguish various commands, displays, and other information:

- Computer keyboard commands are enclosed in angle brackets like this: <KEY>.
- Labels, soft buttons, menu items, etc. that are displayed on various computer screens appear as **SOFT BUTTON**.
- Line commands that must be entered into a computer program appear as line command.
- Physical labels that describe hardware appear in all caps as TEST SWITCH.
- Additional useful information is presented in italics: *The computer display changes when you click on the soft button.*

DEFINITIONS

- **VERIFY**: Perform a comparison with the specified requirements. Does not involve manipulation of equipment or instrumentation. May be done by methods other than direct observation.
- **ENSURE**: To confirm, substantiate, and assure that an activity or condition has been implemented in conformance with the specified requirements or take action to make it so if the activity or condition is not found to be in conformance. May be done by methods other than direct observation.
- **ABORT**: Any unplanned shutdown of 101-SY Mixer Pump.

11.1 Pre-Start Conditions

- 11.1.1 Request West Area Shift Manager to commence TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds*. Record the time the request was made.

TIME REQUESTED	
-------------------	--

- 11.1.2 Verify that [VSD-101-2] TO MIXING PUMP breaker is DANGER tagged in the LOCKED OFF position.

Initial / Date:

- 11.1.3 Verify that [VSD-101-1] TO MIXING PUMP ROTATION MOTOR breaker is DANGER tagged in the LOCKED OFF position.

Initial / Date:

- 11.1.4 Ensure completion of the following items for the Test Director and Test Engineer on duty:

- 11.1.4.1 All Required Reading is complete and up-to-date.

Initial / Date:	Initial / Date:
	Independent Verification

- 11.1.4.2 Review recent Mitigation Test Log entries since last duty (or previous 72 hours, whichever is shorter).

Initial / Date:	Initial / Date:
	Independent Verification

- 11.1.4.3 Review 72 Hour History file (NEW72 screen at DACS station 5). Report any indications of significant tank activity or evidence of rollovers to the Test Manager prior to continuing.

Initial / Date:

11.1.5 Reset the GENESIS software to the default settings as follows:

11.1.5.1 At DACS station 5, press <ALTE> and enter y to exit the test strategy. *Station 5 drops to DOS mode.*

☐

11.1.5.2 In DOS enter rename72 to reset the 72 Hour History file (NEW72 screen).

☐

11.1.5.3 In DOS enter runtime test. *Station 5 returns to GENESIS.*

☐

11.1.5.4 At DACS station 8, press <ALTE> and enter y to exit the pump strategy. *Station 8 drops to DOS mode.*

☐

11.1.5.5 In DOS enter runtime motor. *Station 8 returns to GENESIS.*

☐

11.1.5.6 Ensure the GENESIS WATCHDOG TIMEOUT ALARM switch (above station 2) is in the RUN position.

Initial / Date:	Initial / Date:
	Independent Verification

11.1.6 Set DACS security level to level 3 at DACS stations 5, 6, 7, and 8 by entering the appropriate password.

Initial / Date:

11.1.7 At DACS station 1, load the current version of the PLC abort files, as follows:

11.1.7.1 IF not already done, start the MODSOFT program:

- At DOS prompt enter cd C:\MODSOFT
- At DOS prompt enter MODSOFT

☐

NOTE: The <TAB> key toggles the cursor between the menu bar and the display screen.

- 11.1.7.2 At the **ONLINE** pull down on the menu bar, choose **Select Program** and <ENTER>.

--

NOTE: "HFPLC" is the file name of the current version of the PLC abort data. File loading takes approximately 30 seconds and is complete when the **SEGMENT STATUS DISPLAY** is shown.

- 11.1.7.3 Highlight **HFPLC** in the pop-up window and press <ENTER> to start file loading.

--

- 11.1.7.4 At the **SEGMENT STATUS DISPLAY** screen, press <ALT F2> to display the **REFERENCE DATA** screen.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: Steps 11.1.8 through 11.1.24.4 may be performed in any order.

- 11.1.8 Complete Appendix A, Minimum Instrumentation Checklists.

Part A	Part B
Initial / Date:	Initial / Date:
	Independent Verification

NOTE: The Test Manager's specific approval is required to disable any abort coils.

- 11.1.9 Disable the abort coils of any instruments that were declared inoperable during the performance of step 11.1.8 in accordance with the guidelines in Appendix C, Disabling Inoperable Instruments. (Enter "N/A", if no instruments were disabled.)

Initial / Date:	Initial / Date:
	Independent Verification

11.1.10 Verify that the Programmable Logic Controller (PLC) abort limits are set correctly as follows:

11.1.10.1 In the MODSOFT program (station 1), at the Template pull down, choose Load Template.

☐

11.1.10.2 Load the PLC abort limit template by entering abortlim.

☐

11.1.10.3 Verify that the MOD ABORT entry as displayed on screen for each Tag is the same as the corresponding MOD ABORT entry on TABLE B1, Abort Limit Checklist (Appendix B, PLC Verification).

- Use PART A of TABLE B1 for Initial checkoff.
- Use PART B of TABLE B1 for Independent Verification checkoff.

Initial / Date:	Initial / Date:
	Independent Verification

11.1.10.4 IF any deviations are noted, notify the Test Manager and do not proceed with this procedure. IF no deviations are noted, continue.

11.1.11 Verify Uninterruptible Power System (UPS) is on-line.

Initial / Date:

11.1.12 Verify from the Surveillance Log Book that the most recent average rate of level rise is within the established limit. (See explanation in section 11.10.)

Initial / Date:	Initial / Date:
	Independent Verification

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- NOTE:**
- The waste level measurements used to satisfy step 11.1.13.1 shall have been obtained within the previous 8 hours.
 - Level is required to be recorded from at least 2 different instruments, one of which must be connected to DACS, unless Contingency Instrumentation has been authorized by the TRG.

11.1.13 Establish tank level conditions:

11.1.13.1 Record operable 101-SY tank level readings in the table below (Enter "N/A" for any device not operable):

FIC	ENRAF	RADAR	TAPE
inches	inches	inches	inches

11.1.13.2 IF level reading is > 405.3 inches, THEN notify the Test Manager before continuing.

11.1.13.3 Verify that the Alarm and Abort level limits are set for the FIC (at 2 inches above FIC level, but not to exceed 405.3 inches; see TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds*).

☐

11.1.14 Verify Ventilation Exhauster requirements are satisfied:

11.1.14.1 IF Primary (K1) AND Auxiliary (P28) exhausters are both operable, THEN enter "N/A" in the TRG Authorization box and initial the completion box and continue.

11.1.14.2 IF Primary (K1) OR Auxiliary (P28) exhauster is operable AND waste level is < 402 inches, THEN enter the TRG Authorization (date of the TRG minutes or file number of the TRG letter) and initial the completion box and continue.

11.1.14.3 IF neither of the above are met, THEN stop and notify the Test Manager.

TRG Authorization:

Initial / Date:

11.1.15 Verify nitrogen pressure regulator [WST-PI-3152A] indicates 10 - 20 psig (see TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds*).

Initial / Date:

- 11.1.16 Verify that the pump column centering jack pressures are ≥ 100 psig (see TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds*).

Initial / Date:

- 11.1.17 Calculate the ventilation flow ratio in the box below AND verify that it is ≥ 0.66 . (This step may be N/A'd if Contingency Instrumentation Checklist is authorized.)

[IF FTE50003 is not in service, enter ventilation flow ratio obtained from TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds* and enter "N/A" in the Independent Verification box.]

Calculation for Ventilation Flow Ratio	
$\frac{(\text{FTE50003 cfm}) - (\text{FTE50001 cfm})}{(\text{FTE50001 cfm})} = 0.68$	
DACS Tag FTE50003 = SY Tank Farm Exhaust Flow DACS Tag FTE50001 = Vent Header Flow (101-SY only) (DACS Tag FTE50002 may be used in place of FTE50001)	
Initial / Date:	Initial / Date:
Independent Verification	

- 11.1.18 Request West Area Shift Manager (373-3475, Radio Station 20) to establish Personnel Access controls for ammonia (in accordance with the requirements found in West Operations Standing Order #93-14).

Initial / Date:

- 11.1.19 Check the following conditions for the portable ammonia monitor:

Operating and in place (DACS vent register)	☒
Not in alarm state	☐
Date on applied sticker not exceeded	☐

Initial / Date:

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- 11.1.20 Ensure availability of appropriate respiratory equipment, as required by TWRS - Industrial Health and Safety.

Initial / Date:

- 11.1.21 Ensure that abort coil is reset as follows:

- 11.1.21.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled **Reset Abort Coil**. Observe the red indicator clear.

☐

- 11.1.21.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON.

☐

- 11.1.21.3 Ensure the E STOP alarm switch is in the NORMAL position.

Initial / Date:

- 11.1.22 Verify no range fires within 5 miles of SY-101 tank. (Perform visual inspection of surrounding area and call Patrol Operations Center at 373-3800.)

Initial / Date:

- 11.1.23 Verify no significant thunderstorm activity reported or predicted to occur at the S Complex during the expected time of pump operation. (Perform visual inspection of surrounding area and call Hanford Meteorological Station at 373-2716.)

Initial / Date:

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NOTE: Verification of some or all of the following conditions may not be possible in some instances, because of instrument availability. See Appendix A, Minimum Instrumentation Checklists for details.

11.1.24 Verify tank gas conditions as follow (enter "N/A" for any instrument authorized to be out of service):

11.1.24.1 Hydrogen concentration is $\leq 0.01\%$ (100 ppm) by volume using DACS tag GC1-H2 (or GC3-H2). ☐

11.1.24.2 Verify no foaming is present (tank video camera, if available; enter "N/A" in placekeeper if not available). ☐

11.1.24.3 Verify that the most recent ammonia reading is ≤ 150 ppm (vent header or stack monitor). ☐

11.1.24.4 Hydrogen concentration is > 10 ppm (DACs tag GC1-H2 or GC3-H2), unless a lower limit has been specifically authorized by the TRG. [IF TRG authorizes a limit lower than 10 ppm, then note the TRG Authorization and new limit in the appropriate boxes.]

TRG Authorization:	Authorized H ₂ concentration:

Initial / Date:

11.1.25 Ensure that steps 11.1.8 through 11.1.24.4 have been completed. Perform the remaining steps in the order specified unless otherwise noted.

Initial / Date:

11.1.26 If any instrumentation determined to be operable in step 11.1.8 is currently in alarm state, obtain the permission of the Test Manager prior to proceeding. Record the Test Manager's permission and time received in the Mitigation Test Log (N/A if not required).

Initial / Date:	Initial / Date:
Independent Verification	

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11.1.27 Request the West Area Shift Manager (373-3475, Radio Station 20) to prepare for pump operation as follows:

11.1.27.1 Ensure the following electrical breakers or switches are unlocked AND positioned to ON:

[VSD-101-2]	TO MIXING PUMP	☐
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐
[DS-101-26] not required ON if pump nozzles will not be repositioned. Leave placekeeper box empty if [DS-101-26] is OFF.		

Initial / Date:

11.1.27.2 Verify S Complex is in compliance with Personnel Access controls for ammonia, as specified by West Operations Standing Order #93-14.

11.1.28 At the SY-101 MIXER PUMP STROBE control box, position the TEST SWITCH to ON and verify that the Strobe On indicator is lit.

Initial / Date:

11.1.29 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:	Initial / Date:
	Independent Verification

11.1.30 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

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- 11.1.31 IF the pump has already run during the current calendar day (ie, since midnight), then complete WORKSHEET to Determine Pump Operating Parameters (page 60). (N/A this step if not required.)

Initial / Date:	Initial / Date:
	Independent Verification

- 11.1.32 Determine the set of operating parameters to be used for this pump run:

- 11.1.32.1 Record the set of operating parameters directed by the Test Manager for the current pump run (including the pre-programmed test number) in the spaces provided:

Test Number	Total Duration (min) including all orientations	Speed (rpm)	Initial Orientation	Number of Orientations

- 11.1.32.2 IF the Test Director chooses a less energetic set of operating parameters from the menu in Appendix D, Pre-Programmed Mixer Pump Parameters, because of current conditions and limitations, THEN enter that set of operating parameters below. OTHERWISE N/A the unused spaces.

Test Number	Total Duration (min) including all orientations	Speed (rpm)	Initial Orientation	Number of Orientations

Initial / Date:

- 11.1.33 IF a Tank Sweep pump run is to be performed, GOTO section 11.3 of this procedure. IF a single orientation pump run is to be performed, GOTO section 11.2 of this procedure.

11.2 Single Position Pump Run

11.2.1 Ensure all prerequisite steps of section 11.1 have been completed.

Initial / Date:

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

11.2.2 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU.

Initial / Date:

11.2.3 Click on the **Test** field and input the Test Number of the pre-programmed parameters determined in step 11.1.32. Press **<ENTER>**.

Initial / Date:

11.2.4 Enter the parameters, as displayed above the **SET VALUES** soft button, from the **PUMP OPERATION** screen to the table below:

Test	
Angle	degrees
Speed	RPM
Duration	Hrs
	Mins
	Secs
Accel	RPM/SEC
Decel	RPM/SEC

Initial / Date:

Initial / Date:

Independent Verification

SINGLE POSITION PUMP RUN

- 11.2.5 Verify that the values recorded in step 11.2.4 match the values for the corresponding Test Number, as listed in Appendix D, Pre-Programmed Mixer Pump Parameters.

Initial / Date:	Initial / Date:
	Independent Verification

- 11.2.6 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field corresponds to the desired test regimen.

Initial / Date:

- 11.2.7 IF pump nozzles require positioning (ie, **POSITION PUMP** soft button is green and **ENABLE TEST** soft button is gray), THEN click on **POSITION PUMP** soft button. OTHERWISE N/A this step and continue.

Initial / Date:

NOTE: Performance of step 11.2.8 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.2.8 WHEN **POSITION MOTOR Angle** is the same (within $\pm 2^\circ$) as Angle recorded in step 11.2.4, click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.2.9 Verify that only authorized PLC aborts are disabled by performing the following at DACS station 1:

NOTE: The <TAB> key toggles the cursor between the menu bar and the display screen.

- 11.2.9.1 At the **Disable** pull down, choose the **List Disabled** menu item.

Initial / Date:

SINGLE POSITION PUMP RUN

NOTE: The **List Disabled** menu item will produce a pop-up window that displays the identification number of each abort coil that is disabled. The abort coils will be displayed one at a time and may be scrolled through by using the **<SPACE BAR>**.

- 11.2.9.2 Verify that each abort coil number displayed in the pop-up window appears in the Disabled Instrument List (maintained in the Required Reading book).

Initial / Date:	Initial / Date:
	Independent Verification

- 11.2.10 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

NOTE: When the **ENABLE TEST** button is clicked (step 11.2.11) the pump controls will be enabled for 60 seconds as indicated when **START TEST** button turns green. Pump operation will proceed only IF the **START TEST** soft button is selected while it is green (step 11.2.12).

- 11.2.11 Click on the pump **ENABLE TEST** soft button.

☐

NOTE: Upon activation of the pump in step 11.2.12 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

- 11.2.12 Click on the green **START TEST** soft button to initiate the pump run.

☐

- 11.2.13 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad **OR** the Independent Speed monitor (VRINDRPM).

START TIME	
---------------	--

Initial / Date:

SINGLE POSITION PUMP RUN

- 11.2.14 Monitor pump parameters and tank conditions for the duration of the run. IF available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

- 11.2.15 Stop the pump as follows:

- 11.2.15.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

- 11.2.15.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

- 11.2.15.3 Check all indications to ensure that the pump has stopped (press the E **STOP** button if indications demonstrate that the pump is not stopped).

☐

- 11.2.15.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
--------------	--

Initial / Date:

--

- 11.2.16 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

SINGLE POSITION PUMP RUN

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11.3.3 Click on the Test field and input 13.0. Press **<ENTER>**.

Initial / Date:

11.3.4 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	13.0			
Angle	28	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

11.3.5 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 28 DEG.**

Initial / Date:

11.3.6 IF pump nozzles require positioning (ie, **POSITION PUMP** soft button is green and **ENABLE TEST** soft button is gray), THEN click on **POSITION PUMP** soft button. OTHERWISE N/A this step and continue.

Initial / Date:

TANK SWEEP: First Segment (28°)

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NOTE: Performance of step 11.3.7 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

11.3.7 **WHEN POSITION MOTOR Angle** is 28 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

11.3.8 Verify that only authorized PLC aborts are disabled by performing the following at DACS station 1:

NOTE: The **<TAB>** key toggles the cursor between the menu bar and the display screen.

11.3.8.1 At the **Disable** pull down, choose the **List Disabled** menu item.

Initial / Date:

NOTE: The **List Disabled** menu item will produce a pop-up window that displays the identification number of each abort coil that is disabled. The abort coils will be displayed one at a time and may be scrolled through by using the **<SPACE BAR>**.

11.3.8.2 Verify that each abort coil number displayed in the pop-up window appears in the Disabled Instrument List (maintained in the Required Reading book).

Initial / Date:

Initial / Date:

Independent Verification

11.3.9 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

TANK SWEEP: First Segment (28°)

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NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

11.3.10 Click on the pump **ENABLE TEST** soft button.

☐

NOTE: Upon activation of the pump in step 11.3.11 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.3.11 Click on the **START TEST** soft button to initiate the pump run.

☐

11.3.12 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad OR the Independent Speed monitor (VRINDRPM).

START TIME	
-----------------------	--

Initial / Date:

11.3.13 Monitor pump parameters and tank conditions for the duration of the run. IF available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

TANK SWEEP: First Segment (28°)

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NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.3.14 Stop the pump as follows:

11.3.14.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.3.14.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.3.14.3 Check all indications to ensure that the pump has stopped (press the E **STOP** button if indications demonstrate that the pump is not stopped).

☐

11.3.14.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.3.15 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

TANK SWEEP: First Segment (28°)

11.4 Second Segment: 65°, 750 RPM for 30 Minutes

11.4.1 Ensure that abort coil is reset as follows:

11.4.1.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled **Reset Abort Coil**. Observe the red indicator clear.

☐

11.4.1.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON.

☐

11.4.1.3 Ensure the E STOP alarm switch is in the **NORMAL** position.

Initial / Date:

11.4.2 IF required, request the West Area Shift Manager to ensure the following devices are unlocked and positioned to ON (N/A if not required):

[VSD-101-2]	TO MIXING PUMP	☒
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐

Initial / Date:

11.4.3 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:

<input type="text"/>	Initial / Date:
	Independent Verification

TANK SWEEP: Second Segment (65°)

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- 11.4.4 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

- 11.4.5 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU.

Initial / Date:

- 11.4.6 Click on the Test field and input 14.0. Press <ENTER>.

Initial / Date:

- 11.4.7 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	14.0			
Angle	65	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Second Segment (65°)

- 11.4.8 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 65 DEG.**

Initial / Date:

- 11.4.9 Click on **POSITION PUMP** soft button.

Initial / Date:

NOTE: Performance of step 11.4.10 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.4.10 **WHEN POSITION MOTOR** Angle is 65 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.4.11 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature:_____

Date/Time:_____

NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

- 11.4.12 Click on the pump **ENABLE TEST** soft button.

TANK SWEEP: Second Segment (65°)

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NOTE: Upon activation of the pump in step 11.4.13 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.4.13 Click on the **START TEST** soft button to initiate the pump run.

☐

11.4.14 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad **OR** the Independent Speed monitor (VRINDRPM).

START TIME	-----
---------------	-------

Initial / Date:

11.4.15 Monitor pump parameters and tank conditions for the duration of the run. **IF** available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

TANK SWEEP: Second Segment (65°)

NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.4.16 Stop the pump as follows:

11.4.16.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.4.16.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.4.16.3 Check all indications to ensure that the pump has stopped (press the E STOP button if indications demonstrate that the pump is not stopped).

☐

11.4.16.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.4.17 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

11.5 Third Segment: 97°, 750 RPM for 30 Minutes

11.5.1 Ensure that abort coil is reset as follows:

11.5.1.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled Reset Abort Coil. Observe the red indicator clear.

☐

11.5.1.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON.

☐

11.5.1.3 Ensure the E STOP alarm switch is in the NORMAL position.

Initial / Date:

11.5.2 IF required, request the West Area Shift Manager to ensure the following devices are unlocked and positioned to ON (N/A if not required):

[VSD-101-2]	TO MIXING PUMP	☒
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐

Initial / Date:

11.5.3 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Third Segment (97°)

**LEVEL MAINTENANCE
FOR
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- 11.5.4 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

- 11.5.5 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU.

Initial / Date:

- 11.5.6 Click on the **Test** field and input 15.0. Press **<ENTER>**.

Initial / Date:

- 11.5.7 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	15.0			
Angle	97	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Third Segment (97°)

- 11.5.8 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 97 DEG.**

Initial / Date:

- 11.5.9 Click on **POSITION PUMP** soft button.

Initial / Date:

NOTE: Performance of step 11.5.10 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.5.10 **WHEN POSITION MOTOR Angle** is 97 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.5.11 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

- 11.5.12 Click on the pump **ENABLE TEST** soft button.

TANK SWEEP: Third Segment (97°)

NOTE: Upon activation of the pump in step 11.5.13 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.5.13 Click on the **START TEST** soft button to initiate the pump run.

☐

11.5.14 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad **OR** the Independent Speed monitor (VRINDRPM).

START TIME	
-----------------------	--

Initial / Date:

11.5.15 Monitor pump parameters and tank conditions for the duration of the run. **IF** available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

NOTE: • DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.

• The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.5.16 Stop the pump as follows:

11.5.16.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.5.16.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.5.16.3 Check all indications to ensure that the pump has stopped (press the E **STOP** button if indications demonstrate that the pump is not stopped).

☐

11.5.16.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.5.17 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

11.6 Fourth Segment: 125°, 750 RPM for 30 Minutes

11.6.1 Ensure that abort coil is reset as follows:

11.6.1.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled Reset Abort Coil. Observe the red indicator clear.

☐

11.6.1.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON.

☐

11.6.1.3 Ensure the E STOP alarm switch is in the NORMAL position.

Initial / Date:

11.6.2 IF required, request the West Area Shift Manager to ensure the following devices are unlocked and positioned to ON (N/A if not required):

[VSD-101-2]	TO MIXING PUMP	☒
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐

Initial / Date:

11.6.3 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:

Initial / Date:

Independent Verification

TANK SWEEP: Fourth Segment (125°)

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- 11.6.4 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

- 11.6.5 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU.

Initial / Date:

- 11.6.6 Click on the Test field and input 16.0. Press **<ENTER>**.

Initial / Date:

- 11.6.7 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	16.0			
Angle	125	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Fourth Segment (125°)

- 11.6.8 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 125 DEG.**

Initial / Date:

- 11.6.9 Click on **POSITION PUMP** soft button.

Initial / Date:

NOTE: Performance of step 11.6.10 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.6.10 **WHEN POSITION MOTOR Angle** is 125 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.6.11 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

- 11.6.12 Click on the pump **ENABLE TEST** soft button.

TANK SWEEP: Fourth Segment (125°)

LEVEL MAINTENANCE

FOR-

TANK 101-SY MITIGATION-BY-MIXING TEST

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NOTE: Upon activation of the pump in step 11.6.13 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.6.13 Click on the **START TEST** soft button to initiate the pump run.

☐

11.6.14 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the **PUMP DRIVE** keypad **OR** the Independent Speed monitor (**VRINDRPM**).

START TIME	
-----------------------	--

Initial / Date:

11.6.15 Monitor pump parameters and tank conditions for the duration of the run. **IF** available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

TANK SWEEP: Fourth Segment (125°)

**LEVEL MAINTENANCE
FOR
TANK 101-SY MITIGATION-BY-MIXING TEST**

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NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.6.16 Stop the pump as follows:

11.6.16.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.6.16.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.6.16.3 Check all indications to ensure that the pump has stopped (press the E STOP button if indications demonstrate that the pump is not stopped).

☐

11.6.16.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.6.17 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

TANK SWEEP: Fourth Segment (125°)

11.7 Fifth Segment: 155°, 750 RPM for 30 Minutes

11.7.1 Ensure that abort coil is reset as follows:

11.7.1.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled **Reset Abort Coil**. Observe the red indicator clear.

☐

11.7.1.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON.

☐

11.7.1.3 Ensure the E STOP alarm switch is in the NORMAL position.

Initial / Date:

--

11.7.2 IF required, request the West Area Shift Manager to ensure the following devices are unlocked and positioned to ON (N/A if not required):

[VSD-101-2]	TO MIXING PUMP	☒
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐

Initial / Date:

--

11.7.3 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:

--

Initial / Date:

Independent Verification

TANK SWEEP: Fifth Segment (155°)

**LEVEL MAINTENANCE
FOR
TANK 101-SY MITIGATION-BY-MIXING TEST**

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- 11.7.4 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

- 11.7.5 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU.

Initial / Date:

- 11.7.6 Click on the Test field and input 17.0. Press **<ENTER>**.

Initial / Date:

- 11.7.7 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	17.0			
Angle	155	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Fifth Segment (155°)

- 11.7.8 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 155 DEG.**

Initial / Date:

- 11.7.9 Click on **POSITION PUMP** soft button.

Initial / Date:

NOTE: Performance of step 11.7.10 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.7.10 **WHEN POSITION MOTOR Angle** is 155 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.7.11 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

- 11.7.12 Click on the pump **ENABLE TEST** soft button.

☐

TANK SWEEP: Fifth Segment (155°)

**LEVEL MAINTENANCE
FOR
TANK 101-SY MITIGATION-BY-MIXING TEST**

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NOTE: Upon activation of the pump in step 11.7.13 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.7.13 Click on the **START TEST** soft button to initiate the pump run.

☐

11.7.14 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad **OR** the Independent Speed monitor (VRINDRPM).

START TIME	---
-----------------------	-----

Initial / Date:

11.7.15 Monitor pump parameters and tank conditions for the duration of the run. **IF** available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

TANK SWEEP: Fifth Segment (155°)

NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.7.16 Stop the pump as follows:

11.7.16.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.7.16.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.7.16.3 Check all indications to ensure that the pump has stopped (press the E **STOP** button if indications demonstrate that the pump is not stopped).

☐

11.7.16.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.7.17 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

LEVEL MAINTENANCE
FOR
TANK 101-SY MITIGATION-BY-MIXING TEST

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11.8 Sixth Segment: 185°, 750 RPM for 30 Minutes

11.8.1 Ensure that abort coil is reset as follows:

11.8.1.1 At any Control System screen (eg, CSMAIN) click on the blue box labeled Reset Abort Coil. Observe the red indicator clear. ☐

11.8.1.2 Ensure both E STOP buttons are in the pulled out position, with associated red lights ON. ☐

11.8.1.3 Ensure the E STOP alarm switch is in the NORMAL position.

Initial / Date:

11.8.2 IF required, request the West Area Shift Manager to ensure the following devices are unlocked and positioned to ON (N/A if not required):

[VSD-101-2]	TO MIXING PUMP	☒
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐
[DS-101-25]	MIXER PUMP disconnect switch	☐
[DS-101-26]	ROTATIONAL MOTOR disc. switch	☐

Initial / Date:

11.8.3 Ensure that the two, 2-digit displays on the left side of both the PUMP DRIVE and DIRECTIONAL DRIVE keypads read "SP" and "MA" in either order.

Initial / Date:

Initial / Date:

Independent Verification

TANK SWEEP: Sixth Segment (185°)

**LEVEL MAINTENANCE
FOR
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- 11.8.4 Ensure that the "KPD LOCKED" light is illuminated on both the DIRECTIONAL DRIVE and PUMP DRIVE keypads.

Initial / Date:	Initial / Date:
	Independent Verification

NOTE: All pump related DACS commands are issued from the Pump Control Console (DACS station 8).

- 11.8.5 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the **MAINMENU**.

Initial / Date:

- 11.8.6 Click on the **Test** field and input 18.0. Press **<ENTER>**.

Initial / Date:

- 11.8.7 Verify the parameters, as displayed above the **SET VALUES** soft button, on the **PUMP OPERATION** screen match those in the table below:

			✓	iv
Test	18.0			
Angle	185	degrees		
Speed	750	RPM		
Duration	0	Hrs		
	30	Mins		
	0	Secs		
Accel	6	RPM/SEC		
Decel	360	RPM/SEC		

Initial / Date:	Initial / Date:
	Independent Verification

TANK SWEEP: Sixth Segment (185°)

**LEVEL MAINTENANCE
FOR
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- 11.8.8 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field displays **TANK SWEEP AT 185 DEG.**

Initial / Date:

- 11.8.9 Click on **POSITION PUMP** soft button.

Initial / Date:

NOTE: Performance of step 11.8.10 automatically updates alarm and abort limits for pump speed, discharge pressure and motor current to the present requirements and enables the fast scan (1 second) data archive rate.

- 11.8.10 WHEN **POSITION MOTOR** Angle is 185 degrees ($\pm 2^\circ$), click on the green **ENABLE TEST** soft button.

Initial / Date:

- 11.8.11 Obtain West Area Shift Manager concurrence to commence pump operation.

West Area Shift Manager signature: _____

Date/Time: _____

NOTE: When the **ENABLE TEST** button is clicked the pump controls will be enabled for 60 seconds (indicated by flashing green). Pump operation will proceed only IF the **START TEST** soft button is selected while it is green.

- 11.8.12 Click on the pump **ENABLE TEST** soft button.

☐

TANK SWEEP: Sixth Segment (185°)

**LEVEL MAINTENANCE
FOR
TANK 101-SY MITIGATION-BY-MIXING TEST**

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NOTE: Upon activation of the pump in step 11.8.13 there will be approximately a 5 second delay before the pump **RUNNING** indication is displayed on the **DACS PUMP OPERATION** screen.

11.8.13 Click on the **START TEST** soft button to initiate the pump run.

☐

11.8.14 Record the Start Time **WHEN** the pump's speed (rpm) increases from zero, as displayed on either the PUMP DRIVE keypad **OR** the Independent Speed monitor (VRINDRPM).

START TIME	
-----------------------	--

Initial / Date:

11.8.15 Monitor pump parameters and tank conditions for the duration of the run. **IF** available, the video camera may be maneuvered through its range of motion to better observe conditions inside the tank.

Initial / Date:

TANK SWEEP: Sixth Segment (185°)

**LEVEL MAINTENANCE
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NOTE:

- DACS will alarm 30 seconds prior to termination of test to provide notification of automatic pump trip.
- The **STOP TEST** button will change to a green **ENABLE STOP** while the pump is running. When the **ENABLE STOP** button is clicked it will change to a steady yellow for 2 - 3 seconds, then change to a flashing yellow **STOP TEST** button. The flashing yellow **STOP TEST** button must be clicked to manually stop the pump. IF the **STOP TEST** button is not clicked within 5 seconds, it will revert to a steady green **ENABLE STOP** button.

11.8.16 Stop the pump as follows:

11.8.16.1 **WHEN** the 30 second warning sounds, click on the green **ENABLE STOP** soft button and observe that it changes to flashing yellow **STOP TEST** button.

☐

11.8.16.2 **WHILE** the button is flashing yellow **STOP TEST**, click on it again.

☐

11.8.16.3 Check all indications to ensure that the pump has stopped (press the E **STOP** button if indications demonstrate that the pump is not stopped).

☐

11.8.16.4 Record below and in the Mitigation Test Log the time that the Mixer Pump was stopped.

STOP TIME	
----------------------	--

Initial / Date:

11.8.17 **GOTO** section 11.9 of this procedure to secure Mitigation Test systems.

TANK SWEEP: Sixth Segment (185°)

11.9 Shutdown of Mitigation Test Systems

NOTE: Step 11.9.1 is optional and is provided as a time saving measure for the next scheduled pump operation.

11.9.1 IF desired, rotate the pump to the orientation anticipated for the next pump run as follows (N/A these substeps if not used):

11.9.1.1 At the Pump Control Console, access the **PUMP OPERATION [PUMPRUN]** screen from the MAINMENU. ☐

11.9.1.2 Click on the **Test** field and input the Test Number of the next anticipated pump run, as provided by the Test Manager. Press **<ENTER>**. ☐

11.9.1.3 Click on the **SET VALUES** soft button and verify that the description in the **SELECTED TEST:** field corresponds to the desired test regimen. ☐

11.9.1.4 Click on the **POSITION PUMP** soft button and observe the **RUNNING** indication. ☐

11.9.1.5 **WHEN POSITION MOTOR** indicates **STOPPED**, record the new pump orientation in the space provided.

degrees
PUMP ORIENTATION

Initial / Date:	Initial / Date:
	Independent Verification

11.9.2 Contact the West Area Shift Manager (373-3475, Radio Station 20):

11.9.2.1 Notify the WASM that pump operation has stopped. ☐

11.9.2.2 Request WASM to notify DACS test team **WHEN** the Personnel Access controls for ammonia have been released. ☐

SHUTDOWN OF MITIGATION TEST SYSTEMS

**LEVEL MAINTENANCE
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- 11.9.2.3 Request WASM ensure the following circuit breakers are OFF and DANGER tagged in the LOCKED OFF position:

[VSD-101-2]	TO MIXING PUMP	☐
[VSD-101-1]	TO MIXING PUMP ROTATION MOTOR	☐

Initial / Date:

NOTE: The conditions required for the release of Personnel Access controls for ammonia are contained in West Operations Standing Order #93-14.

- 11.9.3 **WHEN** the Personnel Access controls for ammonia are released, perform the following:

- 11.9.3.1 Record below and in the Mitigation Test Log the time the West Area Shift Manager released S Complex from Personnel Access controls for ammonia.

Access controls
RELEASED

Initial / Date:

- 11.9.3.2 At the SY-101 MIXER PUMP STROBE control box, position the TEST SWITCH to OFF and verify that both amber indicators are not lit.

Initial / Date:

- 11.9.4 Monitor the tank level, hydrogen concentrations, and waste surface (using the video camera, if available) to ensure that no abnormal conditions exist for a minimum of 1 hour after the pump has stopped.

Initial / Date:

- 11.9.5 Position the video camera to view the base of the pump column where it meets the waste surface (N/A if video camera not available).

Initial / Date:

SHUTDOWN OF MITIGATION TEST SYSTEMS

LEVEL MAINTENANCE
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11.9.6 Exit MODSOFT as follows:

NOTE: Repeat step 11.9.6.1 until a dialog box is displayed.

11.9.6.1 Choose QUIT from the menu bar.

11.9.6.2 Answer Y to all dialog boxes, until returned to a DOS prompt.

Initial / Date:

NOTE: The following 3 steps shall be performed prior to vacating the DACS Trailer.

11.9.7 Set the GENESIS security level to view only at DACS stations 5, 6, 7 and 8 by entering the appropriate password.

Initial / Date:

Initial / Date:

Independent Verification

11.9.8 Ensure that the CPU access doors on the computer workstations are closed and locked.

Initial / Date:

11.9.9 Ensure that both doors of the DACS trailer are locked.

A Quality Assurance review has been conducted as defined in Section 10 of this procedure.

QA representative signature: _____ Date: _____

11.10 Tank Level Monitoring

During all phases of testing, the rate of tank waste level rise will be closely monitored. A change in the rate of hydrogen generation, gas retention within the non-convective layer, or the depth of the foam layer near the top of the tank should be detected by an unexpected change in the tank level or a change in the rate of level rise. Safe limits for the tank waste level and the rate of tank waste level rise have been established in the Safety Assessment.

The tank waste level shall be recorded on Data Sheet 1, Waste Level Rise Rate (maintained in the Surveillance Log Book) once per day, preferably at approximately the same time each day. The tank waste level shall be determined using the FIC or ENRAF¹.

The maximum rate of waste level rise established in the Safety Assessment is 0.15 in/day as a 7-day average. If the average determined in column (6) of Data Sheet 1 exceeds 0.15, notify the Test Manager and request the TRG to provide a detailed evaluation of the waste level data. Use the results of the TRG evaluation to satisfy step 11.1.12 and record an explanation in the Comments section of Data Sheet 1. The maximum rate of level rise requirement may be exceeded on a case-by-case basis for short duration (≤ 5 minutes) pump operation only, if authorized by the TRG. If the control is authorized to be exceeded, make a notation in the Comments section of Data Sheet 1 and at step 11.1.12.

11.11 General Shift Procedures and Requirements

The mitigation Test Directors and Test Engineers shall conduct the operation of the mitigation pump in accordance with the applicable sections of WHC-SP-0708, *Westinghouse Hanford Company Conduct of Operations Manual*.

12 DISPOSITION OF TEST SUBJECT

Once it has been concluded that use of the mixer pump is completed, the mixer pump will be deactivated and the tank contents allowed to stabilize. The mixer pump will then be removed from DST 101-SY and decontaminated or stored as determined by an as-yet-unwritten procedure.

¹ Manual tape may be used if FIC or ENRAF is not available, but must be so noted on Data Sheet 1.

13 REFERENCES

- 13.1 WHC-SD-WM-PLN-081, *Mixer Pump Long Term Operations Plan for Tank 101-SY Mitigation*
- 13.2 LA-UR-92-3196 Revised, *A Safety Assessment for Proposed Pump Mixing Operations to Mitigate Episodic Gas Releases in Tank 241-101-SY: Hanford Site, Richland, Washington (US Department of Energy)*
- 13.3 WHC-SD-WM-ATP-046, *101-SY Mitigation Testing Acceptance Test Procedure*
- 13.4 WHC-SD-WM-ATP-058, *101-SY Post Pump Installation Acceptance Test Procedure*
- 13.5 WHC-SD-WM-ATP-061, *MIT Acceptance Test Procedure*
- 13.6 WHC-SD-WM-ATP-082, *DACS Upgrade Acceptance Test Procedure*
- 13.7 WHC-SP-0708, *WHC Conduct of Operations Manual*
- 13.8 WHC-SD-WM-MA-014, *Mitigation Test Management Plan*
- 13.9 WHC-SD-WM-PLN-052, *Data Management Plan for Tank SY-101 Hydrogen Mitigation Experiments*
- 13.10 WHC-IP-0263-TF, *WHC Building Emergency Plan*
- 13.11 H-2-89967, *HMT 101-SY Tank Mixing Pump System P & ID*
- 13.12 WHC-SD-WM-SAD-012, *Safety Assessment for the Installation and Operation of Inlet Filters on Tank 101-SY*
- 13.13 WHC-SD-WM-PROC-004, *Alarm Response Procedures for Tank 101-SY Mitigation-By-Mixing Test*
- 13.14 WHC-SD-WM-PROC-005, *Abnormal Operating Procedures for Tank 101-SY Mitigation-By-Mixing Test*
- 13.15 WHC-SD-WM-TPI-008, *Unplugging 101-SY Mixer Pump Nozzles*
- 13.16 WHC-IP-0842, *Waste Tank Project Administration*
- 13.17 TF-OR-SY-01, *Tank Farm Operator Surveillance Rounds*
- 13.18 WHC-SD-WM-HSP-002, *Tank Farm Health and Safety Plan (HASP)*
- 13.19 *West Operations Standing Orders*

14 PROCEDURE CHANGES

Changes to this procedure shall be made in accordance with WHC-CM-6-1, *Standard Engineering Practices*, Engineering Document Change Control, EP-2.2. Direct revisions and page changes shall be made, as appropriate. In addition to the approval requirements in EP-2.2, all changes of Intent shall be approved by the TRG.

TRG approval may be accomplished by telecon. The minimum signature requirements for telecon approval are not changed: 5 TRG members (one SAFETY, one QA, and 3 others) are required. The telecon change shall then be presented at the next scheduled TRG meeting.

Figure 1: DACS Calculated Discharge Pressure Limits

Figure 2: DACS Calculated Electrical Current Limits

WORKSHEET to Determine Pump Operating Parameters

This worksheet is required in the event that the pump is being operated more than once during the calendar day (ie, midnight to midnight). Complete this worksheet as directed. Maintain the original with the procedure for which it was prepared. Show all work. This worksheet is not valid for FIC level > 405.3 inches.

1. Perform the following calculations, obtaining values for the variables S and Δt from the Mitigation Test Log or completed procedures:

Determine the Daily Energy Input (E), where,

S_1 = pump speed (rpm) for first pump run since midnight

Δt_1 = pump runtime (minutes) for first pump run since midnight

$$E = (S_1)^2(\Delta t_1) + (S_2)^2(\Delta t_2) + \dots (S_n)^2(\Delta t_n)$$

Determine the Allowable Energy Input (R) for the current planned pump operation: (The value $1.0125 * 10^8$ is a constant obtained from Appendix AN of the Safety Assessment.)

$$R = (1.0125 * 10^8) - E$$

3. Enter the chosen set of parameters (as provided by Test Manager and verified against Appendix D, Pre-Programmed Mixer Pump Parameters) in the space provided:

Test # (13-18 for Sweep)	Total Duration (min) including all orientations	Speed (rpm)	Number of Orientations

WORKSHEET to Determine Pump Operating Parameters

4. Verify that the set of operating parameters chosen in step 3 will not exceed the value of R, as calculated in step 1.

$$R > (S_o)^2(\Delta t_o)$$

where,

S_o = Speed as entered in step 3

Δt_o = Total Duration as entered in step 3

5. Verify that the daily runtime total for the pump, including all previous pump runs since midnight ($\Delta t_1 + \Delta t_2 + \dots \Delta t_n$) and the currently planned pump run (Δt_o) will not exceed 4 hours (240 minutes).

$$\Delta t_1 + \Delta t_2 + \dots \Delta t_n + \Delta t_o < 240 \text{ minutes}$$

6. Return to step 11.1.31 in the procedure and use the operating parameters determined in this worksheet to complete step 11.1.32.

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15 DATA SHEETS

DATA SHEET 1

WASTE LEVEL RISE RATE

(1) DATE (mm/dd/yy)	(2) TIME (hh:mm)	(3) CURRENT LEVEL (inches)	(4) LEVEL 7 DAYS AGO (inches)	(5) LEVEL CHANGE (3)-(4)	(6) RISE RATE (5)÷7	(7) INITIALS	(8) INDEPENDENT VERIFICATION

Comments:

NOTES:

- (2) Level reading should be taken at approximately the same time each day.
- (4) Level 7 Days Ago may be obtained from this data sheet or from Tank Farm Operations.

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APPENDIX A

The instrumentation listed in Appendix A, Minimum Instrumentation Checklists shall be operable prior to and during any pump operation performed in accordance with this procedure.

IF waste level is less than 402 inches, the TRG may authorize one 5-minute (or less) duration pump run per day with an abbreviated set of instrumentation. This is intended as a short term measure only to keep pump nozzles from clogging when certain Minimum Instrumentation is temporarily out-of-service. The TRG shall assure that corrective action is taken to repair or replace the affected instruments as soon as possible. The Minimum Instrumentation Checklists shall be completed as usual for those instruments still in service, in addition to the Contingency Instrumentation Checklists. TRG Authorization (date of TRG minutes or file number of the TRG letter) shall be indicated on the checklist in the space provided.

Perform Part A and Part B of the Checklist independently. Upon completion of the Checklists the Test Director shall review both parts and ensure they concur with each other. This review shall be documented by the Test Director's signature on the line provided at the end of the Checklists.

A "Comments" section is provided at the end of the Checklists; initial any entries made in this section.

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APPENDIX A

PART A Minimum Instrumentation Checklist

PARAMETER	REQUIREMENTS	First Verification
		OPERABLE (Y/N)
101-SY Vent Flow Rate	One flowmeter connected to DACS: FTE50001 OR FTE50002	_____
SY Tank Farm Exhaust Stack Flow Rate	One measurement connected to DACS or determined manually: DACs (FTE50003 required for calculation) OR Manual Reading (Reference 13.17)	_____
Pump Moisture	One detector connected to DACS: MIP00001	_____
Pump Motor Oil Temperature	One temperature device connected to DACS: TIR12A01 OR TIR12A02	_____
Hydrogen Concentration	One hydrogen monitor from each of the following 3 Groups shall be operable: Group 1: GC1-H2 - 0-100 PPM VENT HDR GC3-H2 - 0-100 PPM VENT HDR Group 2: GC2-H2 - 100-10,000 PPM VENT HDR NITKSY06 - 0-10% VENT HDR SHMS2 Group 3: NIR05A01 - 0-10% RISER 12A SHMS3 NITJSY06 - 0-10% RISER 16A SHMS1 NIR17B01 - 0-1% RISER 17B GMS1	_____ _____ _____ _____ _____ _____ _____
Pump Motor Speed (rpm)	HMT MIXING PUMP MOTOR RPM (VRINDRPM) AND Mixer Pump Speed (DACs VR232050)	_____
Pump Motor Current (amps)	One measurement connected to DACS: VR232040	_____
Pump Column Gas Pressure	One pressure measurement connected to DACS: ZIMPE142	_____
Pump Column Orientation	Sensor connected to DACS (ZIMPE112) OR visual observation required	_____

Instrument Checklist

Initial/Date: _____

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PARAMETER	REQUIREMENTS	First Verification OPERABLE (Y/N)
Ammonia	FTIR measurement: DACS tag FT-NH3C OR Stack Ammonia measurement: DACS tag PHO-NH3	_____ _____
Elapsed Time of Pump Operation	Measured by DACS	_____
Waste Level	2 independent level instruments are required: One device connected to DACS: FIC OR ENRAF AND One of the following indications shall be operable: Radar Gauge (LIR13A01) OR Manual Tape Reading OR ENRAF	_____ _____ _____ _____ _____
Nozzle Discharge Flow Indication	For pump operations ≤ 5 minutes duration the lower waste temperature or either flow element on each downcomer shall be operable: TIPN0101 OR FIPN0101 OR FIPN0102 AND TIPN0202 OR FIPN0202 OR FIPN0201	_____ _____
Pump Discharge Pressure	Pump volute pressure (PCR12A01)	_____
Pump Column Strain	Minimum of 2 strain gauges not oriented at 180° apart shall be connected to DACS: WIR12A01 at 45° WIR12A02 at 135° WIR12A03 at 225° WIR12A04 at 315°	_____ _____ _____ _____
Radiation	For speeds ≥ 530 rpm an Area Radiation Monitor (ARM) is connected to DACS	_____
Tank Dome Pressure	One sensor connected to DACS: PIR17B04 OR PIR11B01	_____ _____

Instrument Checklist

Initial/Date: _____

MINIMUM INSTRUMENTATION CHECKLISTS

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PART A Minimum Instrumentation Checklist

PARAMETER	REQUIREMENTS	First Verification
		OPERABLE (Y/N)
Waste Temperature	At least one device must be operable in each Group.	
	Group I: Level = 0-50"	
	TIR17B01	
	TIR17B02	
	TIR17B03	
	Group II: Level = 50-100"	
	TIR17B04	
	TIR17B05	
	TIR17B06	
	Group III: Level = 100-150"	
	TIR17B07	
	TIR17B08	
	TIR17B09	
	Group IV: Level = 150-200"	
	TIR17B10	
	TIR17B11	
	Group V: Level = 200-250"	
	TIR17B12	
	TIR17B13	
	TIR17B14	
	TIR17B15	
	Group VI: Level = 250-300"	
	TIR17B16	
	TIR17B17	
	Group VII: Level = 300-350"	
	TIR17B18	
	TIR17B19	
	Group VIII: Level = 350-425"	
	TIR17B20	
	TIR17B21	
	TIR17B22	

Instrument Checklist

Initial/Date: _____

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PARAMETER	REQUIREMENTS	First Verification
		OPERABLE (Y/N)
VDTT Strain 1B	3 strain gauges connected to DACS: WIR1BA01 at 0° AND WIR1BA02 at 120° AND WIR1BA03 at 240°	_____ _____ _____
MIT Strain 17B	2 strain gauges connected to DACS: WIR17B01 at 0° AND WIR17B02 at 90°	_____ _____
MIT Strain 17C	2 strain gauges connected to DACS: WIR17C01 at 0° AND WIR17C02 at 90°	_____ _____

PART A Contingency Instrumentation Checklist

TRG
Authorization:

NOTE: This checklist is valid only for waste levels < 402 inches AND with TRG Authorization. Pump runs based on this checklist shall not exceed 5 minutes in duration.

PARAMETER	REQUIREMENTS	First Verification
		OPERABLE (Y/N)
Hydrogen Concentration	At least one of the following devices shall be operable and connected to DACS: GC2-H2 - 100-10,000 PPM VENT HDR NITKSY06 - 0-10% VENT HDR SHMS2 NIR05A01 - 0-10% RISER 12A SHMS3 NITJSY06 - 0-10% RISER 16A SHMS1 NIR17B01 - 0-1% RISER 17B GMS1	_____ _____ _____ _____ _____
Waste Level	One valid level measurement recorded within the previous 4 days.	_____
Tank Ventilation	At least one of the following devices must be operable and connected to DACS: PIR17B04 - Tank Dome Pressure PIR11B01 - Tank Dome Pressure FTE50001 - Vent Flowrate FTE50002 - Vent Flowrate	_____ _____ _____ _____

Instrument Checklist

Initial/Date: _____

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PART B Minimum Instrumentation Checklist

PARAMETER	REQUIREMENTS	Independent Verification OPERABLE (Y/N)
101-SY Vent Flow Rate	One flowmeter connected to DACS: FTE50001 OR FTE50002	_____ _____
SY Tank Farm Exhaust Stack Flow Rate	One measurement connected to DACS or determined manually: DACs (FTE50003 required for calculation) OR Manual Reading (Reference 13.17)	_____ _____
Pump Moisture	One detector connected to DACS: MIP00001	_____
Pump Motor Oil Temperature	One temperature device connected to DACS: TIR12A01 OR TIR12A02	_____ _____
Hydrogen Concentration	One hydrogen monitor from each of the following 3 Groups shall be operable: Group 1: GC1-H2 - 0-100 PPM VENT HDR GC3-H2 - 0-100 PPM VENT HDR Group 2: GC2-H2 - 100-10,000 PPM VENT HDR NITKSY06 - 0-10% VENT HDR SHMS2 Group 3: NIR05A01 - 0-10% RISER 12A SHMS3 NITJSY06 - 0-10% RISER 16A SHMS1 NIR17B01 - 0-1% RISER 17B GMS1	_____ _____ _____ _____ _____ _____ _____
Pump Motor Speed (rpm)	HMT MIXING PUMP MOTOR RPM (VRINDRPM) AND Mixer Pump Speed (DACs VR232050)	_____ _____
Pump Motor Current (amps)	One measurement connected to DACS: VR232040	_____
Pump Column Gas Pressure	One pressure measurement connected to DACS: ZIMPE142	_____
Pump Column Orientation	Sensor connected to DACS (ZIMPE112) OR visual observation required	_____ _____

Instrument Checklist

Initial/Date: _____

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PARAMETER	REQUIREMENTS	Independent Verification
		OPERABLE (Y/N)
Ammonia	FTIR measurement: DACS tag FT-NH3C OR Stack Ammonia measurement: DACS tag PHO-NH3	_____ _____
Elapsed Time of Pump Operation	Measured by DACS	_____
Waste Level	2 independent level instruments are required: One device connected to DACS: FIC OR ENRAF AND One of the following indications shall be operable: Radar Gauge (LIR13A01) OR Manual Tape Reading OR ENRAF	_____ _____ _____ _____ _____
Nozzle Discharge Flow Indication	For pump operations ≤ 5 minutes duration the lower waste temperature or either flow element on each downcomer shall be operable: TIPN0101 OR FIPN0101 OR FIPN0102 AND TIPN0202 OR FIPN0202 OR FIPN0201	_____ _____
Pump Discharge Pressure	Pump volute pressure (PCR12A01)	_____
Pump Column Strain	Minimum of 2 strain gauges not oriented at 180° apart shall be connected to DACS: WIR12A01 at 45° WIR12A02 at 135° WIR12A03 at 225° WIR12A04 at 315°	_____ _____ _____ _____
Radiation	For speeds ≥ 530 rpm an Area Radiation Monitor (ARM) is connected to DACS	_____
Tank Dome Pressure	One sensor connected to DACS: PIR17B04 OR PIR11B01	_____ _____

Instrument Checklist

Initial/Date: _____

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PART B Minimum Instrumentation Checklist

PARAMETER	REQUIREMENTS	Independent Verification
		OPERABLE (Y/N)
Waste Temperature	At least one device must be operable in each Group.	
	Group I: Level = 0-50"	
	TIR17B01	_____
	TIR17B02	_____
	TIR17B03	_____
	Group II: Level = 50-100"	
	TIR17B04	_____
	TIR17B05	_____
	TIR17B06	_____
	Group III: Level = 100-150"	
	TIR17B07	_____
	TIR17B08	_____
	TIR17B09	_____
	Group IV: Level = 150-200"	
	TIR17B10	_____
	TIR17B11	_____
	Group V: Level = 200-250"	
	TIR17B12	_____
	TIR17B13	_____
	TIR17B14	_____
	TIR17B15	_____
	Group VI: Level = 250-300"	
	TIR17B16	_____
	TIR17B17	_____
	Group VII: Level = 300-350"	
	TIR17B18	_____
	TIR17B19	_____
	Group VIII: Level = 350-425"	
	TIR17B20	_____
	TIR17B21	_____
	TIR17B22	_____

Instrument Checklist

Initial/Date: _____

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PART B Minimum Instrumentation Checklist

PARAMETER	REQUIREMENTS	Independent Verification
		OPERABLE (Y/N)
VDTT Strain 1B	3 strain gauges connected to DACS: WIR1BA01 at 0° AND WIR1BA02 at 120° AND WIR1BA03 at 240°	_____ _____ _____
MIT Strain 17B	2 strain gauges connected to DACS: WIR17B01 at 0° AND WIR17B02 at 90°	_____ _____
MIT Strain 17C	2 strain gauges connected to DACS: WIR17C01 at 0° AND WIR17C02 at 90°	_____ _____

PART B Contingency Instrumentation Checklist

TRG Authorization: _____

NOTE: This checklist is valid only for waste levels < 402 inches AND with TRG Authorization. Pump runs based on this checklist shall not exceed 5 minutes in duration.

PARAMETER	REQUIREMENTS	Independent Verification
		OPERABLE (Y/N)
Hydrogen Concentration	At least one of the following devices shall be operable and connected to DACS: GC2-H2 - 100-10,000 PPM VENT HDR NITKSY06 - 0-10% VENT HDR SHMS2 NIR05A01 - 0-10% RISER 12A SHMS3 NITJSY06 - 0-10% RISER 16A SHMS1 NIR17B01 - 0-1% RISER 17B GMS1	_____ _____ _____ _____ _____
Waste Level	One valid level measurement recorded within the previous 4 days.	_____
Tank Ventilation	At least one of the following devices must be operable and connected to DACS: PIR17B04 - Tank Dome Pressure PIR11B01 - Tank Dome Pressure FTE50001 - Vent Flowrate FTE50002 - Vent Flowrate	_____ _____ _____ _____

Instrument Checklist

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APPENDIX A

1. What is the main purpose of the document?
 2. What are the key findings of the study?
 3. What are the limitations of the study?
 4. What are the implications of the study?
 5. What are the conclusions of the study?
 6. What are the recommendations of the study?
 7. What are the future research directions?
 8. What are the acknowledgments?
 9. What are the references?
 10. What are the appendices?
 11. What are the footnotes?
 12. What are the endnotes?
 13. What are the glossary?
 14. What are the index?
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 212. What are the illustrations?
 213. What are the drawings?
 214. What are the sketches?
 215. What are the diagrams?
 216. What are the flowcharts?
 217. What are the maps?
 218. What are the photos?
 2

Initial / Date:	Initial / Date:
	Independent Verification

Test Director signature: _____ Date: _____

Initial/Date: _____

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APPENDIX B

TABLE B1 ABORT LIMIT CHECKLIST - PART A

Tag	Mod Reg	Mod Abort	Checkoff (✓)	Description
HH2LIM	400200	307		HIGH HYDROGEN CONC LIMIT
H1BSAL	400201	2996		HIGH 1B STRAIN ALARM LIMIT
HTEMPLIM	400203	1605		HIGH TEMPERATURE LIMIT
HTDPLIM	400204	1229		HIGH TANK DOME PRESSURE LIMIT
HPMOTLIM	400206	2252		HIGH PUMP MOTOR OIL TEMP LIMIT
LVFLLIM	400207	1285		LOW VENTILATION FLOW LIMIT
HPMCLIMF	400208	35334	VARIABLE	HIGH PUMP MOTOR CURRENT LIMIT
HPDPLIM	400209	184	VARIABLE	HIGH PUMP DISCHARGE PRESS LIMIT
PBTLMF	400210	0		PHASE B TIME LIMIT (MINUTES)
CURALRM	400211	30287		PUMP MOTOR CURRENT ALARM LIMIT
BUMPTLMF	400212	0		PUMP BUMP TIME LIMIT (SECS)
HPSPDLIM	400213	0	VARIABLE	HIGH PUMP SPEED LIMIT
HH2LIM2	400232	3071		HIGH H2 LIMIT FOR 0-30 GAUGE
HTMPLIM3	400234	2343		HIGH TEMP LIMIT FOR PUMP TEMPS
LVFLLIM2	400235	688		LOW VENT FLOW LIMIT 0-4000 GAUGE
HTDPLIM2	400236	655		HIGH TANK DOME PRESS LIMIT 2
H1BCSLIM	400237	3682		HIGH COLUMN STRAIN LIMIT R1B
LPCSLIM	400238	1467		LOW PUMP COLUMN STRAIN LIMIT
LMITSLIM	400239	979		LOW MIT COLUMN STRAIN LIMIT
L17CSLIM	400240	979		LOW 17C COLUMN STRAIN LIMIT
L1BCSLIM	400241	413		LOW VDTT 1B COLUMN STRAIN LIMIT
LPCGPLIM	400252	1147		LOW PUMP COLUMN GAS PRESS LIMIT
HVFLLIM1	400253	2248		HIGH VENT FLOW LIMIT 1
HVFLLIM2	400254	835		HIGH VENTILATION FLOW LIMIT 2

Appendix B, PLC Verification Part A
Checklist completed by (sign/date): _____

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APPENDIX B

TABLE B1 ABORT LIMIT CHECKLIST - PART B

Tag	Mod Reg	Mod Abort	Checkoff (✓)	Description
HH2LIM	400200	307		HIGH HYDROGEN CONC LIMIT
H1BSAL	400201	2996		HIGH 1B STRAIN ALARM LIMIT
HTEMLIM	400203	1605		HIGH TEMPERATURE LIMIT
HTDPLIM	400204	1229		HIGH TANK DOME PRESSURE LIMIT
HPMOTLIM	400206	2252		HIGH PUMP MOTOR OIL TEMP LIMIT
LVFLLIM	400207	1285		LOW VENTILATION FLOW LIMIT
HPMCLIMF	400208	35334	VARIABLE	HIGH PUMP MOTOR CURRENT LIMIT
HPDPLIM	400209	184	VARIABLE	HIGH PUMP DISCHARGE PRESS LIMIT
PBTLIMF	400210	0		PHASE B TIME LIMIT (MINUTES)
CURALRM	400211	30287		PUMP MOTOR CURRENT ALARM LIMIT
BUMPTLIMF	400212	0		PUMP BUMP TIME LIMIT (SECS)
HPSPDLIM	400213	0	VARIABLE	HIGH PUMP SPEED LIMIT
HH2LIM2	400232	3071		HIGH H2 LIMIT FOR 0-30 GAUGE
HTMPLIM3	400234	2343		HIGH TEMP LIMIT FOR PUMP TEMPS
LVFLLIM2	400235	688		LOW VENT FLOW LIMIT 0-4000 GAUGE
HTDPLIM2	400236	655		HIGH TANK DOME PRESS LIMIT 2
H1BCSLIM	400237	3682		HIGH COLUMN STRAIN LIMIT R1B
LPCSLIM	400238	1467		LOW PUMP COLUMN STRAIN LIMIT
LMITSLIM	400239	979		LOW MIT COLUMN STRAIN LIMIT
L17CSLIM	400240	979		LOW 17C COLUMN STRAIN LIMIT
L1BCSLIM	400241	413		LOW VDTT 1B COLUMN STRAIN LIMIT
LPCGPLIM	400252	1147		LOW PUMP COLUMN GAS PRESS LIMIT
HVFLLIM1	400253	2248		HIGH VENT FLOW LIMIT 1
HVFLLIM2	400254	835		HIGH VENTILATION FLOW LIMIT 2

Appendix B, PLC Verification Part B

Checklist completed by (sign/date): _____

DISABLING INOPERABLE INSTRUMENTS

APPENDIX C

WARNING!

The instructions that follow will result in a reduction of DACS abort capability. Aborts may only be disabled with the express approval of the Test Manager.

NOTE:

- All steps in Appendix C, Disabling Inoperable Instruments shall be performed at DACS Station 1.
- The <TAB> key toggles the cursor between the menu bar and the display screen.
- Use TABLE C1, Abort Coil Cross Reference to identify the applicable abort coil numbers.

- 1 Enter the abort coil number associated with the inoperable instrument (DACS Tag) in field **F1** on the REFERENCE DATA screen.
- 2 Highlight the **F5** field (using the cursor keys), enter a D in the field and press <ENTER> to disable the selected abort coil.
- 3 Highlight field **F3** and ensure that the State block displays a zero (abort coil off).

NOTE: Some instruments may have more than one abort coil. This is indicated in TABLE C1 by a dashed line separating the coil numbers in the row occupied by the DACS Tag of the instrument.

- 4 Repeat steps 1 through 3 for each abort coil associated with an inoperable instrument.
- 5 Ensure that all appropriate entries are made in the Disabled Instrument List (maintained in the Required Reading book).

NOTE: Step 6, performed independently by a second qualified individual satisfies the requirement for independent verification of disabled abort coils.

- 6 Verify disabled abort coils by performing the following steps:
 - 6.1 At the **Disable** pull down, choose the **List Disabled** menu item.

DISABLING INOPERABLE INSTRUMENTS

APPENDIX C

NOTE: The List Disabled menu item will produce a pop-up window that displays the identification number of each abort coil that is disabled. The abort coils will be displayed one at a time and may be scrolled through by using the <SPACE BAR>.

- 6.2 Verify that each abort coil number displayed in the pop-up window appears in the Disabled Instrument List.

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TABLE C1 ABORT COIL CROSS REFERENCE

DACS Tag	DACS Description	Modicon Tag	MODICON Coil Description	Coil No.
FTE50001	VENT HEADER FLOW LOW RANGE	FCE50001	Low Ventilation Flow Abort 1	308
		FHE50001	High Vent Flow Abort 1	342
FTE50002	VENT HEADER FLOW HIGH RANGE	FCE50002	Low Ventilation Flow Abort 2	309
		FHE50002	High Vent Flow Abort 2	343
FICABORT	FIC TANK LEVEL ALARM	FCCABORT	High Waste Tank Level Abort	261
NIR05A01	MIX PUMP WTKR MON HI H2	NCR05A01	High H2 Abort - Pump	260
NIR17B01	RISER 17B WTKR MON/HI H2	NCR17B01	High H2 - Riser 17B Abort	259
NITJSY06	R-16A WTKR MON/HI H2	NCTJSY06	High H2 - Riser 16A Abort	258
NITKSY06	EXH HDR WTKR MON/HI H2	NCTKSY06	High H2 - Vent Header Abort	257
PIR11B01	TANK DOME PRESSURE RISER 11B	PCR11B01	High Tank Dome Pressure Abort 1	310
PCR12A01	PMP VOLUTE PRESS MINUS BASELIN	PHR12A01	High Pump Discharge Pressure Abort	304
PIR17B04	MIT TANK DOME PRESSURE	PCR17B04	High Tank Dome Pressure Abort 2	311
TIPN0101	MIX PUMP DIS. NOZ. 2 TEMP 1	TCPN0101	High Temp Abort Pump 101	300
TIPN0102	MIX PUMP DIS. NOZ. 2 TEMP 2	TCPN0102	High Temp Abort Pump 102	301
TIPN0201	MIX PUMP DIS. NOZ. 1 TEMP 2	TCPN0201	High Temp Abort Pump 201	302
TIPN0202	MIX PUMP DIS. NOZ. 1 TEMP 1	TCPN0202	High Temp Abort Pump 202	303
TIR12A01	MIXER PUMP MOTOR OIL TEMP #1	TCR12A01	High Pump Motor Oil Temp Abort 1	306

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DACS Tag	DACS Description	Modicon Tag	MODICON Coil Description	Coil No.
TIR12A02	MIX PUMP MOTOR OIL TEMP 2	TCR12A02	High Pump Motor Oil Temp Abort 2	307
TIR17B01	TANK TEMP RISER 17B, LVL 4"	TCR17B01	High Temp Abort 17B01	278
TIR17B02	TANK TEMP RISER 17B, LVL 16"	TCR17B02	High Temp Abort 17B02	279
TIR17B03	TANK TEMP RISER 17B, LVL 28"	TCR17B03	High Temp Abort 17B03	280
TIR17B04	TANK TEMP RISER 17B, LVL 52"	TCR17B04	High Temp Abort 17B04	281
TIR17B05	TANK TEMP RISER 17B, LVL 76"	TCR17B05	High Temp Abort 17B05	282
TIR17B06	TANK TEMP RISER 17B, LVL 100"	TCR17B06	High Temp Abort 17B06	283
TIR17B07	TANK TEMP RISER 17B, LVL 112"	TCR17B07	High Temp Abort 17B07	284
TIR17B08	TANK TEMP RISER 17B, LVL 124"	TCR17B08	High Temp Abort 17B08	285
TIR17B09	TANK TEMP RISER 17B, LVL 148"	TCR17B09	High Temp Abort 17B09	286
TIR17B10	TANK TEMP RISER 17B, LVL 172"	TCR17B10	High Temp Abort 17B10	287
TIR17B11	TANK TEMP RISER 17B, LVL 196"	TCR17B11	High Temp Abort 17B11	288
TIR17B12	TANK TEMP RISER 17B, LVL 208"	TCR17B12	High Temp Abort 17B12	289
TIR17B13	TANK TEMP RISER 17B, LVL 220"	TCR17B13	High Temp Abort 17B13	290
TIR17B14	TANK TEMP RISER 17B, LVL 232"	TCR17B14	High Temp Abort 17B14	291
TIR17B15	TANK TEMP RISER 17B, LVL 244"	TCR17B15	High Temp Abort 17B15	292
TIR17B16	TANK TEMP RISER 17B, LVL 268"	TCR17B16	High Temp Abort 17B16	293
TIR17B17	TANK TEMP RISER 17B, LVL 292"	TCR17B17	High Temp Abort 17B17	294

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DACS Tag	DACS Description	Modicon Tag	MODICON Coil Description	Coil No.
TIR17B18	TANK TEMP RISER 17B, LVL 326"	TCR17B18	High Temp Abort 17B18	295
TIR17B19	TANK TEMP RISER 17B, LVL 340"	TCR17B19	High Temp Abort 17B19	296
TIR17B20	TANK TEMP RISER 17B, LVL 364"	TCR17B20	High Temp Abort 17B20	297
TIR17B21	TANK TEMP RISER 17B, LVL 392"	TCR17B21	High Temp Abort 17B21	298
TIR17B22	TANK TEMP RISER 17B, LVL 402"	TCR17B22	High Temp Abort 17B22	299
VR232040	PUMP MOTOR CURRENT	VC232040	High Pump Motor Current Abort	325
VR232050	PUMP SPEED	VC232050	High Pump Motor Speed Abort	326
WIR12A01	PUMP SUPPORT COLUMN STRAIN #1	WCR12A01	High Pump Column Strain Abort 1	313
		WLR12A01	Low 12A-1 Strain Abort	256
WIR12A02	PUMP SUPPORT COLUMN STRAIN #2	WCR12A02	High Pump Column Strain Abort 2	314
		WLR12A02	Low 12A-2 Strain Abort	262
WIR12A03	PUMP SUPPORT COLUMN STRAIN #3	WCR12A03	High Pump Column Strain Abort 3	315
		WLR12A03	Low 12A-3 Strain Abort	263
WIR12A04	PUMP SUPPORT COLUMN STRAIN #4	WCR12A04	High Pump Column Strain Abort 4	316
		WLR12A04	Low 12A-4 Strain Abort	331

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DACS Tag	DACS Description	Modicon Tag	MODICON Coil Description	Coil No.
WIR17C01	STRAIN GAUGE R17C AT LVL	WCR17C01	High MIT 17C Column Strain Abort 1	323
		WLR17C01	Low 17C-1 Strain Abort	339
WIR17C02	STRAIN GAUGE R17C AT LVL	WCR17C02	High MIT 17C Column Strain Abort 2	324
		WLR17C02	Low 17C-2 Strain Abort	340
WIR17B01	STRAIN GAUGE RISER 17B AT LVL	WCR17B01	High MIT Column Strain Abort 1	318
		WLR17B01	Low 17B-1 Strain Abort	332
WIR17B02	STRAIN GAUGE RISER 17B AT LVL	WCR17B02	High MIT Column Strain Abort 2	319
		WLR17B02	Low 17B-2 Strain Abort	333
WIR1BA01	STRAIN GAUGE 1B, LVL 530"	WCR1BA01	High VDTT Column 1B Strain Abort 1	320
		WLR1BA01	Low 1B-1 Strain Abort	334
WIR1BA02	STRAIN GAUGE RISER 1B AT 530"	WCR1BA02	High 1B-2 Strain Abort	337
		WLR1BA02	Low 1B-2 Strain Abort	335
WIR1BA03	STRAIN GAUGE 1B, LVL 530"	WCR1BA03	High VDTT Column 1B Strain Abort 2	321
		WLR1BA03	Low 1B-3 Strain Abort	336
ZIMPE142	MIXER PUMP COLUMN GAS PRESSURE	ZLMPE142	Low Pump Column Gas Pressure Abort	341

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PRE-PROGRAMMED MIXER PUMP PARAMETERS

APPENDIX D

Appendix D, Pre-Programmed Mixer Pump Parameters

TEST	ANGLE	SPEED	DURATION	DESCRIPTION
1.0	28°	1000	5 MIN	BUMP AT 28 DEG
2.0	65°	1000	5 MIN	BUMP AT 65 DEG
3.0	97°	1000	5 MIN	BUMP AT 97 DEG
4.0	125°	1000	5 MIN	BUMP AT 125 DEG
5.0	155°	1000	5 MIN	BUMP AT 155 DEG
6.0	185°	1000	5 MIN	BUMP AT 185 DEG
7.0	28°	750	1 HR	1 HR RUN AT 28 DEG
8.0	65°	750	1 HR	1 HR RUN AT 65 DEG
9.0	97°	750	1 HR	1 HR RUN AT 97 DEG
10.0	125°	750	1 HR	1 HR RUN AT 125 DEG
11.0	155°	750	1 HR	1 HR RUN AT 155 DEG
12.0	185°	750	1 HR	1 HR RUN AT 185 DEG
13.0	28°	750	30 MIN	TANK SWEEP AT 28 DEG
14.0	65°	750	30 MIN	TANK SWEEP AT 65 DEG
15.0	97°	750	30 MIN	TANK SWEEP AT 97 DEG
16.0	125°	750	30 MIN	TANK SWEEP AT 125 DEG
17.0	155°	750	30 MIN	TANK SWEEP AT 155 DEG
18.0	185°	750	30 MIN	TANK SWEEP AT 185 DEG

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PRE-PROGRAMMED MIXER PUMP PARAMETERS

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TEST	ANGLE	SPEED	DURATION	DESCRIPTION
19.0	28°	1000	25 MIN	25 MIN EXCAV, 28 DEG
20.0	65°	1000	25 MIN	25 MIN EXCAV, 65 DEG
21.0	97°	1000	25 MIN	25 MIN EXCAV, 97 DEG
22.0	125°	1000	25 MIN	25 MIN EXCAV, 125 DEG
23.0	155°	1000	25 MIN	25 MIN EXCAV, 155 DEG
24.0	185°	1000	25 MIN	25 MIN EXCAV, 185 DEG
25.0	28°	920	40 MIN	40 MIN EXCAV, 28 DEG
26.0	65°	920	40 MIN	40 MIN EXCAV, 65 DEG
27.0	97°	920	40 MIN	40 MIN EXCAV, 97 DEG
28.0	125°	920	40 MIN	40 MIN EXCAV, 125 DEG
29.0	155°	920	40 MIN	40 MIN EXCAV, 155 DEG
30.0	185°	920	40 MIN	40 MIN EXCAV, 185 DEG

Test Description: _____ DATE: _____

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