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242-A MCS LOGIC ACCEPTANCE TEST REPORT FOR YEAR 2000 UPGRADE

M.C. TEATS

WASTE MANAGEMENT HANFORD, Richland, WA 99352
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Abstract: This report documents the acceptance test results for the 242-A Evaporator distributive control system upgrade to D/3 version 9.0-2 for year 2000 compliance. Testing was performed per test procedure HNF-3568. There were no unresolved exceptions. The system responded correctly to all testing and meets the requirements to operate the 242-A Evaporator facility.

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1/19/99
Date

Approved for Public Release

**242-A MCS LOGIC
ACCEPTANCE TEST REPORT
FOR YEAR 2000 UPGRADE**

TABLE OF CONTENTS

ACCEPTANCE TEST REPORT SUMMARY	4
1.0 INTRODUCTION	5
2.0 TEST PLAN	5
2.1 TEST PERSONNEL AND RESPONSIBILITIES	5
2.2 TEST METHODS	5
3.0 TEST PROCEDURE	6
3.1 ALARM PROGRAM TESTING	6
3.1.1 SEQUENCE ALARM PROGRAM TEST DATA SHEET	7
3.1.2 C ALARM PROGRAM TEST DATA SHEET	8
3.2 MISCELLANEOUS C PROGRAM TESTING	9
3.2.1 MISCELLANEOUS C PROGRAM TEST DATA SHEET	9
3.3 DEVICE LOGIC TESTING	10
3.3.1 PCM0 DEVICE DESCRIPTIONS AND DATA SHEETS	11
0I0M1S20N	12
0I0M1S44N	14
0I0M1S60N	16
0M1M2P11S	18
0M2M1S11S	25
0M2M1S77S	27
0V0M1S11N	29
0V1M0S22	31
0V1M1S00N	33
0V2M1R55S	35
0V2M1S00N	37
0V2M1S44S	39
0XALMSUMP	41
0XBASPUMP	43
0XBOTDUMP	45
0XEA1ILK2	47
0XEC2S3D1	49
0XEXHDCD1	51
0XEXC1ILK	52
0XFVEA1D1	55
0XGBIT0S1	57
0XHVCA1D1	58
0XHVCA1D5	60
0XHVCA1D6	62
0XJGVALVE	64
0XMDPC100	66
0XMDPC106	68
0XPADSPRY	70
0XPB1BYPA	72
0XPB1PUMP	74

0XPB1WFIL	75
0XPB2PUMP	78
0XPB2SFIL	79
0XPB2WFIL	82
0XRC1DPIG	84
0XRC1SAMP	86
0XRC2DPIG	88
0XRC2SAMP	90
0XRC3DPIG	92
0XRC3SAMP	94
0XSELECDI	96
0XSELECTI	97
0XSELECWF	98
0XSLFLUSH	100
0XSWAPUMP	102
0XVCA1ILK	105
0XVSTATCO	107
0XVSTATRW	109
0XVSTATNB	111
0XVSTATSL	112
 4.0 TEST EXCEPTIONS	 113
 5.0 REFERENCES	 114
 6.0 INDEX TO DEVICES	 115
 APPENDIX A	 117
FIGURE 1. TEST EXCEPTION LOG SHEET	118

ACCEPTANCE TEST REPORT SUMMARY

This test was performed per HNF-3568, 242-A MCS LOGIC ACCEPTANCE TEST PROCEDURE FOR YEAR 2000 UPGRADE. The test was performed in Baltimore, MD, at the factory of the control system supplier. The test was conducted using a simulation database, where software addresses to hardwired input signals were modified to accept simulated inputs.

As the test was performed, displays that showed the information necessary to verify the test results were brought to the screen of the operator workstation. When the results were verified, the appropriate verification blocks on the test data sheets contained herein were initialed. After all the required information on each test data sheet was verified, the test data sheet was then signed and dated.

There were no exceptions exposed during testing that could not be resolved or explained. There were three exceptions (see page 118) that were the direct result of testing with a simulation database. Each exception involved the Device FAULT bit. When the real hardware input addresses were used instead of the simulated inputs, the FAULT bit operated normally. Therefore, these exceptions are accepted as-is. Otherwise, the system, logic, batch programs, and C-language programs responded correctly to all testing and meets the requirements to operate the 242-A Evaporator facility.

ACCEPTANCE TEST REPORT APPROVALS:

MC Galt
MCS Cognizant Engineer

DATE: 1/5/99

W. J. Hall
Cog Engineering Manager

DATE: 1-5-99

109 DKK S
Operations

DATE: 1/15/99 1/18/99

M. J. Wom
Quality Assurance

DATE: 1/11/99

1.0 INTRODUCTION

The 242-A Evaporator Monitor and Control System (MCS) is being upgraded to meet Year 2000 requirements. This software Acceptance Test Report (ATR) documents validation of the evaporator logic and other applications for the MCS. A separate test procedure (Reference 1) will be performed to verify Year 2000 compliance.

2.0 TEST PLAN

This ATP was performed at the factory of the control system manufacturer and/or at the 242-A Evaporator Building. After testing at the factory, the new equipment provided by the upgrade project will be moved to the 242-A Evaporator Building for installation. The ability to conduct this ATP at the factory depends on the vendor providing the necessary hardware, primarily Process Control Modules (PCMs). In the event the vendor is unable to provide the necessary equipment, the ATP may be completed after the MCS is moved and installed at the 242-A Evaporator Building.

The test data sheets containing the results of the testing are documented herein.

2.1 TEST PERSONNEL AND RESPONSIBILITIES

The cognizant engineering manager shall appoint a test coordinator and test performers for the duration of the ATP. The test coordinator shall be responsible for scheduling the various parts of the test and notifying participants when testing will commence. Test performers will be responsible for performing the test and recording the test results on the data sheets.

The test coordinator and test performers will be individuals who are knowledgeable of the MCS. The test coordinator and performers shall have a working knowledge of various system operations including the operator console keyboard, and the software utilities and editors that are used to construct the application databases, programs, and displays. Performance of this test also requires knowledge of how logic devices function, including their interactions.

2.2 TEST METHODS

Testing will be performed using a computer simulation of the process or by actual operation of plant equipment. In either case, the logic will be functionally tested for correctness of operation.

Section 3 contains the specific tests to be performed and the associated data sheets. With few exceptions, the order in which the tests are performed is unimportant. Each section also provides specific details regarding the testing methods to be employed.

3.0 TEST PROCEDURE

3.1 ALARM PROGRAM TESTING

Field input signals are distributed between 26 sequence units. For each unit there is one sequence program that processes the alarms. One or more alarms for each unit will be tripped to verify proper operation of the sequence program, several C programs, the annunciator lamp, acknowledgement, and clearing of alarms.

Each sequence program and supporting C programs (DOG0A, DOG0B, DOG1A, or DOG1B; and WATCH) will be tested by generating one alarm in each sequence unit to verify the following features:

- Lamp blinks on alarm
- Selecting lamp button displays correct graphic
- Flashing alarm message displayed in graphic
- Acknowledging the alarm makes the message go steady in graphic
- Acknowledging the alarm makes the lamp go steady
- Acknowledging the alarm makes other flashing alarm indications go steady (P lists, faceplates)
- Clearing of alarm makes graphic message disappear or turn to normal color (such as green)
- Clearing of alarm makes lamp turn off (if no other alarms in the sequence unit), or
- Clearing of alarm has no effect on lamp (if other alarms are active in the sequence unit)

Sequence programs that perform other functions such as EPN on/off (TAG), time for inhibit program (INHA), and time for program status (PGM0A, PGM1A) will be verified by viewing their respective graphic displays for correctness of information.

3.1.1 SEQUENCE ALARM PROGRAM TEST DATA SHEET

SABL PROGRAM NAME	PROGRAM VERIFIED
224BATCH	MT 12/19/98
244HVAC	MT 12/19/98
WSTXFR	MT 12/19/98
350BATCH	MT 12/19/98
FEEDBATCH	MT 12/19/98
CA1BATCH	MT 12/19/98
PB1BATCH	MT 12/19/98
PB2BATCH	MT 12/19/98
EA1BATCH	MT 12/19/98
EC1BATCH	MT 12/19/98
RWBATCH	MT 12/19/98
URWBATCH	MT 12/19/98
VENTBATCH	MT 12/19/98
PCBATCH	MT 12/19/98
IXBATCH	MT 12/19/98
SCBATCH	MT 12/19/98
BASINBAT	MT 12/19/98
UTILBATCH	MT 12/19/98
AMUBATCH	MT 12/19/98
LERFBATCH	MT 12/19/98
CASSBATCH	MT 12/19/98
TAG	MT 12/18/98
TIMEINHA	MT 12/18/98
PGM0A	MT 12/18/98
WHITE1	MT 12/18/98 *
ANBATCH	MT 12/19/98
APBATCH	MT 12/19/98
AWBATCH	MT 12/19/98
XYZBATCH	MT 12/19/98
242BATCH	MT 12/19/98
PGM1A	MT 12/19/98

TESTED BY M. Leats DATE 12/19/98

* 10 sec for skid to light up
 15 sec for white skid

3.1.2 C ALARM PROGRAM TEST DATA SHEET

C PROGRAM NAME	PROGRAM(S) VERIFIED
DOG0A, DOG0B, DOG1A, or DOG1B	12/19/98 MT
WATCH	12/19/98 MT

TESTED BY M. Seale DATE 12/19/98

3.2 MISCELLANEOUS C PROGRAM TESTING

The following C programs will be functionally tested.

<u>C PROGRAM NAME</u>	<u>FUNCTIONAL DESCRIPTION</u>
FQIRESET	Automatically Resets Totalizers
INHA	Generates List Of Inhibited Alarms For Graphics
UKF14	Regenerates All Alarms For P1 & P2 Summaries
UKF34	Removes Inhibits From 242-A Alarms For Startup
UKF43	Inhibits 242-A Alarms For Shutdown
BALANCE	Performs 242-A Building Material Balance
TFBAL	Performs Tank Farm Transfer Balance

3.2.1 MISCELLANEOUS C PROGRAM TEST DATA SHEET

<u>C PROGRAM NAME</u>	<u>PROGRAM VERIFIED</u>
INHA	12/18/98 MT
UKF14	12/18/98 MT
UKF34	12/19/98 MT
UKF43	12/19/98 MT
BALANCE	12/21/98 MT
TFBAL	12/22/98 MT
FQIRESET	12/18/98 MT

TESTED BY

M. Deats

DATE

12/22/98

MT
12/18/98

3.3 DEVICE LOGIC TESTING

In the MCS database, a "master device" is a unique set of interconnected logic blocks such as AND, OR, NOT, and time delays. Each application of the master device to specific equipment is a device. Devices do not contain logic elements, but are linked to master device logic. Interlocks that are specific to a device are linked to the master device by assignment of input addresses in the device. A device is also linked to field equipment by assignment of input and output addresses. Verification of all software input and output addresses was completed in previous acceptance tests (References 2, 3) and operability tests (Reference 4) and shall not be duplicated in this ATP. The purpose of the logic testing in this ATP is to verify that new vendor software obtained by the MCS upgrade has not changed the way the logic works.

This does not mean that all logic must be tested. In fact, the philosophy of this ATP is not to conduct 100% testing of the logic, but to spot check logic for proper operation. If each of the basic logic elements function correctly, then all logic can be declared valid. This eliminates the need to test all of the logic, such as logic for the Tank Farm equipment. It also eliminates the need to test every interlock in a given device. In cases where there are multiple interlocks in a device, only one interlock needs to be triggered to observe the correct logic response.

Any number of devices may share the same master device logic. For this reason, it is not necessary to test every device that shares a common master device to validate the logic for the master device. However, if interlocks are involved, then at least one of the interlocks to a device must be tested. Examples of devices that share the same master device logic and do not contain interlocks are the steam condensate basin valves, which share master device 0V1M1S00N.

All device logic is documented in the H-2-99949 drawing series. This test document contains the information necessary to verify the operation of the devices. The software (code) for the devices determines their configuration at the time of testing. Changes to the code will be controlled after testing commences and documented by Engineering Change Notice.

Test data sheets for devices are contained in this section of the ATP. Each device also has a functional description including the commands and statuses in the operator displays and keyboard. For all discrete inputs the expected interlock or active state ("0" or "1") is specified. A "0" is the absence of a simulated signal or absence of voltage. A "1" is the presence of a simulated signal or presence of voltage at the input. For analog signals the interlock or active level is given in engineering units. The analog faceplate display indicates the current value in engineering units. When this measured value exceeds the limit, the interlock must activate.

The devices can be tested in any order, however, since some devices interact with others, they must be tested simultaneously. It will be the responsibility of the test performer to anticipate these interactions and order the testing accordingly. These interactions are listed on the data sheets as inputs and/or outputs.

3.3.1 PCM0 DEVICE DESCRIPTIONS AND DATA SHEETS

This section contains the device descriptions and data sheets for devices in PCM0. They are presented in alphabetical order by master device name. An index by device name can be found at the end of this ATP.

MASTER DEVICE 010M1S20N

DEV(S): EA1-INLK1

DRAWING: H-2-99949 SHT 12

DESCRIPTION: This device is used to bypass the recirculation line high and low flow interlocks to the reboiler steam/air valve (FV-EA1-1).

COMMANDS:

C0 NOBYPASS: Turns off the bypass condition.

C1 BYPASS: Turns on the bypass condition.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has two interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NOBYPASS: Not in bypass.

S1 BYPASS: Bypass condition is on.

S5 INTERLOK: High or Low flow condition (interlocks steam in Device FV-EA1-1 unless in BYPASS).

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: EA1-INLK1

INTERLOCKS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
FI-CA1-3	270	Recirculation Line Flow Hi
FI-CA1-3	40	Recirculation Line Flow Lo

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G7	0/1	Passes Interlock Condition to FV-EA1-1

MT Verify that any one of the interlocks are passed to FV-EA1-1 when not bypassed.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition.

TESTED BY M. Galt DATE 12/19/98

MASTER DEVICE 010M1S44N

DEV(S): PC-INLK1

DRAWING: H-2-99949 SHT 22

DESCRIPTION: This device is used to bypass up to four interlocks that are passed to another device. It also monitors a hardware bypass switch and goes to the BYPASS state whenever the switch is in bypass. When the hardware switch is moved from bypass to normal, the device is placed in NOBYPASS status, however, it can be returned to BYPASS using the C1 command.

COMMANDS:

C0 NOBYPASS: Puts the device into NOBYPASS status unless the hardware bypass switch is in the bypass position.

C1 BYPASS: Puts the device into BYPASS status.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has four interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NOBYPASS: Not in bypass.

S1 BYPASS: Bypass condition is on.

S5 INTERLOK: An interlock condition exists and is being passed to another device unless in BYPASS.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: PC-INLK1

INTERLOCKS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
RI-RC3-1	45	Process Condensate Rad Hi
RI-CA1-1	8000	Process Condensate Line Rad Hi
RSH-RC3-1	"0"	Process Condensate Rad Hi
RSH-CA1-1	"0"	Process Condensate Line Rad Hi

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G13	0/1	Passes Interlock Condition to P-C100

MT Verify that any one of the interlocks are passed to P-C100 when not bypassed.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition.

TESTED BY M. Seato DATE 12/19/98

MASTER DEVICE 010M1S60N

DEV(S): PC-INLK2

DRAWING: H-2-99949 SHT 22

DESCRIPTION: This device is used to pass interlocks to device P-C100. There are no bypasses or commands. *

COMMANDS: None.

AUTO/MAN: None.

INTERLOCKS: This device has several interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S5 INTERLOCK: An interlock condition exists and is being passed to another device unless in BYPASS.

FAULT: Not used on this device.

INTERLOCKS

OUTPUTS

NT Verify that any one of the interlocks are passed to P-C100 when not bypassed.

N/A Verify that command 0 turns off the bypass condition. — No bypasses or commands
MT 12/19/98 are programmed. (see p16)

N/A Verify that command 1 turns on the bypass condition.

TESTED BY M. J. S. DATE 12/19/98

MASTER DEVICE 0M1M2P11S

DEV(S): A-E-101 P-E-101 A-E-102 P-E-102 A-E-104 P-E-104

DRAWING: H-2-99949 SHTS 31, 32, 33, 34, 35, and 36

DESCRIPTION: Controls the operation of a motor with contact confirm. Two pulsed outputs are used - one for START and one for STOP. This master device is used for motors that have a remote manual start/stop station.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device has one interlock. When active, the interlock will cause the stop output to remain open continuously thereby preventing manual starting of the motor.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or current.

S1 CF-ON: Running as confirmed by the motor contactor and current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device (remote stop). If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact is still present.

S7 STARTING: The motor has been commanded to start but the contact confirm has not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: A-E-101

INTERLOCKS: A-E-101 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFI-E101	25	Eluant Tank WF Lo

CONFIRMS:

EPN	VALUE	DESCRIPTION
YS-A-E101	"1"	Confirm on

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

FAULT OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. Skates DATE 12/19/98

TEST DATA SHEET

DEVICE: P-E-101

INTERLOCKS: P-E-101 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFI-E101	15	Eluant Tank WF Lo-Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-P-E101	"1"	Confirm on

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

☒ FAULT ☐ OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 0 turns off the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

TESTED BY M. J. [Signature] DATE 12/19/98

TEST DATA SHEET

DEVICE: A-E-102

INTERLOCKS: A-E-102 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFI-E102	12	Anti-Foam Tank WF Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-A-E102	"1"	Confirm on

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

FAULT OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 0 turns off the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

TESTED BY M Deato DATE 12/19/98

TEST DATA SHEET

DEVICE: P-E-102

INTERLOCKS: P-E-102 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFI-E102	5	Anti-Foam Tank WF Lo-Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-P-E102	"1"	Confirm on

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

FAULT OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 0 turns off the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

TESTED BY M. Deitz DATE 12/19/98

TEST DATA SHEET

DEVICE: A-E-104

INTERLOCKS: A-E-104 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFI-E104	12	Decon Tank WF Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-A-E104	"1"	Confirm on

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

FAULT OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. Seeto DATE 12/19/98

TEST DATA SHEET

DEVICE: P-E-104

INTERLOCKS: P-E-104 Stops and will not start on interlock

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
WFI-E104	5	Decon Tank WF Lo-Lo

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
YS-P-E104	"1"	Confirm on

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

FAULT OVERRIDE N/A

TEST EXCEPTION #3

OTHER TESTS OR EXPLANATION:

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. Gents DATE 12/19/98

MASTER DEVICE 0M2M1S11S

DEV(S): A-C100

DRAWING: H-2-99949 SHTS 23 and 42

DESCRIPTION: Controls the operation of a motor with both current and contact confirm. This master device has one interlock.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device has one interlock.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: A-C100

INTERLOCKS: A-C100 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFIC-C100	27	TK-C-100 WF Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
II-A-C100	3	Motor Current Confirm
YS-A-C100	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

FAULT **OVERRIDE** N/A

T.E. #3

12/19/98

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. Seatz DATE 12/19/98

MASTER DEVICE 0M2M1S77S

DEV(S): P-AW-102

DRAWING: H-2-99949 SHT 37

DESCRIPTION: Controls the operation of a motor with both current and contact confirm. This master device has up to seven interlocks.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device can have up to seven interlocks. These devices all have hardwired interlocks also.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: P-AW-102

INTERLOCKS: P-AW-102 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
LI-CA1-1	65.8	Evaporator Level #1 Hi
LI-CA1-2	65.45	Evaporator Level #2 Hi
RI-CA1-1	8000	PC Line Rad Hi
PDI-CA1-1	4.5	Lower De-Entrainment DP Hi
PDI-CA1-2	4.5	Upper De-Entrainment DP Hi
YSAW102IL	"0"	Hardwired Interlock Status
\$G14	"0"	Interlock from EX-C-1

CONFIRMS

EPN	VALUE	DESCRIPTION
II-AW-102	5	Motor Current Confirm
YS-AW102	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

FAULT OVERRIDE N/A

TE 43

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. Geste DATE 12/19/98

MASTER DEVICE 0V0M1S11N

DEV(S): TV-DSH1/2

DRAWING: H-2-99949 SHT 13

DESCRIPTION: This device controls a two-position valve with no limit switch confirmation for either position.

COMMANDS:

C0 CLOSE: Closes the valve.

C1 OPEN: Opens the valve.

AUTO/MAN: Auto locks out all commands. Device should always be in MANUAL.

INTERLOCKS: This device has one interlock. When steam valve FV-EA1-1 is closed, it forces TV-DSH-1/2 to close also. This interlock is also hardwired.

OVERRIDE: Not used in this device.

STATUSES:

S0 CLOSED: Valve has been commanded to close (no confirmation).

S1 OPEN: Valve has been commanded to open (no confirmation).

S5 INTERLOK: An interlock is present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: TV-DSH1/2

INTERLOCKS: TV-DSH1/2 Closes on interlock and will not Open.

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-EA1-C	"1"	Steam valve FV-EA1-1 Closed

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Open TV-DSH1/2

MT Verify that the interlock closes valve and prevents opening of valve.MT Verify that command 0 closes valve.MT Verify that command 1 opens valve.TESTED BY M. Galt DATE 12/19/98

MASTER DEVICE 0V1M0S22

DEV(s): HV-CA1-10

DRAWING: H-2-99949 SHT 55.

DESCRIPTION: Valve controller with two confirms on position, manual operation only, no local control, one output, standard state, two interlocks.

COMMANDS:

C0 CLOSE: Positions valve to filtered raw water (FRW).

C1 OPEN: Positions valve to recycle process condensate (PC).

C2 CS-RESET: Resets the CHGSTATE status and causes the FRW (\$C0) command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device has two interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirm to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-FRW: Set to FRW as confirmed by analog ZI-CA1-10.

S1 CF-PC: Set to PC-recycle as confirmed by analog ZI-CA1-10.

S2 CS-RESET: Temporary status during resetting of the CHGSTATE status.

S4 CHGSTATE: The valve went to FRW as determined by the CF-PC confirm without being commanded to do so. This could be due to an interlock or some undetected abnormality. If no interlock is present, attempting to reposition the valve may result in a FAULT condition.

S5 INTERLOK: An interlock is present which prevents closing the valve.

S6 TRVLTORW: Status when the device has been commanded to FRW but the full-FRW confirmation has not been received yet.

S7 TRVLTOPC: Status when the device has been commanded to PC but the full-PC confirmation has not been received yet.

FAULT: The device will fault when the open/closed status does not agree with the command (after appropriate delay). The fault alarm can be cleared with OVERRIDE.

TEST DATA SHEET

DEVICE: HV-CA1-10

INTERLOCKS: HV-CA1-10 positions to FRW and will not go to the PC position on interlock.

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
PI-CA1-20	75	P-C106 discharge pressure Lo
P-C106	\$G23 (0)	P-C106 shutdown

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZI-CA1-10	10	\$T30 Confirm Closed
ZI-CA1-10	90	\$T31 Confirm Open

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT0	NO	To PC recycle (1) / To FRW(0)

MT Verify that interlock positions valve to FRW.MT Verify that command 0 positions to filtered raw water.MT Verify that command 1 opens positions to condensate recycle.TESTED BY M. Gato DATE 12/19/98

MASTER DEVICE 0V1M1S00N

DEV(s): HV-SC-1A HV-SC-2A HV-SC-3A HV-SC-1B HV-SC-2B HV-SC-3B

DRAWING: H-2-99949 SHTS 25, 26, 28, and 29.

DESCRIPTION: Valve controller with confirm on close, manual operation only, no local control, one output, standard state, no interlocks.

COMMANDS:

C0 CLOSE: Closes valve.

C1 OPEN: Opens valve.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device has no interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirm to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-CLOSD: Closed as confirmed by limit switch.

S1 OPEN: Valve is open or partially open. Only the closed position can be confirmed by the limit switch since the switch opens when the valve begins to open.

S6 CLOSING: Valve has been commanded to close but the confirm has not been received yet.

FAULT: The device will fault when the open/closed status does not agree with the command (after appropriate delay). The fault alarm can be cleared by going to OVERRIDE. The FAULT condition has a 30-second timer instead of the usual five seconds since this is a MOV and has travel time.

TEST DATA SHEET

DEVICE: HV-SC-1A, HV-SC-2A, HV-SC-3A, HV-SC-1B, HV-SC-2B, or HV-SC-3B

CONFIRMS

For Device	EPN	VALUE	DESCRIPTION
HV-SC-1A	ZS-SC-1FC	"1"	Confirm Closed
HV-SC-2A	ZS-SC-2FC	"1"	Confirm Closed
HV-SC-3A	ZS-SC-3FC	"1"	Confirm Closed
HV-SC-1B	ZS-SC-1DC	"1"	Confirm Closed
HV-SC-2B	ZS-SC-2DC	"1"	Confirm Closed
HV-SC-3B	ZS-SC-3DC	"1"	Confirm Closed

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Opens valve

FAULT MT OVERRIDE MT T.E.#2

Override does clear FAULT.

MT Verify that command 0 closes valve.

MT Verify that command 1 opens valve.

TESTED BY M. Galt DATE 12/19/98

MASTER DEVICE 0V2M1R55S

DEV(S): HV-EC1-1

DRAWING: H-2-99949 SHT 5

DESCRIPTION: This master device controls a valve with both full-open and full-closed limit switch confirmation. On interlock occurrence, this valve will open (fail-open).

COMMANDS:

C0 CLOSE: Closes the valve provided no interlock is present.

C1 OPEN: Opens the valve.

C2 CS-RESET: Resets the CHGSTATE status and causes the OPEN command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This master device has five interlocks. Activation of any one or more of the interlocks will cause the valve to open. One of the five interlocks is passed from EX-C-1 via Global Bit G14. This device also has hardwired interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-CLOSD: Closed as confirmed by the full-closed limit switch.

S1 CF-OPEN: Open as confirmed by the full-open limit switch.

S2 CS-RESET: Temporary status during resetting of the CHGSTATE status.

S4 CHGSTATE: The valve opened as determined by the CF-OPEN confirm without being commanded to do so. This could be due to an interlock or some undetected abnormality. If no interlock is present, attempting to CLOSE the valve may result in a FAULT condition.

S5 INTERLOK: An interlock is present which prevents closing the valve.

S6 CLOSING: Status when the device has been commanded to CLOSE but the full-closed confirmation has not been received yet.

S7 OPENING: Status when the device has been commanded to OPEN but the full-open confirmation has not been received yet.

FAULT: The device will FAULT when the CF-OPEN or CF-CLOSD confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE (Override Key) which causes the confirms to be ignored.

TEST DATA SHEET

DEVICE: HV-EC1-1

INTERLOCKS: HV-EC1-1 Opens on interlock and can not be closed.

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
PDI-CA1-1	4.5	Evap Lower De-Entrainment DP Hi
PDI-CA1-2	4.5	Evap Upper De-Entrainment DP Hi
PDSH-CA1	"0"	Evap Lower De-Entrainment DP Hi
\$G2	"0"	PB-1 Off or not Bypassed
\$G14	"0"	Vessel Vent Interlocks

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-EC1-1N	"1"	Confirm Open
ZS-EC1-1C	"1"	Confirm Closed

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT0	NO	Close Valve

MT Verify that command 0 closes valve.MT Verify that command 1 opens valve.MT Verify that command 2 resets the CHGSTATE status.

TESTED BY

M. Feats

DATE

12/12/98

MASTER DEVICE 0V2M1S00N

DEV(S): HV-SUMP-1

DRAWING: H-2-99949 SHT 16

DESCRIPTION: This master device controls a valve with both full-open and full-closed limit switch confirmation.

COMMANDS:

C0 CLOSE: Closes the valve.

C1 OPEN: Opens the valve.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This master device has no interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-CLOSD: Closed as confirmed by the full-closed limit switch.

S1 CF-OPEN: Open as confirmed by the full-open limit switch.

S6 CLOSING: Status when the device has been commanded to CLOSE but the full-closed confirmation has not been received yet.

S7 OPENING: Status when the device has been commanded to OPEN but the full-open confirmation has not been received yet.

FAULT: The device will FAULT when the CF-OPEN or CF-CLOSD confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE. When in OVERRIDE the confirms are ignored.

TEST DATA SHEET

DEVICE: HV-SUMP-1

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-SUMP1C	"1"	Confirm Closed
ZS-SUMP1N	"1"	Confirm Open

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Opens valve

MT Verify that command 0 closes valve.MT Verify that command 1 opens valve.TESTED BY M. Geats DATE 12/19/98

MASTER DEVICE 0V2M1S44S

DEV(S): HV-EA1-2 HV-RC1-3 HV-RC3-3

DRAWING: H-2-99949 SHTS 17, 18

DESCRIPTION: This master device controls a two position valve with limit switch confirmation for both positions (DIVERT and NORMAL). On interlock occurrence, this valve will go to the Divert position (fail-divert).

COMMANDS:

C0 DIVERT: Commands the valve to go to the DIVERT position.

C1 NORMAL: Commands the valve to go to the NORMAL position provided there is no interlock.

C2 CS-RESET: Resets the change-of-state status (CHGSTATE) and causes the DIVERT command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This master device has up to four interlocks any one of which will cause the valve to go to DIVERT when activated. Interlocks are also hardwired.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-DVRT: In DIVERT position as confirmed by the limit switch.

S1 CF-NORM: In NORMAL position as confirmed by the limit switch.

S2 CS-RESET: Temporary status during resetting of the CHGSTATE status.

S4 CHGSTATE: The valve went to DIVERT position as determined by the limit switch without being commanded to do so. This could be due to an interlock or some undetected abnormality. If no interlock is present, attempting to change the valve to NORMAL may result in a FAULT condition.

S5 INTERLOK: An interlock is present which forces the valve to DIVERT.

S6 TRVLNGTD: Status when the device has been commanded to DIVERT but the limit switch confirmation has not been received yet.

S7 TRVLNGTN: Status when the device has been commanded to NORMAL but the limit switch confirmation has not been received yet.

FAULT: The device will FAULT when the NORMAL or DIVERT confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE (Override Key). When in OVERRIDE confirms are ignored.

TEST DATA SHEET

DEVICE: HV-EA1-2, HV-RC1-3, or HV-RC3-3

INTERLOCKS: HV-EA1-2 goes to the Divert position on interlock.

EPN	VALUE	DESCRIPTION	FOR DEVICES
RI-RC1-1	80	Steam Condensate Rad Hi	HV-EA1-2, HV-RC1-3
RI-EA1-1	750	Steam Condensate Line Rad Hi	HV-EA1-2
RSH-RC1-1	"0"	Steam Condensate Rad Hi	HV-EA1-2, HV-RC1-3
RSH-EA1-1	"0"	Steam Condensate Line Rad Hi	HV-EA1-2
RI-RC3-1	45	Process Condensate Rad Hi	HV-RC3-3
RSH-RC3-1	"0"	Process Condensate Rad Hi	HV-RC3-3

CONFIRMS

EPN	VALUE	DESCRIPTION	FOR DEVICES
ZS-EA1-2D	"1"	Confirm Divert	HV-EA1-2
ZS-EA12NM	"1"	Confirm Normal	HV-EA1-2
ZS-RC1-3D	"1"	Confirm Divert	HV-RC1-3
ZS-RC13NM	"1"	Confirm Normal	HV-RC1-3
ZS-RC3-3D	"1"	Confirm Divert	HV-RC3-3
ZS-RC33NM	"1"	Confirm Normal	HV-RC3-3

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Moves Valve to Normal position

MT Verify that command 0 positions the valve to divert.

MT Verify that command 1 positions the valve to normal.

MT Verify that interlock diverts the valve.

MT Verify that command 2 resets the CHGSTATE status.

TESTED BY M. Dents DATE 12/18/98

MASTER DEVICE 0XALMSUMP

DEV(S): P-207A-S

DRAWING: H-2-99949 SHT 23

DESCRIPTION: This device is used to provide an alarm if the 207-A Building sump level is high and the sump pump does not turn on.

COMMANDS:

C0 RES OFF: Command issued by the device after SA-RESET. Not used by the operator.

C1: This is a legal command, but does not affect the device.

C2 SA-RESET: Resets the sump alarm and is followed by the RES OFF command.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used and has no effect on the device.

STATUSES:

S0 NORMAL: Indicates that there is no alarm condition associated with the sump pump.

S2 SA-RESET: Temporary status during resetting of the SUMP ALM.

S5 HI&P OFF: Status indicating that the sump level is high and the sump pump is not operating. The high sump level signal is delayed for 10 seconds before the alarm is generated to allow the pump to come on.

S6 SUMP ALM: Indicates the alarm status for the above condition.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: P-207A-S

OTHER

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
LSH-P-1	"0"	207-A Building Sump Level Hi
YS-P1-1	"0"	Pump 207-A-P1 Not Running

OTHER TESTS OR EXPLANATION:

The SUMP ALM status (\$S6) is a non-critical alarm (yellow). It clears after the SA-RESET command is issued.

MT Verify the sump alarm and reset.

TESTED BY

M. G. Galt

DATE

12/19/98

MASTER DEVICE 0XBASPUMP

DEV(S): 207-A-P3

DRAWING: H-2-99949 SHTS 27 and 30

DESCRIPTION: Controls the operation of a motor with both current and contact confirm.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device has interlocks that are hardwired and are monitored by YS-PCP2(SCP3)-IL. In addition, an interlock occurs when any one of the basin levels is low and the associated drain valve is open. This condition is delayed by one minute to allow time for the valves to close.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or current.

S1 CF-ON: Running as confirmed by the motor contactor and current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: 207-A-P3

INTERLOCKS: 207-A-P3 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
ZS-SC-1DC	"0"	Valve HV-SC-1B Open
LSL-SC-1	"0"	Basin #1 Level Lo
ZS-SC-2DC	"0"	Valve HV-SC-2B Open
LSL-SC-2	"0"	Basin #2 Level Lo
ZS-SC-3DC	"0"	Valve HV-SC-3B Open
LSL-SC-3	"0"	Basin #3 Level Lo
YS-SCP3IL	"0"	Hardwired Interlock Active

CONFIRMS

EPN	VALUE	DESCRIPTION
II-SC-P3	1	Motor Current Confirm
YS-SC-P3	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

FAULT OVERRIDE NA

TEST EXCEPTION #3

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 0 turns off the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

TESTED BY M. DeLo DATE 12/19/98

MASTER DEVICE 0XBOTDUMP**DEV(S):** BOT-DUMP**DRAWING:** H-2-99949 SHT 15

DESCRIPTION: This device is used to control the dumping of the pot as well as flushing the pot and dump lines. When bypass goes to active (from PB1-BYPAS), the valves will be placed in the BLOCK position. On loss of bypass, a 30 second POT FLUSH will occur and then the valves will be placed in the DUMP position. The operator may select the BLOCK, DUMP, or LINEFLSH positions whenever the bypass is active. On selection of POT FLUSH, the pot is flushed for 30 seconds and the valves revert to the DUMP position.

COMMANDS:

C0 BLOCK: Valves HV-CA1-7, 8, and 9 are placed in the BLOCK position (7 and 9 closed, 8 open).
C1 DUMP: Valves HV-CA1-7, 8 and 9 are placed in the DUMP position (7 and 9 open, 8 closed).
C2 POT FLSH: Valves HV-CA1-7, 8, and 9 are placed in the POT FLUSH position (7 and 8 open, 9 closed).
C3 LINEFLSH: Valves HV-CA1-7, 8, and 9 are placed in the LINEFLSH position (8 and 9 open, 7 closed).

AUTO/MAN: Device should always be in MANUAL.

INTERLOCKS: No interlocks on this device.

OVERRIDE: Not used on this device.

STATUSES:

S0 BLOCK: Valves HV-CA1-7, 8, and 9 are in the BLOCK position (7 and 9 closed, 8 open).
S1 DUMP: Valves HV-CA1-7, 8 and 9 are in the DUMP position (7 and 9 open, 8 closed).
S2 POT FLSH: Valves HV-CA1-7, 8, and 9 are in the POT FLUSH position (7 and 8 open, 9 closed).
S3 LINEFLSH: Valves HV-CA1-7, 8, and 9 are in the DUMP FLUSH position (8 and 9 open, 7 closed).

FAULT: Not used by this device.

TEST DATA SHEET

DEVICE: BOT-DUMP

OTHER

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G2	"0"	PB-1 off or not in Bypass

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT7	NO	Close (1) HV-CA1-7
?OUT8	NO	Open (1) HV-CA1-8
?OUT9	NO	Close (1) HV-CA1-9

MT Verify that when PB1 is running that the valves are positioned to BLOCK.

MT Verify that command 0 or PB1-BYPAS "BYPASS" positions the valves to BLOCK.

MT Verify that command 1 positions the valves to DUMP.

MT Verify that command 2 positions the valves to POTFLSH.

MT Verify that command 3 positions the valves to LINEFLSH.

TESTED BY M Jett DATE 12/19/98

MASTER DEVICE 0XEA1ILK2

DEV(S): EA1-INLK2

DRAWING: H-2-99949 SHT 12

DESCRIPTION: This device is used to bypass the Reboiler low pressure and low steam flow interlocks to the Reboiler steam valve (FV-EA1-1).

COMMANDS:

C0 NOBYPASS: Turns off the bypass condition.

C1 BYPASS: Turns on the bypass condition.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has two interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NOBYPASS: Not in bypass.

S1 BYPASS: Bypass condition is on.

S5 INTERLOK: Interlocks are present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: EA1-INLK2

INTERLOCKS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
PI-EA1-1	17.2	Reboiler Pressure Low
FIC-EA1-1	3000	Reboiler Steam Flow Low

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G12	0/1	Passes Interlock Condition to FV-EA1-1

MT Verify that the interlocks, such as low steam flow, are passed to FV-EA1-1 when not bypassed. In this case, \$G12 should be zero.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition (\$G12 = 1).

TESTED BY M. Seato DATE 12/19/98

MASTER DEVICE 0XEC2S3D1**DEV(S):** HVEC2/3-1**DRAWING:** H-2-99949 SHT 5

DESCRIPTION: This master device controls a valve with both full-open and full-closed limit switch confirmation. On interlock occurrence, this valve will close (fail-close).

COMMANDS:**C0 CLOSE:** Closes the valve.**C1 OPEN:** Opens the valve provided no interlock is present.**C2 CS-RESET:** Resets the change-of-state status (CHGSTATE) and causes the CLOSE command to follow. If this status is alarmed, it will clear the alarm.**AUTO/MAN:** AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has two interlocks, one of which is delayed by 255 seconds. This delayed interlock will close HVEC2/3-1 if valve HV-EC1-1 is in the "not closed" state for 255 seconds. The other interlock is passed from EX-C-1 via Global Bit G14. In addition there are hardwired interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:**S0 CF-CLOSD:** Closed as confirmed by the full-closed limit switch.**S1 CF-OPEN:** Open as confirmed by the full-open limit switch.**S2 CS-RESET:** Temporary status during resetting of the CHGSTATE status.

S4 CHGSTATE: The valve closed as determined by the CF-CLOSD confirm without being commanded to do so. This could be due to an interlock or some undetected abnormality. If no interlock is present, attempting to OPEN the valve may result in a FAULT condition.

S5 INTERLOK: An interlock is present which prevents opening the valve.

S6 CLOSING: Status when the device has been commanded to CLOSE but the full-closed confirmation has not been received yet.

S7 OPENING: Status when the device has been commanded to OPEN but the full-open confirmation has not been received yet.

FAULT: The device will FAULT when the CF-OPEN or CF-CLOSD confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE. When in OVERRIDE the confirms are ignored.

TEST DATA SHEET

DEVICE: HVEC2/3-1

INTERLOCKS: HVEC2/3 Closed on interlock.

EPN	VALUE	DESCRIPTION
ZS-EC1-1C	"0"	Valve HV-EC1-1 not Closed
\$G14	"0"	Vessel Vent Interlocks

CONFIRMS

EPN	VALUE	DESCRIPTION
ZSEC2/31C	"1"	Confirm Closed
ZSEC2/31N	"1"	Confirm Open

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Opens valve.

MT Verify that command 0 closes the valve.MT Verify that command 1 opens the valve.MT Verify that interlock closes the valve.MT Verify that command 2 resets the CHGSTATE status.TESTED BY M. Deeks DATE 12/19/98

MASTER DEVICE 0XEXHDCD1

DEV(S): EX-C-1

DRAWING: H-2-99949 SHT 24

DESCRIPTION: Controls the operation of a motor with contact confirm. Two pulsed outputs are used - one for START and one for STOP. This master device is used for motors that have a remote manual start/stop station and a Remote/Local switch.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN/LOC: Auto locks out all commands. Device should always be in Manual. When the Remote/Local switch is in the Local position, the motor can only be started from the local start/stop station.

INTERLOCKS: This master device has one interlock (Global bit 19 from VCA1-INLK). When active, the interlock will stop the motor and cause the stop output to remain open continuously thereby preventing manual starting of the motor.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or current.

S1 CF-ON: Running as confirmed by the motor contactor and current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device (remote stop). If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and current are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirm have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

MASTER DEVICE 0XEXC1ILK

DEV(S): EXC1-INLK

DRAWING: H-2-99949 SHT 24

DESCRIPTION: This device is used to pass the Vessel Vent interlocks to the exhauster control device EX-C-1.

COMMANDS: None

AUTO/MAN: No effect.

INTERLOCKS: This device has six interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NORMAL: No interlock is activated.

S5 INTERLOK: One or more of the six interlocks is activated.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: EX-C-1

INTERLOCKS: EX-C-1 Stops and will not start on interlock.

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G19	"0"	Interlocks Passed from EXC1-INLK

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
II-EXC-1	1	Current Confirm
YS-EXC-1	"1"	Contact Confirm

OTHER

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
YS-EXC3RL	"0"	EX-C-1 in Local Control Mode

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Start Pulse
?OUT0	NC	Stop Pulse

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.MT Verify that the motor can not be started from the keyboard when in LOCAL.TESTED BY M. J. [Signature] DATE 12/19/98

TEST DATA SHEET

DEVICE: EXC1-INLK

INTERLOCKS

EPN	VALUE	DESCRIPTION
RI-VVB/G	2000	Vessel Vent B/G Rad Hi
PDI-FC5-1	4	FC-1 Filter DP Hi
PDI-FC5-2	3	FC-2 Filter DP Hi
RSH-VVB/G	"0"	Vessel Vent B/G Rad Hi
PDSH-FC51	"0"	FC-1 Filter DP Hi
PDI-FC512	5	Vessel Vent Overall DP Hi

OUTPUTS

DESTN	VALUE	DESCRIPTION
\$G19	"0"	Combined Interlock Status.

MT Verify that INTERLOCK status is back-lit when interlock is tripped.

TESTED BY M Seals DATE 12/19/98

MT Verify interlock shuts down vessel vent, and
 12/19/98 cascades interlock to:

P-AW-102

UCAI-INLK

FV-EA1-1

HV-EC1-1

HVEC2/3-1

MASTER DEVICE 0XFVEA1D1

DEV(S): FV-EA1-1

DRAWING: H-2-99949 SHT 12

DESCRIPTION: This device controls the operation of the air/steam to the Reboiler. A steam permissive signal is sent to the steam controller PIC-EA1-1 whenever the AIR OFF command is active and reboiler pressure drops below the lower limit as determined by PI-EA1-1. The permissive is removed whenever the steam valve closes or when the AIR OFF is activated and the reboiler pressure is high.

COMMANDS:

C0 AIR OFF: Causes the air valve to turn off and permits the steam valve to be turned on (opens solenoid valve between controller PIC-EA1-1 and steam valve FV-EA1-1) provided there are no interlocks.

C1 AIR ON: Opens air valve HV-EA1-3 and closes steam valve PV-EA1-1.

AUTO: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has numerous software and hardwired interlocks. On occurrence of an interlock, the air is turned on and the steam is turned off. Some of the interlocks can be bypassed using Devices EA1-INLK1 and EA1-INLK2. See descriptions of these devices for details of their operation.

OVERRIDE: Not used on this device.

STATUSES:

S0 AIR OFF: Air off. Steam can be turned on with a software permissive to the steam controller PIC-EA1-1.

S1 AIR ON: Air on and steam off.

S2 STM PRM: Air off and software permissive to steam controller (Reboiler pressure no longer high).

S5 INTERLOCK: An interlock is present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: FV-EA1-1

INTERLOCKS: Will go to AIR ON status when any one or more of the interlocks is present.

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
TI-DSH-3	250	Reboiler Steam Inlet Temp Hi
RI-CA1-1	8000	PC Line Rad Hi
PI-CA1-11	20	Evaporator Pressure Hi
RI-RC1-1	80	Steam Condensate Rad Hi
RI-EA1-1	750	Steam Condensate Line Rad Hi
YS-PB1-1	"0"	PB-1 off
RSH-CA1-1	"0"	PC Line Rad Hi
PSH-CA111	"0"	Evaporator Pressure Hi
RSH-RC1-1	"0"	Steam Condensate Rad Hi
RSH-EA1-1	"0"	Steam Condensate Line Rad Hi
TSH-DSH-3	"0"	Desuperheater Outlet Temp Hi-Hi
ZS-EC1-C	"0"	Vacuum Breaker Valve Not Closed
\$G7	"0"	Interlocks from EA1-INLK1
\$G12	"0"	Interlocks from EA1-INLK2
\$G14	"0"	Interlocks from Vessel Vent

OTHER

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
PI-EA1-1	29.7	Reboiler Pressure Hi
ZS-EA1-C	"1"	Steam Valve FV-EA1-1 Closed

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT0	NO	Close Air Valve and Open Steam Valve
\$T16	"1"	Steam Permissive to FIC-EA1-1

MT Verify that command 0 turns air off.MT Verify that command 1 turns air on.MT Verify that the Steam Permissive is "0" when in AIR OFF status and Reboiler Pressure is high.MT Verify that the Steam Permissive is "1" when in AIR OFF status and Reboiler Pressure returns to normal (not high).TESTED BY M. Quate DATE 12/19/98

MASTER DEVICE 0XGBIT0S1

DEV(S): GBIT0-0/1

DRAWING: H-2-99949 SHT 4

DESCRIPTION: This device provides a constant logic 0 (\$G0) and a constant logic 1 (\$G1) for use in PCM0 devices (1XGBIT0S1 does the same for PCM1). They are typically used to provide a fixed input to an unused logic gate. In some cases this allows the use of the same master device for more than one device.

COMMANDS:

C0 NORMAL: The device is always forced to this command.

AUTO/MAN: Has no affect on the operation of this device.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used on this device.

STATUSES: None

FAULT: Not used on this master device.

TEST DATA SHEET

DEVICE: GBIT0-0/1

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G0	"0"	Should always be logic "0"
\$G1	"1"	Should always be logic "1"

OTHER EXPLANATION:

These can be verified by looking on the Loop Maintenance Display for the value of \$T1 which is equal to \$G1 and for the value of \$T2 which is equal to the value of \$G0.

MI Verify the values of \$G0 and \$G1 are correct.

TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XHVCA1D1

DEV(S): HV-CA1-1

DRAWING: H-2-99949 SHT 6

DESCRIPTION: This master device controls a valve with both full-open and full-closed limit switch confirmation. On interlock occurrence, this valve will close (fail-close).

COMMANDS:

C0 CLOSE: Closes the valve.

C1 OPEN: Opens the valve provided no interlock is present.

C2 CS-RESET: Resets the change-of-state status (CHGSTATE) and causes the CLOSE command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This master device has three interlocks that will cause the valve to close when activated. One of the interlocks (P-AW-102 shutdown) causes HV-CA1-1 to close on shutdown of P-AW-102, however, HV-CA1-1 can be opened again. Device HV-CA1-1 is linked to Device VCA1-INLK via a global bit (G10). Device VCA1-INLK has multiple interlock inputs that are passed to HV-CA1-1 through this global bit. See the description for VCA1-INLK.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-CLOSD: Closed as confirmed by the full-closed limit switch.

S1 CF-OPEN: Open as confirmed by the full-open limit switch.

S6 CLOSING: Status when the device has been commanded to CLOSE but the full-closed confirmation has not been received yet.

S7 OPENING: Status when the device has been commanded to OPEN but the full-open confirmation has not been received yet.

S5 INTERLOK: An interlock is present which prevents opening the valve.

S4 CHGSTATE: The valve closed as determined by the CF-CLOSD confirm without being commanded to do so. This could be due to an interlock or some undetected abnormality. If no interlock is present, attempting to OPEN the valve may result in a FAULT condition.

S2 CS-RESET: Temporary status during resetting of the CHGSTATE status.

FAULT: The device will FAULT when the CF-OPEN or CF-CLOSD confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE. When in OVERRIDE the confirms are ignored.

TEST DATA SHEET

DEVICE: HV-CA1-1

INTERLOCKS: Any one or more of the interlocks will cause HV-CA1-1 to close. Interlocks \$G2 and \$G10 also prevent the opening of HV-CA1-1.

EPN	VALUE	DESCRIPTION
YS-PAW102	"0"	Pump P-AW-102 off
\$G2	"0"	PB-1 off or not Bypassed
\$G10	"0"	Combined Interlocks from VCA1-INLK

CONFIRMS

EPN	VALUE	DESCRIPTION
ZS-CA1-1C	"1"	Confirm Closed
ZS-CA1-1N	"1"	Confirm Open

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Opens Valve

MT Verify that command 0 closes the valve.

MT Verify that command 1 opens the valve.

MT Verify that interlock closes the valve.

MT Verify that command 2 resets the CHGSTATE status.

TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XHVCA1D5

DEV(S): HV-CA1-5

DRAWING: H-2-99949 SHT 7

DESCRIPTION: This device controls a two-position valve with limit switch confirmation for both positions.

COMMANDS:

C0 NOZZLE 4: Moves the valve to the Nozzle 4 position.

C1 NOZZLE 5: Moves the valve to the Nozzle 5 Position.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has no interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-NOZ 4: Valve is in the Nozzle 4 position as confirmed by the limit switch.

S1 CF-NOZ 5: Valve is in the Nozzle 5 position as confirmed by the limit switch.

S6 TRVLNGT4: Valve is traveling to Position 4.

S7 TRVLNGT5: Valve is traveling to Position 5.

FAULT: Not used on this master device.

TEST DATA SHEET

DEVICE: HV-CA1-5

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-CA1-54	"1"	Confirm Nozzle 4 Position
ZS-CA1-55	"1"	Confirm Nozzle 5 Position

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Puts valve in Nozzle 5 Position

MT Verify that command 0 closes the valve. (TO AW-B PIT) MT 12/19/98

MT Verify that command 1 opens the valve. (TO AW-A PIT) MT 12/19/98

TESTED BY M. Galt DATE 12/19/98

MASTER DEVICE 0XHVCA1D6

DEV(S): HV-CA1-6

DRAWING: H-2-99949 SHT 14

DESCRIPTION: This master device controls a valve with both full-open and full-closed limit switch confirmation. In addition, the valve is opened automatically whenever the slurry flush is active (Global bit 3).

COMMANDS:

C0 CLOSE: Closes the valve provided the slurry flush is not active.

C1 OPEN: Opens the valve.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This master device has no interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-CLOSD: Closed as confirmed by the full-closed limit switch.

S1 CF-OPEN: Open as confirmed by the full-open limit switch.

S6 CLOSING: Status when the device has been commanded to CLOSE but the full-closed confirmation has not been received yet.

S7 OPENING: Status when the device has been commanded to OPEN but the full-open confirmation has not been received yet.

FAULT: The device will FAULT when the CF-OPEN or CF-CLOSD confirm is not received within a specified time after the command is issued. The FAULT can be cleared by going to OVERRIDE. When in OVERRIDE the confirms are ignored.

TEST DATA SHEET

DEVICE: HV-CA1-6

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-CA1-6N	"1"	Confirm Open
ZS-CA1-6C	"1"	Confirm Closed

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT0	NO	Closes valve

MT Verify that command 0 closes the valve.MT Verify that command 1 opens the valve.TESTED BY M. Gato DATE 12/19/98

MASTER DEVICE 0XJGVALVE

DEV(S): JGV-SUMP

DRAWING: H-2-99949 SHT 16

DESCRIPTION: This device is used to control a steam jet or jet gang valve.

COMMANDS:

C0 STOP: Stops the jet. Always followed by 60 seconds of air blow.

C1 START: Starts the jet. Will continue until stopped.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used in this device.

STATUSES:

S0 OFF: No steam or air.

S1 ON: Jet is on (steam).

S2 AIR BLOW: Air purge for 60 seconds after turning off.

S3 ON 8MIN+: This will be the status if the jet is left ON for 8.5 minutes. The jet will remain ON but will indicate this status.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: JGV-SUMP

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUTB	NO	On during Jet and 60 sec Air Blow
?OUTS	NO	On during Jet (Steam)

MT Verify that command 1 starts the jet.N/A Verify that a non-critical alarm is generated if the jet is on for more than 8.5 minutes.MT Verify that command 0 stops the jet.TESTED BY M. Scats DATE 12/19/98

MASTER DEVICE 0XMDPC100

DEV(S): P-C100

DRAWING: H-2-99949 SHT 22

DESCRIPTION: Controls the operation of a motor with both current and contact confirm. This master device has up to seven interlocks.

COMMANDS:

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This master device can have up to seven interlocks. These devices all have hardwired interlocks also.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: P-C100

INTERLOCKS: P-C100 Stops and will not start on interlock.

DESTN	VALUE	DESCRIPTION
\$G13	0/1	From PC-INLK1 interlocks
\$G20	0/1	From LERFILK interlocks
\$G22	0/1	From PC-INLK2 interlocks

CONFIRMS

EPN	VALUE	DESCRIPTION
II-P-C100	2	Motor Current Confirm
YS-P-C100	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

FAULT OVERRIDE NA

TEST EXCEPTION 3

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor. *to proper destination (LERF), MT*MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M Teat DATE 12/19/98MT Verify command starts to divert when HVRC33 diverted. *MT 12/19/98*MT Verify pump will not start to wrong destination. *MT 12/19/98*

MASTER DEVICE 0XMDPC106**DEV(S):** P-C106**DRAWING:** H-2-99949 SHT 55**DESCRIPTION:** Controls the operation of a motor with both current and contact confirm. This master device has four interlocks.**COMMANDS:**

C0 STOP: Stops the motor.

C1 START: Starts the motor provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.**INTERLOCKS:** This master device has four interlocks.**OVERRIDE:** OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.**STATUSES:**

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the motor may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: P-C106

INTERLOCKS: P-C106 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
WFIC-C100	27	Tank C-100 weight factor Lo
PDI-FC4/5	20	F-C-4/5 filter differential pressure Hi
RSH-RC3-1	"0"	Process condensate radiation Hi
RSH-CA1-1	"0"	Process condensate line radiation Hi

CONFIRMS

EPN	VALUE	DESCRIPTION
II-P-C106	1	Motor Current Confirm
YS-P-C106	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT0	NO	Motor Start(1)/Stop(0)

FAULT _____ OVERRIDE N/A

TEST EXCEPTION #3

MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 0 turns off the motor.MT Verify that command 1 turns on the motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY M. J. J. J. DATE 12/19/98

MASTER DEVICE 0XPADSPRY

DEV(S): HV-PDSPRY

DRAWING: H-2-99949 SHT 15

DESCRIPTION: This device is used to control the sequencing of the pad spray valves. When the device is started the valves will sequence, opening for 15 seconds each. The sequence order is 10, 11, 12, 13, and back to 10.

COMMANDS:

C0 STOP: Closes all pad spray valves.

C1 START10: Initiates pad spray sequence with valve CA1-10.

C2 START11: Initiates pad spray sequence with valve CA1-11.

C3 START12: Initiates pad spray sequence with valve CA1-12.

C4 START13: Initiates pad spray sequence with valve CA1-13.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: No interlocks on this device.

OVERRIDE: Not used. Has no effect on the device.

STATUSES:

S0 STOPPED: No pad spray valves open.

S1 CA1-10: Valve CA1-10 open.

S2 CA1-11: Valve CA1-11 open.

S3 CA1-12: Valve CA1-12 open.

S4 CA1-13: Valve CA1-13 open.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: HV-PDSPRY

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT10	NO	Open Valve CA1-10
?OUT11	NO	Open Valve CA1-11
?OUT12	NO	Open Valve CA1-12
?OUT13	NO	Open Valve CA1-13

MT Verify that command 1 starts the sequence.MT Verify that sequences cycle through all valves.MT Verify that command 0 stops the sequence.TESTED BY M. Gato DATE 12/19/98

MASTER DEVICE 0XPB1BYPA**DEV(S):** PB1-BYPAS**DRAWING:** H-2-99949 SHT 8

DESCRIPTION: This device is used to bypass the PB-1 shutdown status. Whenever PB-1 is on (as determined by the contactor YS-PB-1), this device will be in PB1 ON status and the interlock to other devices will be inhibited. Whenever PB-1 shuts off, this device will go to TIME BYP status and will continue to inhibit the interlock until Timer KY-PB1-1 times out. After KY-PB1-1 times out, this device will go to BYP OFF and the interlock will be activated. The interlocks can be inhibited by going to BYP ON (Command #1). The device will remain in BYP ON until turned off (Command #0) or until PB-1 starts. When in BYP OFF the device activates interlocks to:

1. Open the vacuum breaker valve HV-EC1-1,
2. Close feed valve HV-CA1-1.
3. Causes a 30-second POT FLSH by Device BOT-DUMP.

COMMANDS:

C0 BYPA OFF: Activates the interlock condition. Cannot be placed in this status unless PB-1 is not running.

C1 BYPA ON: Inhibits the interlock condition. Cannot be placed in this status unless PB-1 is not running.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used and has no effect on the device.

STATUSES:

S0 BYPA OFF: PB-1 is off and interlocks to other devices are active.

S1 BYPA ON: PB-1 is off and interlocks to other devices are inhibited.

S2 PB1 ON: PB-1 is on and interlocks to other devices are inhibited.

S3 TIME BYP: PB-1 is off and timer KY-PB1-1 has not timed out. Interlocks to other devices are inhibited.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: PB1-BYPAS

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G2	"1"	Bypass Permissive to other devices

MT Verify that command 0 activates the interlock condition with the motor off.

MT Verify that command 1 turns on the bypass.

TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XPB1PUMP

DEV(S): PB-1

DRAWING: H-2-99949 SHT 9

DESCRIPTION: Controls the operation of PB-1 and associated interlocks. This device has both current and contact confirm.

COMMANDS:

C0 STOP: Stops PB-1.

C1 START: Starts PB-1 provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

C3 JOG: Jogs PB-1 for 5 seconds provided no interlock is present. All interlocks except seal water pressure and flow can be bypassed in order to jog the pump.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: Seal water pressure and flow (PI-CA1-9 and (FI-CA1-1) and high motor current (II-PB1-1) have no bypass and will shut PB-1 down. The weight factor interlocks from Device PB1WFINLK can be bypassed (see description of PB1WFINLK).

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S3 CF-JOING: Jogging as confirmed by the motor contactor.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the pump may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor was commanded to stop but the motor confirms are still present.

S7 STARTING: The motor was commanded to start but the confirms have not been received yet.

FAULT: The device will fault when it does not start, jog, or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

MASTER DEVICE 0XPB1WFIL

DEV(S): PB1WFINLK

DRAWING: H-2-99949 SHT 9

DESCRIPTION: This device allows the weight factor interlocks for PB-1 to be bypassed provided LI-CA1-3 is not low.

COMMANDS:

C0 NOBYPASS: Places the device in NOBYPASS mode (interlocks not bypassed).

C1 BYPASS: Places the device in BYPASS mode (bypasses interlocks).

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has two interlocks (LI-CA1-1 and 2). Both interlocks must be present to shutdown PB-1. The interlocks can be bypassed provided LI-CA1-3 is not low. When LI-CA1-3 is low, the device is commanded to the NOBYPASS status.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NOBYPASS: Interlocks are not bypassed.

S1 BYPASS: Interlocks are bypassed.

S3 LI-CA1-3: LI-CA1-3 is low and interlocks are not bypassed.

S5 INTERLOK: An interlock is present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: PB-1

INTERLOCKS: PB-1 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
PI-CA1-9	35	Seal Water pressure Lo
FI-CA1-1	0.3	Seal Water flow Lo
II-PB1-1	260	Motor Current Hi-Hi (Delayed 3 sec)
\$G8	"0"	WF interlocks from PB1WFINLK

CONFIRMS

EPN	VALUE	DESCRIPTION
II-PB1-1	20	Motor Current Confirm
YS-PB1-1	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

MT Verify fault and override. EXCEPTION #1 Accept As Is

MT Verify that command 3 jogs the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 0 turns off the motor.

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

MT Verify that the SHUTDOWN status is alarmed with a non-critical (yellow) alarm.

TESTED BY M. Scott DATE 12/19/98

TEST DATA SHEET

DEVICE: PB1WFINLK

INTERLOCKS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
LI-CA1-1	33.88	Evaporator Level #1 Lo-Lo
LI-CA1-2	33.83	Evaporator Level #2 Lo-Lo

OTHER

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
LI-CA1-3	370	Level #3 Lo

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G8	0/1	Passes Interlock Condition to PB-1

MT Verify that the interlocks are passed to PB-1 when not bypassed.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition.

TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XPB2PUMP

DEV(S): PB-2

DRAWING: H-2-99949 SHT 10

DESCRIPTION: Controls the operation of PB-2 and associated interlocks. This device has both current and contact confirm.

COMMANDS:

C0 STOP: Stops PB-2.

C1 START: Starts PB-2 provided there is no interlock.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

C3 JOG: Jogs PB-2 for 5 seconds provided no interlock is present.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: PB-2 has seven interlocks connected directly to Device PB-2 with additional interlocks passed from Devices PB2SLFILK and PB2WFILNK. These interlocks can be bypassed (see descriptions for PB2WFILNK and PB2SLFILK). PB-2 also has hardwired interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor or the motor current.

S1 CF-ON: Running as confirmed by the motor contactor and the motor current.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S3 CF-JOGNG: Jogging as confirmed by the motor contactor.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor or motor current without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the pump may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor has been commanded to stop but the contact and motor current confirm are still present.

S7 STARTING: The motor has been commanded to start but the contact and current confirms have not been received yet.

FAULT: The device will fault when it does not start, jog, or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

MASTER DEVICE 0XPB2SFIL

DEV(S): PB2SLFILK

DRAWING: H-2-99949 SHT 10

DESCRIPTION: This device allows the slurry flushing interlock for PB-2 to be bypassed.

COMMANDS:

C0 NOBYPASS: Places the device in NOBYPASS mode (interlocks not bypassed).

C1 BYPASS: Places the device in BYPASS mode (bypasses interlocks).

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has one interlock that is activated whenever an evaporator flush or a farm flush is active (see Device HV-CA1-2).

OVERRIDE: OVERRIDE (Override Key) has no effect on this device.

STATUSES:

S0 NOBYPASS: Interlocks are not bypassed.

S1 BYPASS: Interlocks are bypassed.

S5 INTERLOK: An interlock is present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: PB-2

INTERLOCKS: PB-2 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
PI-CA1-10	70	Seal Water pressure Lo
FI-CA1-2	0.95	Seal Water flow Lo
PI-CA1-8	170	Slurry Outlet Pressure Hi
PSH-CA1-3	"0"	Slurry Outlet Pressure Hi
TSH-PB2-1	"0"	Pump Temp Hi
YS-PB2-IL	"0"	Hardwired Interlocks Active
PSH-PB2-1	"0"	Rupture Disk Broken
\$G9	"0"	WF interlocks from PB2WFINLK
\$G11	"0"	Interlocks from PB2SLFILK

CONFIRMS

EPN	VALUE	DESCRIPTION
II-PB2-1	10	Motor Current Confirm
YS-PB2-1	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)

____ Verify fault and override.

TEST EXCEPTION #3

MT Verify that command 3 jogs the motor.

MT Verify that command 1 turns on the motor.

MT Verify that command 0 turns off the motor.

MT Verify that the interlock stops motor and prevents starting of motor.

MT Verify that command 2 resets the shutdown of the motor following interlock.

TESTED BY

M. J. Jett

DATE

12/19/98

TEST DATA SHEET

DEVICE: PB2SLFILK

INTERLOCKS

<u>SOURCE</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G4	"0"	Slurry Flush Active

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G11	0/1	Passes Interlock Condition to PB-2

MT Verify that the interlocks are passed to PB-2 when not bypassed.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition.

TESTED BY M. Gault DATE 12/19/98

MASTER DEVICE 0XPB2WFIL

DEV(S): PB2WFINLK

DRAWING: H-2-99949 SHT 10

DESCRIPTION: This device allows the weight factor interlocks for PB-2 to be bypassed.

COMMANDS:

C0 NOBYPASS: Places the device in NOBYPASS mode (interlocks not bypassed).

C1 BYPASS: Places the device in BYPASS mode (bypasses interlocks).

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: This device has two interlocks (LI-CA1-1 and 2). Both interlocks must be present to shutdown PB-2.

OVERRIDE: OVERRIDE (Override Key) has no effect on this device.

STATUSES:

S0 NOBYPASS: Interlocks are not bypassed.

S1 BYPASS: Interlocks are bypassed.

S5 INTERLOK: An interlock is present.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: PB2WFINLK

INTERLOCKS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
LI-CA1-1	33.88	Evaporator Level #1 Lo-Lo
LI-CA1-2	33.83	Evaporator Level #2 Lo-Lo

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$G9	0/1	Passes Interlock Condition to PB-2

MT Verify that the interlocks are passed to PB-2 when not bypassed.

MT Verify that command 0 turns off the bypass condition.

MT Verify that command 1 turns on the bypass condition.

TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XRC1DPIG**DEV(S):** RC1-PIG**DRAWING:** H-2-99949 SHT 19

DESCRIPTION: This master device controls the sample flow through the radiation monitoring pig for the RC1 sampling system. Timer KY-RC1-1 causes the pig sample stream to be periodically diverted and drained. If NO VENT is selected, the funnel valve is not opened during the divert/drain period (4 min 15 sec). If AUTOVENT is selected, the funnel valve will be opened during this time. Whenever PIG FLISH is selected, the device immediately goes to the Divert, Vent, and Drain valve positions and remains there until NO VENT or AUTOVENT is again selected. On occurrence of a radiation interlock, the valves revert to their normal position regardless of which command is selected. The radiation interlock can be bypassed using HS-RC1-6.

COMMANDS:

C0 NO VENT: Causes the funnel valve to remain closed during diversion.

C1 AUTOVENT: Causes the funnel valve to open during diversion.

C2 PIG FLISH: Causes the valves to Divert, Vent, and Drain (no interlock).

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: Two radiation interlocks prohibit sample diversion. These interlocks are also hardwired.

OVERRIDE: Not used.

STATUSES:

S0 NO VENT: Indicates the NO VENT command is selected.

S1 AUTOVENT: Indicates the AUTOVENT command is selected.

S2 PIG FLISH: Indicates that the PIG FLISH command is selected and the valves are in the Divert, Vent, and Drain position (unless interlocked).

S3 DI/DRAIN: The valves are placed in the Divert and Drain position, but the funnel valve remains closed (no confirms).

S4 DI/VN/DR: The valves are placed in the Divert, Vent, and Drain position.

S5 INTERLOK: Indicates the presence of an interlock.

S6 LOW FLOW: Indicates the existence of low flow to the sample pig. The low flow is inhibited during the timed diversion and for 75 sec after return to normal and for 5.5 min during pig flush. The low flow alarm is sent to Device CASS0AL2B for output to CASS.

S7 BYPASS Interlocks are bypassed.

FAULT: Not used.

TEST DATA SHEET

DEVICE: RC1-PIG

INTERLOCKS: When an interlock is present, RC1-PIG can not be diverted unless the hardwired bypass switch (HS-RC1-6) is in the bypass position.

EPN	VALUE	DESCRIPTION
RI-RC1-1	80	Steam Condensate Sampler Rad Hi
RSH-RC1-1	"0"	Steam Condensate Sampler Rad Hi

OTHER

EPN	VALUE	DESCRIPTION
YS-RC1-6	"1"	Bypass switch in Bypass Position
FSL-RC1-1	"0"	Monitor Low Flow Indication

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUTDV	NO	Output to Divert Valve HV-RC1-1
?OUTDR	NO	Output to Drain Valve HV-RC1-2
?OUTF	NO	Output to Funnel Valve HV-RC1-4
\$G18	"0"	Low Flow to CASS0AL2B

MT Verify command 0 puts the device in NO VENT.

MT Verify command 1 puts the device in AUTOVENT.

MT Verify command 2 puts the device in PIG FLSH.

MT Verify that a low flow non-critical (yellow) alarm is generated when the device is in PIG FLSH for longer than 5.5 minutes and the flow is low. *START 13:29:00*

MT Verify that when the device is not in PIG FLSH or diverted by Timer KY-RC1-1, a low flow generates the alarm immediately.

MT Verify that when RC1-SAMP is on, Timer KY-RC1-1 causes periodic flushing of the sample pig as determined by the timer set point.

TESTED BY

M. Deato

DATE

12/19/98

MASTER DEVICE 0XRC1SAMP**DEV(S):** RC1-SAMP**DRAWING:** H-2-99949 SHT 19

DESCRIPTION: Controls the operation of Pump P-RC1-1 and Sampler RC1. When the sample pump is on, a signal is sent to the analog database to meter flow for proportional sampling. A signal is returned from the analog database each time a set number of gallons has been metered. This causes RC1-SAMP to pulse the sampler.

COMMANDS:

C0 STOP: Stops the pump and sends a signal to the analog database to stop metering flow for proportional sampling. Also stops Timer KY-RC1-1.

C1 START: Starts the pump provided there is no interlock. Starts Timer KY-RC1-1. Also sends a signal to the analog database to begin metering flow for proportional sampling.

C2 SD-RESET: Resets the SHUTDOWN status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

C3 P-RC1-1: Starts the pump P-RC1-1 and timer KY-RC1-1, but prevents sampling.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: One interlock (TK-C-103 level low) will turn off the pump and the RC1 sampling system.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor.

S1 CF-ON: Running as confirmed by the motor contactor.

S2 SD-RESET: Temporary status during resetting of the SHUTDOWN status.

S3 P-RC1-1: KY-RC1-1 running, pump P-RC1-1 running, but sampler not being pulsed.

S4 SHUTDOWN: The motor has stopped as confirmed by the contactor without being commanded to stop. This could be due to an interlock (as indicated by the INTERLOK status) or due to some abnormal condition not monitored by the device. If no interlock is present after SHUTDOWN, attempting to restart the pump may result in a FAULT condition.

S5 INTERLOK: Indicates an interlock condition is present.

S6 STOPPING: The motor was commanded to stop but the contact confirm is still present.

S7 STARTING: The motor was commanded to start but contact confirm has not been received yet.

FAULT: The device will fault when it does not start or stop within the allowable time period after the associated command is issued. The FAULT condition can be cleared by going to OVERRIDE (Override Key).

TEST DATA SHEET

DEVICE: RC1-SAMP

INTERLOCKS: P-RC1-1 Stops and will not start on interlock.

EPN	VALUE	DESCRIPTION
LSL-RC1-1	"0"	TK-C-103 Level Lo

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-P-RC1	"1"	Motor Contact Confirm

OTHER

SOURCE	VALUE	DESCRIPTION
\$T21	"1"	Signal to pulse Steam Condensate Sampler

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)
?OUT2	NO	Output to RC1 Sampler
\$G15	"1"	Permissive to start KY-RC1-1

MT Verify that command 1 starts the motor.MT Verify that command 0 stops the motor.MT Verify that command 3 starts the motor.MT Verify that the interlock stops motor and prevents starting of motor.MT Verify that command 2 resets the shutdown of the motor following interlock.TESTED BY MT DATE 12/19/98

MASTER DEVICE 0XRC2DPIG**DEV(S):** RC2-PIG**DRAWING:** H-2-99949 SHT 20

DESCRIPTION: This master device controls the sample flow through the radiation monitoring pig for the RC2 sampling system. Timer KY-RC2-1 causes the pig sample stream to be diverted and drained on a periodic basis. If NO VENT is selected, the funnel valve is not opened during the divert/drain period (4 min 15 sec). If AUTOVENT is selected, the funnel valve will be opened during this time. Whenever PIG FLSH is selected, the device immediately goes to the Divert, Vent, and Drain valve positions and remains there until NO VENT or AUTOVENT is again selected. On occurrence of a radiation interlock, the valves revert to their normal position regardless of which command is selected. The radiation interlock can be bypassed using HS-RC2-6.

COMMANDS:

C0 NO VENT: Causes the funnel valve to remain closed during diversion.

C1 AUTOVENT: Causes the funnel valve to open during diversion.

C2 PIG FLSH: Causes the valves to Divert, Vent, and Drain (no interlock).

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: Two radiation interlocks prohibit sample diversion. These interlocks are also hardwired.

OVERRIDE: Not used.

STATUSES:

S0 NO VENT: Indicates the NO VENT command is selected.

S1 AUTOVENT: Indicates the AUTOVENT command is selected.

S2 PIG FLSH: Indicates that the PIG FLSH command is selected and the valves are in the Divert, Vent, and Drain position (unless interlocked)

S3 DI/DRAIN: The valves are placed in the Divert and Drain position, but the funnel valve remains closed (no confirms).

S4 DI/VN/DR: The valves are placed in the Divert, Vent, and Drain position (no confirms).

S5 INTERLOK: Indicates the presence of an interlock.

S6 LOW FLOW: Indicates the existence of low flow to the sample pig. The low flow is inhibited during the timed diversion and for 75 sec after return to normal and for 5.5 min during pig flush.

S7 BYPASS Interlocks are bypassed.

FAULT: Not used.

TEST DATA SHEET

DEVICE: RC2-PIG

INTERLOCKS: When an interlock is present, RC2-PIG can not be diverted unless the hardwired bypass switch (HS-RC2-6) is in the bypass position.

EPN	VALUE	DESCRIPTION
RI-RC2-1	7.5	Used Raw Water Sampler Rad Hi
RSH-RC2-1	"0"	Used Raw Water Sampler Rad Hi

OTHER

EPN	VALUE	DESCRIPTION
YS-RC2-6	"1"	Bypass switch in Bypass Position
FSL-RC2-1	"0"	Monitor Low Flow Indication

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUTDV	NO	Output to Divert Valve HV-RC2-1
?OUTDR	NO	Output to Drain Valve HV-RC2-2
?OUTF	NO	Output to Funnel Valve HV-RC2-4

MT Verify command 0 puts the device in NO VENT.

MT Verify command 1 puts the device in AUTOVENT.

MT Verify command 2 puts the device in PIG FLSH.

MT Verify that a low flow non-critical (yellow) alarm is generated when the device is in PIG FLSH for longer than 5.5 minutes and the flow is low. *START 11:33:55*

MT Verify that when the device is not in PIG FLSH or diverted by Timer KY-RC2-1, a low flow generates the alarm immediately.

MT Verify that when RC2-SAMP is on, Timer KY-RC2-1 causes periodic flushing of the sample pig as determined by the timer set point.

TESTED BY

M. Gato

DATE

12/19/98

MASTER DEVICE 0XRC2SAMP

DEV(S): RC2-SAMP

DRAWING: H-2-99949 SHT 20

DESCRIPTION: Controls the operation of Valve HV-RC2-5 and Sampler RC2. When the valve is opened, a signal is sent to the analog database to meter flow for proportional sampling. A signal is returned from the analog database each time a set number of gallons has been metered. This causes RC2-SAMP to pulse the sampler.

COMMANDS:

C0 STOP: Closes (no confirm) valve HV-RC2-5 and sends a signal to the analog database to stop metering flow for proportional sampling. Also stops Timer KY-RC2-1.

C1 START: Opens (no confirm) valve HV-RC2-5. Starts Timer KY-RC2-1. Also sends a signal to the analog database to begin metering flow for proportional sampling.

C2 HV-RC2-5: Starts KY-RC2-1 and opens HV-RC2-5, but prevents sampling.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used.

STATUSES:

S0 STOPPED: Sampler not running and valve HV-RC2-5 closed.

S1 RUNNING: Running and valve HV-RC2-5 open.

S2 HV-RC2-5: KY-RC2-1 running, HV-RC2-5 open, but sampler not running.

S3 SAMPLE: Sampler is being pulsed.

S5 INTERLOK: Indicates an interlock condition, which cannot occur because the interlock inputs are all defined as \$G1 (constant logic "1"). This status is a vestige of old logic that had interlocks.

FAULT: Not used.

TEST DATA SHEET

DEVICE: RC2-SAMP

OTHER

<u>SOURCE</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$T5	"1"	Signal to pulse URW Sampler

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Output to Open HV-RC2-5
?OUT2	NO	Output to pulse URW Sampler
\$G16	"1"	Permissive to start Timer KY-RC2-1

MT Verify that command 1 starts the sampler.

MT Verify that command 0 stops the sampler.

MT Verify that command 2 starts KY-RC2-1, but does not start sampler.

TESTED BY M. Gents DATE 12/19/98

MASTER DEVICE 0XRC3DPIG**DEV(S):** RC3-PIG**DRAWING:** H-2-99949 SHT 21

DESCRIPTION: This device controls the sample flow through the radiation monitoring pigs for the RC3 sampling system. Timer KY-RC3-1 causes the pig sample stream to be diverted and drained on a periodic basis when the NO VENT command is selected. Whenever PIG FLSH is selected, the device immediately goes to the Divert and Drain valve positions and remains there until NO VENT is again selected. The funnel (vent) valve on this sample pig is not automatically controlled.

On occurrence of a radiation interlock, the valves revert to their normal position regardless of which status (NO VENT or PIG FLSH) is selected. The radiation interlock can be bypassed using HS-RC3-6.

COMMANDS:

C0 NO VENT: Causes the valves to Divert and Drain whenever the timer KY-RC3-1 activates.

C1 NO VENT: Same as C0.

C2 PIG FLSH: Causes the valves to Divert and Drain provided no interlock is present.

AUTO/MAN: AUTO locks out all commands. The device should always be in MANUAL.

INTERLOCKS: Two radiation interlocks prohibit sample diversion when the radiation is high. These interlocks are also hardwired.

OVERRIDE: Not used.

STATUSES:

S0 NO VENT: Indicates the NO VENT command is selected.

S2 PIG FLSH: Indicates that the PIG FLSH command is selected and the valves are in the Divert and Drain position (unless interlocked).

S3 DI/DRAIN: The valves are placed in the Divert and Drain position.

S5 INTERLOCK: Indicates the presence of an interlock.

S6 LOW FLOW: Indicates the existence of low flow to the sample pig. The low flow is inhibited during the timed diversion and for 75 sec after return to normal and for 5.5 min during pig flush.

S7 BYPASS Interlocks are bypassed.

FAULT: Not used.

TEST DATA SHEET

DEVICE: RC3-PIG

INTERLOCKS: When an interlock is present, RC3-PIG can not be diverted unless the hardwired bypass switch (HS-RC3-6) is in the bypass position.

EPN	VALUE	DESCRIPTION
RI-RC3-1	45	Process Condensate Sampler Rad Hi
RSH-RC3-1	"0"	Process Condensate Sampler Rad Hi

OTHER

EPN	VALUE	DESCRIPTION
YS-RC3-6	"1"	Bypass switch in Bypass Position
FSL-RC3-1	"0"	Monitor Low Flow Indication

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUTDV	NO	Output to Divert Valve HV-RC3-1

MT Verify command 0 puts the device in NO VENT.

MT Verify command 2 puts the device in PIG FLSH.

MT Verify that a low flow non-critical (yellow) alarm is generated when the device is in PIG FLSH for longer than 5.5 minutes and the flow is low. *START 13:40:05*

MT Verify that when the device is not in PIG FLSH or diverted by Timer KY-RC3-1, a low flow generates the alarm immediately.

MT Verify that when RC3-SAMP is on, Timer KY-RC3-1 causes periodic flushing of the sample pig as determined by the timer set point.

TESTED BY M. Beards DATE 12/19/98

MASTER DEVICE 0XRC3SAMP

DEV(S): RC3-SAMP

DRAWING: H-2-99949 SHT 21

DESCRIPTION: Controls the operation of Sampler RC3. When the sampler is running, a signal is sent to the analog database to meter flow for proportional sampling. A signal is returned from the analog database each time a set number of gallons has been metered. This causes RC3-SAMP to pulse the sampler.

COMMANDS:

C0 STOP: Stops the sampler and sends a signal to the analog database to stop metering flow for proportional sampling. Also stops Timer KY-RC3-1.

C1 START: Starts the sampler and sends a signal to the analog database to begin metering flow for proportional sampling. Also starts Timer KY-RC3-1.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: No interlocks.

OVERRIDE: Not used.

STATUSES:

S0 STOPPED: Sampler not running.

S1 RUNNING: Sampler running.

S3 SAMPLE: Sampler is being pulsed.

FAULT: Not used.

TEST DATA SHEET

DEVICE: RC3-SAMP

OTHER

<u>SOURCE</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
\$T5	"1"	Signal to pulse Process Condensate Sampler

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT2	NO	Output to pulse PC Sampler
\$G17	"1"	Permissive to start Timer KY-RC3-1

MT Verify that command 1 starts the sampler.

MT Verify that command 0 stops the sampler.

TESTED BY M Deats DATE 12/19/98

MT Verify command 2 selects no sample.
12/19/98

MASTER DEVICE 0XSELECDI

DEV(S): SELECT-DI

DRAWING: H-2-99949 SHT 39

DESCRIPTION: This device is used to select either the #1 or #2 Tubes for use in the density calculation.

COMMANDS:

C0 NO CMD: Has no effect on the device.

C1 #1 TUBES: Selects the #1 Tubes.

C2 #2 TUBES: Selects the #2 Tubes.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: No interlocks.

OVERRIDE: Not used.

STATUSES:

S0 NO CMD: Temporary status if NO CMD (C0) is selected.

S1 DI-CA1-1: #1 Tubes are being used for the density calculation.

S2 DI-CA1-2: #2 Tubes are being used for the density calculation.

FAULT: Not used.

MASTER DEVICE 0XSELECTI

DEV(S): SELECT-TI

DRAWING: H-2-99949 SHT 39

DESCRIPTION: This device is used to select one of two temperature elements (TI-EA1-7 or TI-CA1-7).

COMMANDS:

C0 TI-EA1-7: Selects TI-EA1-7.

C1 TI-CA1-7: Selects TI-CA1-7.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: No interlocks.

OVERRIDE: Not used.

STATUSES:

S0 TI-EA1-7: TI-EA1-7 is selected.

S1 TI-CA1-7: TI-CA1-7 is selected.

FAULT: Not used.

MASTER DEVICE 0XSELECWF

DEV(S): SELECT-WF

DRAWING: H-2-99949 SHT 39

DESCRIPTION: This device is used to select either the #1 or #2 WF for use in the level calculation.

COMMANDS:

C0 NO CMD: Has no effect on the device.

C1 LI-CA1-1: Selects WFI-CA1-1.

C2 LI-CA1-2: Selects WFI-CA1-2.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: No interlocks.

OVERRIDE: Not used.

STATUSES:

S0 NO CMD: Temporary status if NO CMD (C0) is selected.

S1 LI-CA1-1: WFI-CA1-1 is being used in the level calculation.

S2 LI-CA1-2: WFI-CA1-2 is being used in the level calculation.

FAULT: Not used.

TEST DATA SHEET

DEVICE: SELECT-DI

MT Verify that command 0 has no effect.

MT Verify that command 1 selects #1 tubes.

MT Verify that command 2 selects #2 tubes.

DEVICE: SELECT-TI

MT Verify that command 0 selects TI-EA1-7.

MT Verify that command 1 selects TI-CA1-7.

DEVICE: SELECT-WF

MT Verify that command 0 has no effect.

MT Verify that command 1 selects WFI-CA1-1.

MT Verify that command 2 selects WFI-CA1-2.

TESTED BY M. Leats DATE 12/19/98

MASTER DEVICE 0XSLFLUSH**DEV(S):** HV-CA1-2**DRAWING:** H-2-99949 SHT 14

DESCRIPTION: Controls the slurry flush system. Can be operated either manually or in automatic mode. Whenever flushing is active a signal is sent to Device HV-CA1-6 causing it to open. During flushing a signal is also sent to PB2-INLK2 which causes PB-2 to shutdown (except when PB2-INLK2 is in BYPASS).

COMMANDS:

- C0 BLOCK:** Put HV-CA1-2 in Position 2 (air on) and HV-CA1-2A in Position 2 (air off).
- C1 SL OUT:** Put HV-CA1-2 in Position 1 (air off) and HV-CA1-2A in Position 1 (air on).
- C2 EVAP FL:** Put HV-CA1-2 in Position 2 (air on) and HV-CA1-2A in Position 1 (air on).
- C3 FARM FL:** Put HV-CA1-2 in Position 1 (air off) and HV-CA1-2A in Position 2 (air off). Send signal to Device HV-CA1-6 to open HV-CA1-6.
- C4 LO-RESET:** Resets LOCKOUT condition, then goes to BLOCK. See LOCKOUT status below.

AUTO: If the device is not in LOCKOUT status, the occurrence of low slurry flow (as determined by FSL-CA1-4) will start Timer KY-CA1-2. If the slurry flow is restored it stops and resets the timer.

If Timer KY-CA1-2 times out it will initiate the automatic flush sequence. The automatic sequence consists of a 30 second EVAPORATOR FLUSH followed by a FARM FLUSH (Timer KY-CA1-2F). Upon completion of the FARM FLUSH, the valves are placed in the BLOCK position and the LOCKOUT status is set. In LOCKOUT the automatic flush is locked out until manually reset (LO-RESET).

MANUAL: The operator may select the BLOCK, SL OUT, EVAP FL, FARM FL, or LO-RESET commands.

INTERLOCKS: This device has no interlocks.

OVERRIDE: Not used and has no effect on the device.

STATUSES:

- S0 BLOCK:** HV-CA1-2 is in Position 2 (air on) and HV-CA1-2A is in Position 2 (air off).
- S1 SL OUT:** HV-CA1-2 is in Position 1 (air off) and HV-CA1-2A is in Position 1 (air on).
- S2 EVAP FL:** HV-CA1-2 is in Position 2 (air on) and HV-CA1-2A is in Position 1 (air on).
- S3 FARM FL:** HV-CA1-2 is in Position 1 (air off) and HV-CA1-2A is in Position 2 (air off).
- S4 LO-RESET:** Temporary status when reset is commanded. Always followed by BLOCK status.
- S5 LOCKOUT:** Valves are in the BLOCK position and the auto flush sequence is inhibited.

FAULT: Not used on this device.

SPECIAL DESCRIPTION: If the auto flush sequence has been initiated, switching from AUTO to MANUAL will not stop the sequence unless the LO-RESET command is invoked. Upon completion of the auto sequence, the status will be LOCKOUT, which can be reset with the LO-RESET command.

TEST DATA SHEET

DEVICE: HV-CA1-2

OTHER

EPN	VALUE	DESCRIPTION
FIC-CA1-4	42	Slurry Flow Lo

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT2	NO	Air On (Pos 2) for HV-CA1-2
?OUT2A	NO	Air On (Pos 1) for HV-CA1-2A

MT Verify that command 0 puts the valves in BLOCK.MT Verify that command 1 puts the valves in SL OUT.MT Verify that command 2 puts the valves in EVAP FL.MT Verify that command 3 puts the valves in FARM FL.MT Verify the automatic flush sequence following interlock when in AUTO status.MT Verify that command 4 resets the LOCKOUT condition. START 13:54:50TESTED BY M. D. [Signature] DATE 12/19/98

KY-CA1-2 SP=8

KY-CA1-2F SP=7.5

MASTER DEVICE 0XSWAPUMP

DEV(S): P-C-105 P-C-105A

DRAWING: H-2-99949 SHTS 7 and 8

DESCRIPTION: Controls the operation of the two seal water pumps. Allows the designation of a Primary and Secondary pump. Only one pump need be operated if it can maintain pressure and flow.

COMMANDS:

C0 STOP: Stops the pump when in manual.

C1 START: Starts the pump when in manual.

C2 SF-RESET: Resets the start-fail status and causes the STOP command to follow. If this status is alarmed, it will clear the alarm.

AUTO/MAN: When in AUTO a pump is designated as the Secondary (standby) pump to be started automatically in the event seal water flow and pressure can not be maintained with the other pump. When in MANUAL a pump is designated as the Primary pump and must be started manually. The Primary pump will provide a start signal to the Secondary pump (after two minutes) in the event seal water pressures and flows cannot be maintained. When in MANUAL, a pump will ignore any auto start signal from the other pump. Failure to establish the required minimum pressures and flows for a period of four minutes while a pump is running will also stop the pump regardless of the AUTO/MAN status.

INTERLOCKS: No interlocks.

OVERRIDE: OVERRIDE (Override Key) causes the confirms to be ignored and will therefore clear the FAULT condition if it is present.

STATUSES:

S0 CF-OFF: Not running as confirmed by the motor contactor.

S1 CF-ON: Running as confirmed by the motor contactor.

S2 SF-RESET: Temporary status during resetting of the STRTFail status.

S4 STRTFail: The motor failed to auto-start (commanded by the other pump device) because it was in MANUAL.

S6 STOPPING: The motor has been commanded to stop but the contactor off confirm has not been received yet.

S7 STARTING: The motor has been commanded to start but the contactor on confirm has not been received yet.

FAULT: The device will fault when it does not start or stop within five seconds after the command is issued. It will also fault if the contactor opens due to some external condition. The fault can be cleared by going to OVERRIDE.

TEST DATA SHEET

DEVICE: P-C-105

OTHER

EPN	VALUE	DESCRIPTION
PI-CA1-9	40	Seal Water pressure Lo
FI-CA1-1	0.42	Seal Water flow Lo
PI-CA1-10	75	Seal Water pressure Lo
FI-CA1-2	1.0	Seal Water flow Lo
\$G6	"1"	Start Signal from P-C-105A

CONFIRMS

EPN	VALUE	DESCRIPTION
YS-PC-105	"1"	Motor Contact Confirm

OUTPUTS

DESTN	VALUE	DESCRIPTION
?OUT1	NO	Motor Start(1)/Stop(0)
\$G5	"1"	Start Signal to P-C-105A

MT Verify proper operation of pump with commands.MS Verify that P-C-105A automatically starts if seal water pressure or flow do not reach minimums within 2 minutes. 12:26:45 10:29:20 STARTMS Verify that upon loss of seal water pressure or flow, the pump stops four minutes later.TESTED BY M. Geats DATE 12/19/98

TEST DATA SHEET

DEVICE: P-C-105A

OTHER

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
PI-CA1-9	40	Seal Water pressure Lo
FI-CA1-1	0.42	Seal Water flow Lo
PI-CA1-10	75	Seal Water pressure Lo
FI-CA1-2	1.0	Seal Water flow Lo
\$G5	"1"	Start Signal from P-C-105

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
YS-PC105A	"1"	Motor Contact Confirm

OUTPUTS

<u>DESTN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
?OUT1	NO	Motor Start(1)/Stop(0)
\$G6	"1"	Start Signal to P-C-105

MT Verify proper operation of pump with commands.

MT Verify that P-C-105 automatically starts if seal water pressure or flow do not reach minimums within 2 minutes.

MT Verify that upon loss of seal water pressure or flow, the pump stops four minutes later.

TESTED BY M. Teets DATE 12/19/98

MASTER DEVICE 0XVCA1ILK**DEV(S):** VCA1-INLK**DRAWING:** H-2-99949 SHT 6

DESCRIPTION: This device is used to bypass interlocks that are passed to device HV-CA1-1. It also monitors a hardware bypass switch and goes to the BYPASS state whenever the switch is in bypass. A timer (KY-CA1-1) limits the amount of time the interlocks can be bypassed. When the hardware switch is moved from bypass to normal, the device is placed in NOBYPASS status, however, it can be returned to BYPASS using the C1 command.

COMMANDS:

C0 NOBYPASS: Puts the device into NOBYPASS status unless the hardware bypass switch is in the bypass position.

C1 BYPASS: Puts the device into BYPASS status.

AUTO/MAN: Auto locks out all commands. Device should always be in Manual.

INTERLOCKS: This device has ten interlocks.

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 NOBYPASS: Not in bypass.

S1 BYPASS: Bypass condition is on.

S5 INTERLOK: An interlock condition exists and is being passed to device HV-CA1-1 unless in BYPASS.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: VCA1-INLK

INTERLOCKS

EPN	VALUE	DESCRIPTION
LI-CA1-1	65.8	Evaporator Level #1 Hi
LI-CA1-2	65.45	Evaporator Level #2 Hi
RI-CA1-1	8000	Process Condensate Line Rad Hi
PDI-CA1-1	4.5	Lower De-Entrainer DP Hi
PDI-CA1-2	4.5	Upper De-Entrainer DP Hi
WFSH-CA11	"0"	Evaporator WF #1 Hi
WFSH-CA12	"0"	Evaporator WF #2 Hi
RSH-CA1-1	"0"	Process Condensate Line Rad Hi
PDSH-CA1	"0"	Lower De-Entrainer DP Hi

BYPASS

EPN	VALUE	DESCRIPTION
YS-CA1-1	0/1	Hardwired Bypass Switch Status (1 for Bypass)

OUTPUTS

DESTN	VALUE	DESCRIPTION
\$G10	0/1	Passes Interlock Condition to HV-CA1-1

MT Verify that command 1 turns on the bypass condition.MT Verify that command 0 turns off the bypass condition.MT Verify that the interlocks are passed to HV-CA1-1 when not bypassed.MT Verify that when hardwired bypass switch is placed in bypass, device goes to BYPASS status.MT Verify that when hardwired bypass switch is placed in normal, device goes to NOBYPASS status.TESTED BY M. Seals DATE 12/19/98

MASTER DEVICE 0XVSTATCO

DEV(S): HV-CA1-7 HV-CA1-9

DRAWING: H-2-99949 SHT 13

DESCRIPTION: This master device provides status information for a valve with two-position limit switch confirmation. No valve control is available from this device.

COMMANDS: None

AUTO/MAN: Will work in either AUTO or MANUAL.

INTERLOCKS: None

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 CF-CLOSD: Valve is closed as confirmed by limit switch.

S1 CF-OPEN: Valve is open as confirmed by limit switch.

S2 TRAVEL: Valve is between close and open positions.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: HV-CA1-7

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-CA1-7N	"1"	Confirm Open
ZS-CA1-7C	"1"	Confirm Closed

MT Verify the correct statuses are indicated during operation such as flushing.

DEVICE: HV-CA1-9

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-CA1-9N	"1"	Confirm Open
ZS-CA1-9C	"1"	Confirm Closed

MT Verify the correct statuses are indicated during operation such as flushing.

TESTED BY M. Seate DATE 12/19/98

MASTER DEVICE 0XVSTATRW

DEV(S): HV-RW-1 HV-RW-2

DRAWING: H-2-99949 SHT 13

DESCRIPTION: This master device provides status information for a valve with two-position limit switch confirmation. No valve control is available from this device.

COMMANDS: None

AUTO/MAN: Will work in either AUTO or MANUAL.

INTERLOCKS: None

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 CF-CLOSD: Valve is closed as confirmed by limit switch.

S1 CF-OPEN: Valve is open as confirmed by limit switch.

S2 OPEN 1+M: Valve has been open for more than 1 minute (yellow alarm).

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: HV-RW-1

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-RW-1N	"1"	Confirm Open
ZS-RW-1C	"1"	Confirm Closed

MT Verify the correct statuses are indicated.MT Verify the alarm condition.

DEVICE: HV-RW-2

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-RW-2N	"1"	Confirm Open
ZS-RW-2C	"1"	Confirm Closed

MT Verify the correct statuses are indicated.MT Verify the alarm condition.TESTED BY M. J. Lee DATE 12/19/98

MASTER DEVICE 0XVSTATNB

DEV(S): HV-2-37 HV-2-34

DRAWING: H-2-99949 SHT 13

DESCRIPTION: This master device provides status information for a valve with two-position limit switch confirmation. No valve control is available from this device.

COMMANDS: None

AUTO/MAN: Will work in either AUTO or MANUAL.

INTERLOCKS: None

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 CF-NORM: Valve is in the normal position as confirmed by limit switch.

S1 CF-BKFL: Valve is in the backflush position as confirmed by limit switch.

S2 TRAVEL: Valve is between close and open positions.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: HV-2-37, or HV-2-34

CONFIRMS

<u>FOR DEVICE</u>	<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
HV-2-37	ZS-IDX1NM	"1"	Confirm Normal Position
HV-2-37	ZS-IDX1B	"1"	Confirm Backflush Position
HV-2-34	ZS-IDX3NM	"1"	Confirm Normal Position
HV-2-34	ZS-IDX3B	"1"	Confirm Backflush Position

MT Verify the correct statuses are indicated for one of the devices.

TESTED BY M Gerts DATE 12/19/98

MASTER DEVICE 0XVSTATSL

DEV(S): HV-CA1-2S

DRAWING: H-2-99949 SHT 13

DESCRIPTION: This master device provides status information for the slurry valves using the limit switches. No valve control is available from this device.

COMMANDS: None

AUTO/MAN: Will work in either AUTO or MANUAL.

INTERLOCKS: None

OVERRIDE: OVERRIDE (Override Key) has no effect on this master device.

STATUSES:

S0 BLOCK: HV-CA1-2 in Position 2 and HV-CA1-2A in Position 2.

S1 SL OUT: HV-CA1-2 in Position 1 and HV-CA1-2A in Position 1.

S2 FARM FL: HV-CA1-2 in Position 2 and HV-CA1-2A in Position 1.

S3 EVAP FL: HV-CA1-2 in Position 1 and HV-CA1-2A in Position 2.

FAULT: Not used on this device.

TEST DATA SHEET

DEVICE: HV-CA1-2S

CONFIRMS

<u>EPN</u>	<u>VALUE</u>	<u>DESCRIPTION</u>
ZS-CA1-21	"1"	Confirm Position 1
ZS-CA1-22	"1"	Confirm Position 2
ZS-CA12A1	"1"	Confirm Position 1
ZS-CA12A2	"1"	Confirm Position 2

MT Verify the correct statuses are indicated for one of the devices.TESTED BY M. G. L. S. DATE 12/19/98

4.0 TEST EXCEPTIONS

Exceptions shall be documented using Figure 1, Exception to Software Acceptance Test (Appendix A). Exceptions to the test are dispositioned. Actions taken regarding disposition are noted on the exception sheet. Typical dispositions are:

1. Test approved with exception (rerun of the affected test procedure steps is unnecessary).
2. Test procedure step(s) affected to be repeated after the discrepancy has been corrected.
3. Entire Test Procedure to be repeated after the discrepancy has been corrected.

5.0 REFERENCES

1. HNF-2695, 242A Distributed Control System Year 2000 Acceptance Test Procedure.
2. WHC-SD-534-ATR-001, Project B-534 Software Test Report.
3. WHC-SD-534-ATR-006, Project B-534 Acceptance Test Report.
4. WHC-SD-534-OTP-002, Operational Test Plan For 242-A Evaporator Upgrades and the Liquid Effluent Retention Facility.

6.0 INDEX TO DEVICES

207-A-P3	✓ TE3	43
A-C100	✓ TE3	25
A-E-101	✓ TE3	18
A-E-102	✓ TE3	18
A-E-104	✓ TE3	18
BOT-DUMP	✓	45
EA1-INLK1	✓	12
EA1-INLK2	✓	47
EX-C-1	✓	51
EXC1-INLK	✓	52
FV-EA1-1	✓	55
GBIT0-0/1	✓	57
HV-2-34	✓	111
HV-2-37	✓	111
HV-CA1-1	✓	58
HV-CA1-10	✓	31
HV-CA1-2	✓	100
HV-CA1-2S	✓	112
HV-CA1-5	✓	60
HV-CA1-6	✓	62
HV-CA1-7	✓	107
HV-CA1-9	✓	107
HV-EA1-2	✓	39
HV-EC1-1	✓	35
HVEC2/3-1		49
HV-PDSPRY	✓	70
HV-RC1-3	✓	39
HV-RC3-3	✓	39
HV-RW-1	✓	109
HV-RW-2	✓	109
HV-SC-1A	✓ TE2	33
HV-SC-1B	✓	33
HV-SC-2A	✓	33
HV-SC-2B	✓	33
HV-SC-3A	✓	33
HV-SC-3B	✓	33
HV-SUMP-1	✓	37
JGV-SUMP	✓	64
P-207A-S	✓	41
P-AW-102	✓ TE3	27
PB-1	✓ TE1	74
PB1-BYPAS	✓	72
PB1WFINLK	✓	75
PB-2	✓ TE3	78
PB2SLFILK	✓	79
PB2WFINLK	✓	82
P-C100	✓ TE3	66
P-C-105	✓	102
P-C-105A	✓	102
P-C106	✓ TE3	68

HNF-3569 REV 0

PC-INLK1	✓	14
PC-INLK2	✓	16
P-E-101	✓ TE3	18
P-E-102	✓ TE3	18
P-E-104	✓ TE3	18
RC1-PIG	✓	84
RC1-SAMP	✓	86
RC2-PIG	✓	88
RC2-SAMP	✓	90
RC3-PIG	✓	92
RC3-SAMP	✓	94
SELECT-DI	✓	96
SELECT-TI	✓	97
SELECT-WF	✓	98
TV-DSH1/2	✓	29
VCA1-INLK	✓	105

APPENDIX A

FIGURE 1. TEST EXCEPTION LOG SHEET

T.E. #		Exceptions		Correction Approval	
Procedure No., Page/Tag, or Device/Tag	Date	Description	Initials	Date	
① p 76 (PBI)	12/19/98	FAULT BIT does not latch. It is momentary. (Accept As Is since Stop is commanded and held in.)	MT See Note. Accept As-Is.	12/19/98	
② p 34 (HV-SC-xx)	12/19/98	Fault held-in (Not momentary) See T.E. #1. Graphic "FAULT" string alarm did not flash. LAMP did not flash, BASINBAT did not get BASIN ALM to "ALARM" state.	MT * See Note. Accept As-Is.	12/21/98	
③ p 26 (A-C100)	12/19/98	Stopped SIM program & tried	MT *	12/21/98	
p 28 (PAW102)	12/19/98	start A-C100. FAULT came in	See		
p 19 (AE101)	12/19/98	on PI as "NORM" in red.	Note.		
p 20 (PE101)	12/19/98	(Should be red FAULT). It was	Accept As-Is.		
p 21 (AE102)	12/19/98	also MOMENTARY, so one screen			
p 22 (PE102)	12/19/98	update later the PI went to			
p 23 (AE104)	12/19/98	green "NORM". (See COPY)			
p 24 (PE104)	12/19/98	No FAULT appears in faceplate			
p 44 (207AP3)	12/19/98	due to momentary nature.			
p 80 (PB2)	12/19/98	(See T.E. #3 attachment)			
p 69 (PC1010)	12/19/98	Same Problem on P-AW-102 (See attachment)			
* Note: When Hardware inputs were used instead of simulated inputs, the FAULTs acted normally.					

TEST APPROVED WITH EXCEPTIONS (RETEST UNNECESSARY):

ENGINEERING: M. DeetsDATE: 12/21/98

TEST EXCEPTION#3 ATTACHMENT

CRITICAL ALARM SUMMARY PAGE 0
DYNAMIC DISPLAY

0 19-DEC 11:11:31 PCMOA A-C100 CONDENSATE TANK AGITATOR NORM

ALARM ACK <DONE>

HNF-3569 REV 0

TEST EXCEPTION#3 ATTACHMENT

CRITICAL ALARM SUMMARY PAGE 0
DYNAMIC DISPLAY

0 19-DEC 11:53:26 PCMOA P-AA-102 FEED PUMP NORM

TEST EXCEPTION #3 ATTACHMENT

CRITICAL ALARM SUMMARY PAGE 0
DYNAMIC DISPLAY

0	19-DEC 12:34:35	PCMOA A-E-104	DECON TANK AGITATOR	NORM
1	19-DEC 12:34:35	PCMOA P-E-104	DECON TANK PUMP	NORM
2	19-DEC 12:34:19	PCMOA A-E-101	ELUANT TANK AGITATOR	NORM
3	19-DEC 12:34:19	PCMOA P-E-101	ELUANT TANK PUMP	NORM
4	19-DEC 12:33:25	PCMOA FIC-E102	ANTI FOAM PUMP STROKE CONTROL	NORM
5	19-DEC 12:33:25	PCMOA P-E-102	ANTI FOAM TANK PUMP	NORM
6	19-DEC 12:33:25	PCMOA A-E-102	ANTI FOAM TANK AGITATOR	NORM

ALARM ACK <DONE>

19-DEC-98 12:34:51