**ENVIRONMENTAL
MANAGEMENT &
ENRICHMENT
FACILITIES**

**Old Hydrofracture Facility Tanks
Contents Removal Action Operations Plan
at the Oak Ridge National Laboratory,
Oak Ridge, Tennessee**

**Volume 2: Checklists
and Work Instructions**

MASTER

This document has been approved
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BECHTEL JACOBS COMPANY LLC
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

BJFC-4 (4-98)

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Date Issued—May 1998

Prepared by
CDM Federal Programs Corporation
Oak Ridge, Tennessee
under subcontract 95B-99425C

Prepared for the
U.S. Department of Energy
Office of Environmental Management

Environmental Management Activities at
EAST TENNESSEE TECHNOLOGY PARK
Oak Ridge, Tennessee 37831
managed by
BECHTEL JACOBS COMPANY LLC
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-98OR22700

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PRE-OPERATIONAL TEST CHECKLISTS

Checklist 4.2.1: Instrumentation and Controls Test Field Inst. and Equip. Tagging Verification	Revision: 1 Date: April 28, 1998
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Initials Criteria

_____ Instruments and equipment tags are installed and labeled in accordance with the 100% Configuration drawings.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.2: Instrumentation and Controls Test PLC, Workstation and Panel Audit	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials

Criteria

_____ Workstation equipment, PLC equipment and cables are installed and labeled in accordance with the 100% Configuration drawings.

_____ Panel layout is correct and workmanship is acceptable to the I&C engineer.

Comments:

Signature

Date

System Operator

I&C Engineer

Field Operations Superintendent

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	210	AI	FT210	Process Water Flow			01	04	01	AI010401	30001
	305	AI	PT305	High Press. Pumps Intake Line Press.			01	04	02	AI010402	30002
	305	AI	ZT305	High Press. Pumps Recycle Valve Position			01	04	03	AI010403	30003
	330	AI	PT330	High Press. Transfer Line Press.			01	04	04	AI010404	30004
	340-1	AI	ZT340-1	High Press. Recycle Valve Position			01	04	05	AI010405	30005
	340-2	AI	ZT340-2	MVST Disch. Valve Position			01	04	06	AI010406	30006
	345	AI	FT345	MVST Disch. Flow			01	04	07	AI010407	30007
	440	AI	PT440	Tanks Vacuum Press			01	04	08	AI010408	30008
		AI		Spare			01	05	01	AI010501	30010
	445-2	AI	LT445-2	Old Hydrofracture Tank Level 1			01	05	02	AI010502	30011
	450	AI	FT450	Low Press. Transfer Flow			01	05	03	AI010503	30012
	455	AI	ZT455	Low Press. Transfer Valve Position			01	05	04	AI010504	30013
	445-1	AI	LT445-1	Recycle Tank Level			01	05	05	AI010505	30014
		AI		Spare			01	05	06	AI010506	30015
		AI		Spare			01	05	07	AI010507	30016
	625	AI	PT625	Sluicer System Press.			01	05	08	AI010508	30017
		AI		Spare			01	06	01	AI010601	30019
		AI		Spare			01	06	02	AI010602	30020
		AI		Spare			01	06	03	AI010603	30021
		AI		Spare			01	06	04	AI010604	30022
		AI		Spare			01	06	05	AI010605	30023
		AI		Spare			01	06	06	AI010606	30024
		AI		Spare			01	06	07	AI010607	30025
		AI		Spare			01	06	08	AI010608	30026
	320-1	AO	SY320-1	High Press. Pump 1 Speed Command			01	07	01	AO010701	40001
	305	AO	ZY305	High Press. Pumps Recycle Valve Position Command			01	07	02	AO010702	40002
	455	AO	ZY455	Low Press. Transfer Valve Position Command			01	07	03	AO010703	40003
		AO		Spare			01	07	04	AO010704	40004
	205	DI	HS205	Process Water Pump	Local	Remote	01	08	01	DI010801	10001
	205	DI	QS205	Process Water Pump		Run	01	08	02	DI010802	10002
	230	DI	HS230	Pipe Blow Down Valve Status		Remote	01	08	03	DI010803	10003
	235	DI	HS235	Pipe Flush Valve Status		Remote	01	08	04	DI010804	10004
	245	DI	HS245	High Press. Pumps Disch. Header Flush Valve Status		Remote	01	08	05	DI010805	10005
	220-2	DI	HS220-2	Sluicer Rinse Valve		Remote	01	08	06	DI010806	10006
	225-1	DI	HS225-1	Recycle Tank Camera Lens Rinse Valve Status		Remote	01	08	07	DI010807	10007
	225-2	DI	HS225-2	Old Hydrofracture Tank Camera Rinse Valve Status		Remote	01	08	08	DI010808	10008

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	250-1	DI	HS250-1	High Press. Pumps Suct. Header Flush Valve Status		Remote	01	08	09	DI010809	10009
	250-2	DI	HS250-2	Low Press. Pumps Disch. Line Flush Valve Status		Remote	01	08	10	DI010810	10010
	340-1	DI	HS340-1	High Press. Recycle Valve Status		Remote	01	08	11	DI010811	10011
	220-1	DI	HS220-1	Demister Rinse Valve Status		Remote	01	08	12	DI010812	10012
		DI		Spare			01	08	13	DI010813	10013
	340-2	DI	HS340-2	MVST Disch. Valve Status		Remote	01	08	14	DI010814	10014
		DI		Spare			01	08	15	DI010815	10015
		DI		Spare			01	08	16	DI010816	10016
	410-1	DI	HS410-1	Tank 1 & 3 Pump 1 Status	Local	Remote	01	09	01	DI010901	10017
	410-1	DI	QL410-1	Tank 1 & 3 Pump 1 Run Status		Run	01	09	02	DI010902	10018
	410-1	DI	HS410-1A	Tank 1 Pump Disch. Valve 1 Status		Remote	01	09	03	DI010903	10019
	420-1	DI	HS420-1	Tank 2 & 4 Pump 1 Status	Local	Remote	01	09	04	DI010904	10020
	420-1	DI	QL420-1	Tank 2 & 4 Pump 1 Run Status		Run	01	09	05	DI010905	10021
	420-1	DI	HS420-1A	Tank 2 Pump Disch. Valve 1 Status		Remote	01	09	06	DI010906	10022
		DI		Spare			01	09	07	DI010907	10023
		DI		Spare			01	09	08	DI010908	10024
	430-1	DI	HS430-1A	Tank 3 Pump Disch. Valve 1 Status		Remote	01	09	09	DI010909	10025
		DI		Spare			01	09	10	DI010910	10026
		DI		Spare			01	09	11	DI010911	10027
	440-1	DI	HS440-1A	Tank 4 Pump Disch. Valve 1 Status		Remote	01	09	12	DI010912	10028
	320-1	DI	HS320-1	High Press. Pump 1 Status	Local	Remote	01	09	13	DI010913	10029
	320-1	DI	PA320-1	High Press. Pump 1 Press. Shutdown Alarm	Normal	Sdwn	01	09	14	DI010914	10030
	320-1	DI	QA320-1	High Press. Pump 1 VFD Drive Alarm	Normal	Fail	01	09	15	DI010915	10031
	320-1	DI	QL320-1	High Press. Pump 1 Run Status		Run	01	09	16	DI010916	10032
	410-2	DI	HS410-2	Tank 1 & 3 Pump 2 Status	Local	Remote	01	10	01	DI011001	10033
	410-2	DI	QL410-2	Tank 1 & 3 Pump 2 Run Status		Run	01	10	02	DI011002	10034
	410-2	DI	HS410-2A	Tank 1 Pump Disch. Valve 2 Status		Remote	01	10	03	DI011003	10035
	420-2	DI	HS420-2	Tank 2 & 4 Pump 2 Status	Local	Remote	01	10	04	DI011004	10036
	420-2	DI	QL420-2	Tank 2 & 4 Pump 2 Run Status		Run	01	10	05	DI011005	10037
	420-2	DI	HS420-2A	Tank 2 Pump Disch. Valve 2 Status		Remote	01	10	06	DI011006	10038
		DI		Spare			01	10	07	DI011007	10039
		DI		Spare			01	10	08	DI011008	10040
	430-2	DI	HS430-2A	Tank 3 Pump Disch. Valve 2 Status		Remote	01	10	09	DI011009	10041
		DI		Spare			01	10	10	DI011010	10042
		DI		Spare			01	10	11	DI011011	10043
	440-2	DI	HS440-2A	Tank 4 Pump Disch. Valve 2 Status		Remote	01	10	12	DI011012	10044

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	320-2	DI	HS320-2	High Press. Pump 2 Status	Local	Remote	01	10	13	DI011013	10045
	320-2	DI	PA320-2	High Press. Pump 2 Press. Shutdown Alarm	Normal	Sdwn	01	10	14	DI011014	10046
	320-2	DI	QA320-2	High Press. Pump 2 VFD Drive Alarm	Normal	Fail	01	10	15	DI011015	10047
	320-2	DI	QL320-2	High Press. Pump 2 Run Status		Run	01	10	16	DI011016	10048
	350-1	DI	HS350-1	Strainer Valve 1 Status		Remote	01	11	01	DI011101	10049
	360-1	DI	HS360-1	Strainer Drain Valve 1 Status		Remote	01	11	02	DI011102	10050
	300	DI	HS300	Recycle Tank Disch. Valve Status		Remote	01	11	03	DI011103	10051
	305	DI	HS305	High Press. Pumps Recycle Valve Status		Remote	01	11	04	DI011104	10052
	305	DI	PSH305	High Press. Pumps Intake Line Press. Alarm	Normal	High	01	11	05	DI011105	10053
		DI		Spare			01	11	06	DI011106	10054
		DI		Spare			01	11	07	DI011107	10055
	330	DI	PSH330	High Press. Transfer Line Press. Alarm	Normal	High	01	11	08	DI011108	10056
	400	DI	HS400	Recycle Tank Mixer Status	Local	Remote	01	11	09	DI011109	10057
	400	DI	QL400	Recycle Tank Mixer Run Status		Run	01	11	10	DI011110	10058
	445	DI	PAL445	Bubbler System Air Press. Alarm	Normal	Low	01	11	11	DI011111	10059
	455	DI	HS455	Low Press. Transfer Valve Status		Remote	01	11	12	DI011112	10060
		DI		Spare			01	11	13	DI011113	10061
		DI		Spare			01	11	14	DI011114	10062
	495	DI	HS495	Recycle Tank Pump Status	Local	Remote	01	11	15	DI011115	10063
	495	DI	QL495	Recycle Tank Pump Run Status		Run	01	11	16	DI011116	10064
	350-2	DI	HS350-2	Strainer Valve 2 Status		Remote	01	12	01	DI011201	10065
	360-2	DI	HS360-2	Strainer Drain Valve 2 Status		Remote	01	12	02	DI011202	10066
	510	DI	HS510	Ventilation Line Heater Status		Remote	01	12	03	DI011203	10067
	545	DI	HS545	Ventilation Fan Status	Local	Remote	01	12	04	DI011204	10068
	545	DI	QL545	Ventilation Fan Run Status		Run	01	12	05	DI011205	10069
		DI					01	12	06	DI011206	10070
		DI					01	12	07	DI011207	10071
		DI					01	12	08	DI011208	10072
		DI					01	12	09	DI011209	10073
	660	DI	HS660	Sluicer Pump Intake Valve Status		Remote	01	12	10	DI011210	10074
	665	DI	HS665	Sluicer Pump Status	Local	Remote	01	12	11	DI011211	10075
	665	DI	PA665	Sluicer Pump Press. Shutdown	Normal	Sdwn	01	12	12	DI011212	10076
		DI					01	12	13	DI011213	10077
	665	DI	QL665	Sluicer Pump Run Status		Run	01	12	14	DI011214	10078
	670	DI	HS670	Sluice Pump Press. Release Valve Status		Remote	01	12	15	DI011215	10079
	675	DI	HS675	Sluicer Pump Disch. Valve Status		Remote	01	12	16	DI011216	10080

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	665A	DI	HS665A	Sluicer Pump Bypass Valve Status		Remote	01	13	01	DI011301	10081
	715-1	DI	LAH715-1	Pump Skid Drip Pan Flood Alarm	Normal	Flood	01	13	02	DI011302	10082
	715-2	DI	LAH715-2	Sluicer Skid Drip Pan Flood Alarm	Normal	Flood	01	13	03	DI011303	10083
	715-3	DI	LAH715-3	Ventilation Skid Drip Pan Flood Alarm	Normal	Flood	01	13	04	DI011304	10084
	715-4	DI	LAH715-4	Recycle Tank Riser Flood Alarm	Normal	Flood	01	13	05	DI011305	10085
	715-5	DI	LAH715-5	Old Hydrofracture Tank 1 Riser Flood Alarm	Normal	Flood	01	13	06	DI011306	10086
	715-6	DI	LAH715-6	Old Hydrofracture Tank 2 Riser Flood Alarm	Normal	Flood	01	13	07	DI011307	10087
	715-7	DI	LAH715-7	Old Hydrofracture Tank 3 Riser Flood Alarm	Normal	Flood	01	13	08	DI011308	10088
	715-8	DI	LAH715-8	Old Hydrofracture Tank 4 Riser Flood Alarm	Normal	Flood	01	13	09	DI011309	10089
	670	DI	LAL-670	Sluicer Pump Coolant Low Level	Normal	Low	01	13	10	DI011310	10090
		DI		Spare			01	13	11	DI011311	10091
		DI		Spare			01	13	12	DI011312	10092
		DI		Spare			01	13	13	DI011313	10093
		DI		Spare			01	13	14	DI011314	10094
		DI		Spare			01	13	15	DI011315	10095
		DI		Spare			01	13	16	DI011316	10096
		AI		Spare			02	03	01	AI020301	30028
	445-3	AI	LT445-3	Old Hydrofracture Tank Level 2			02	03	02	AI020302	30029
		AI		Spare			02	03	03	AI020303	30030
		AI		Spare			02	03	04	AI020304	30031
		AI		Spare			02	03	05	AI020305	30032
	645	AI	ZT645	Sluicer Arm Angle			02	03	06	AI020306	30033
	650	AI	ZT650	Sluicer Arm Extension			02	03	07	AI020307	30034
	655	AI	ZT655	Sluicer Mast Angle			02	03	08	AI020308	30035
	663	AI	PT663	Sluicer Pump Intake Pressure			02	04	01	AI020401	30037
	665	AI	ST665	Sluicer Pump Speed			02	04	02	AI020402	30038
	668	AI	PT668	Sluicer Pump Disch. Press.			02	04	03	AI020403	30039
	505	AI	TT505	Ventilation Line Upstream Temp.			02	04	04	AI020404	30040
	515	AI	TT515	Ventilation Line Downstream Heater Temp.			02	04	05	AI020405	30041
	520	AI	PDT520	Ventilation Line 90% Filter Diff. Press.			02	04	06	AI020406	30042
	525	AI	PDT525	Ventilation Line HEPA Filter 1 Diff. Press.			02	04	07	AI020407	30043
	530	AI	PDT530	Ventilation Line HEPA Filter 2 Diff. Press.			02	04	08	AI020408	30044
	500	AI	PDT500	Demister Diff. Press.			02	05	01	AI020501	30046
	535	AI	AT535	Ventilation Line Humidity			02	05	02	AI020502	30047
	540	AI	FT540	Ventilation Line Flow			02	05	03	AI020503	30048
	700	AI	RT700	Radiation Monitor - Recycle Tank			02	05	04	AI020504	30049

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	705	AI	RT705	Radiation Monitor – Hydrofracture Tank			02	05	05	AI020505	30050
	710	AI	RT710	Radiation Monitor – Pumping Skid			02	05	06	AI020506	30051
		AI		24V Power to DIT-535			02	05	07	AI020507	30052
		AI		24V Power to FIT-540			02	05	08	AI020508	30053
	320-2	AO	SY320-2	High Press. Pump 2 Speed Command			02	06	01	AO020601	40005
	340-1	AO	ZY340-1	High Press. Recycle Valve Position Command			02	06	02	AO020602	40006
	340-2	AO	ZY340-2	MVST Disch. Valve Position Command			02	06	03	AO020603	40007
	665	AO	SY665	Sluicer Pump Speed Command			02	06	04	AO020604	40008
		AO		Spare			02	07	01	AO020701	40009
		AO		Spare			02	07	02	AO020702	40010
		AO		Spare			02	07	03	AO020703	40011
		AO		Spare			02	07	04	AO020704	40012
	205	DO	P205	Process Water Pump	Stop	Start	02	08	01	DO020801	00001
	230	DO	V230	Pipe Blow Down Valve Command	Close	Open	02	08	02	DO020802	00002
	235	DO	V235	Pipe Flush Valve Command	Close	Open	02	08	03	DO020803	00003
	245	DO	V245	High Press. Pumps Disch. Header Flush Valve Command	Close	Open	02	08	04	DO020804	00004
	220-2	DO	V220-2	Sluicer Rinse Valve	Close	Open	02	08	05	DO020805	00005
	225-1	DO	V225-1	Recycle Tank Camera Lens Rinse Valve Command	Close	Open	02	08	06	DO020806	00006
	225-2	DO	V225-2	Old Hydrofracture Tank Camera Rinse Valve Command	Close	Open	02	08	07	DO020807	00007
	250-1	DO	V250-1	High Press. Pumps Suct. Header Flush Valve Command	Close	Open	02	08	08	DO020808	00008
	250-2	DO	V250-2	Low Press. Pumps Disch. Line Flush Valve Command	Close	Open	02	08	09	DO020809	00009
	300	DO	V300	Recycle Tank Disch. Valve Command	Close	Open	02	08	10	DO020810	00010
	400	DO	M400	Recycle Tank Mixer Command	Stop	Start	02	08	11	DO020811	00011
	495	DO	M495	Recycle Tank Pump Command	Stop	Start	02	08	12	DO020812	00012
	445-1	DO	V445-1	Recycle Tank Bubbler Blow Down Valve Command	Close	Open	02	08	13	DO020813	00013
	665A	DO	V665	Sluicer Pump Bypass Valve Command	Close	Open	02	08	14	DO020814	00014
	220-1	DO		Demister Rinse Valve	Close	Open	02	08	15	DO020815	00015
		DO		Spare			02	08	16	DO020816	00016
	410-1	DO	M410-1	Tank 1 & 3 Pump 1 Command	Stop	Start	02	09	01	DO020901	00017
	410-1	DO	V410-1	Tank 1 Pump Disch. Valve 1 Command	Close	Open	02	09	02	DO020902	00018
	420-1	DO	M420-1	Tank 2 & 4 Pump 1 Command	Stop	Start	02	09	03	DO020903	00019
	420-1	DO	V420-1	Tank 2 Pump Disch. Valve 1 Command	Close	Open	02	09	04	DO020904	00020
		DO		Spare			02	09	05	DO020905	00021
	430-1	DO	V430-1	Tank 3 Pump Disch. Valve 1 Command	Close	Open	02	09	06	DO020906	00022
		DO		Spare			02	09	07	DO020907	00023
	440-1	DO	V440-1	Tank 4 Pump Disch. Valve 1 Command	Close	Open	02	09	08	DO020908	00024

Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
	445-2	DO	V445-2	Tank Bubbler Blow Down Valve Command 1	Close	Open	02	09	09	DO020909	00025
	320-1	DO	P320-1	High Press. Pump 1 Command	Stop	Start	02	09	10	DO020910	00026
	350-1	DO	V350-1	Strainer Valve 1 Command	Close	Open	02	09	11	DO020911	00027
	360-1	DO	V360-1	Strainer Drain Valve 1 Command	Close	Open	02	09	12	DO020912	00028
		DO		Spare			02	09	13	DO020913	00029
		DO		Spare			02	09	14	DO020914	00030
		DO		Spare			02	09	15	DO020915	00031
		DO		Spare			02	09	16	DO020916	00032
	410-2	DO	M410-2	Tank 1 & 3 Pump 2 Command	Stop	Start	02	10	01	DO021001	00033
	410-2	DO	V410-2	Tank 1 Pump Disch. Valve 2 Command	Close	Open	02	10	02	DO021002	00034
	420-2	DO	M420-2	Tank 2 & 4 Pump 2 Command	Stop	Start	02	10	03	DO021003	00035
	420-2	DO	V420-2	Tank 2 Pump Disch. Valve 2 Command	Close	Open	02	10	04	DO021004	00036
		DO		Spare			02	10	05	DO021005	00037
	430-2	DO	V430-2	Tank 3 Pump Disch. Valve 2 Command	Close	Open	02	10	06	DO021006	00038
		DO		Spare			02	10	07	DO021007	00039
	440-2	DO	V440-2	Tank 4 Pump Disch. Valve 2 Command	Close	Open	02	10	08	DO021008	00040
	445-3	DO	V445-3	Tank Bubbler Blow Down Valve Command 2	Close	Open	02	10	09	DO021009	00041
	320-2	DO	P320-2	High Press. Pump 2 Command	Stop	Start	02	10	10	DO021010	00042
	350-2	DO	V350-2	Strainer Valve 2 Command	Close	Open	02	10	11	DO021011	00043
	360-2	DO	V360-2	Strainer Drain Valve 2 Command	Close	Open	02	10	12	DO021012	00044
		DO		Spare			02	10	13	DO021013	00045
		DO		Spare			02	10	14	DO021014	00046
		DO		Spare			02	10	15	DO021015	00047
		DO		Spare			02	10	16	DO021016	00048
	510	DO	H510	Ventilation Line Heater Set Point Selection	SP1	SP2	02	11	01	DO021101	00049
	545	DO	M545	Ventilation Fan Command	Stop	Start	02	11	02	DO021102	00050
	610	DO	HS610	Sluicer Emergency Stop Command		E-Stop	02	11	03	DO021103	00051
	660	DO	V660	Sluicer Pump Intake Valve Command	Close	Open	02	11	04	DO021104	00052
	665	DO	HY665	Sluicer Pump Reset		Reset	02	11	05	DO021105	00053
	665	DO	M665	Sluicer Pump Command	Stop	Start	02	11	06	DO021106	00054
	670	DO	V670	Sluicer Pump Press. Release Valve Command	Close	Open	02	11	07	DO021107	00055
	675	DO	V675	Sluicer Pump Disch. Valve Command	Close	Open	02	11	08	DO021108	00056
		DO		Spare			02	11	09	DO021109	00057
		DO		Spare			02	11	10	DO021110	00058
		DO		Spare			02	11	11	DO021111	00059
		DO		Spare			02	11	12	DO021112	00060

Checklist 4.2.3:

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Process I/O Verification Test

Initials	Criteria loop	I/O	Tag name	Description	False	True	Rack	Slot	Point	Wire no.	Address
		DO		Spare			02	11	13	DO021113	00061
		DO		Spare			02	11	14	DO021114	00062
		DO		Spare			02	11	15	DO021115	00063
		DO		Spare			02	11	16	DO021116	00064
		DO		Spare			02	12	01	DO021201	00065
		DO		Spare			02	12	02	DO021202	00066
		DO		Spare			02	12	03	DO021203	00067
		DO		Spare			02	12	04	DO021204	00068
		DO		Spare			02	12	05	DO021205	00069
		DO		Spare			02	12	06	DO021206	00070
		DO		Spare			02	12	07	DO021207	00071
		DO		Spare			02	12	08	DO021208	00072
		DO		Spare			02	12	09	DO021209	00073
		DO		Spare			02	12	10	DO021210	00074
		DO		Spare			02	12	11	DO021211	00075
		DO		Spare			02	12	12	DO021212	00076
		DO		Spare			02	12	13	DO021213	00077
		DO		Spare			02	12	14	DO021214	00078
		DO		Spare			02	12	15	DO021215	00079
		DO		Spare			02	12	16	DO021216	00080

Comments: _____

Signature

Date

System Operator

I&C Engineer

Field Operations Superintendent

Checklist 4.2.4: Instrumentation and Controls Test PLC, Workstation and Panel Failure	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials	Criteria
_____	UPS functions properly.
_____	Workstation functions properly on power loss and recovery.
_____	PLC functions properly on power loss and recovery.
_____	PLC Remote I/O functions properly on power loss and recovery.
_____	Workstation and PLC communications function properly on loss of communication and restoration of communications.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.1: Instrumentation and Controls Test Loop 205 Process Water Pump and Loop 210 Process Water Flow Test	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Computer Manual at display.

_____ Verify pump status indicates Off at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

_____ Using input simulation equipment, simulate a flow signal. Verify that the engineering units conversion is performed correctly. Verify trend is functioning correctly.

_____ Verify flow totalization is working. Select flow totalization Reset at display and confirm flow total is set to 0.

C. Manual Control

_____ With pump field switch in the Local position, Select pump Start at display and verify that pump does not Run.

_____ Change pump field switch to the Remote position. Select pump Start at display and verify pump status changes to Run at display.

_____ Select pump Stop at display and verify pump status changes to Off at display.

Checklist 4.2.5.1: Instrumentation and Controls Test Loop 205 Process Water Pump and Loop 210 Process Water Flow Test	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

D. Equipment Failure

- _____ Disable pump from running. Select pump Start at display and verify pump status indicates Off at display. After 10 seconds, verify that an equipment failure alarm is generated.
- _____ Select pump Start and verify PLC start output does not energize.
- _____ Select pump fail Reset at display. Enable pump to run and select pump Start at display and verify pump status changes to Run at display. Select pump Stop at display.

E. Interlocks

- _____ Select pump Start at display. With pump confirmed running, simulate a no flow condition. After 5 seconds, verify that a No Flow Alarm is generated and the pump is shut off.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.2a: Instrumentation and Controls Test Loop 220-1 Demister Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.2a: Instrumentation and Controls Test Loop 220-1 Demister Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.2b: Instrumentation and Controls Test Loop 220-2 Sluicer Rinse Valve	Revision: 0 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.2b: Instrumentation and Controls Test Loop 220-2 Sluicer Rinse Valve	Revision: 0 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.3: Instrumentation and Controls Test Loop 225-1 Recycle Tank Camera Lens Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.3: Instrumentation and Controls Test Loop 225-1 Recycle Tank Camera Lens Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.4: Instrumentation and Controls Test Loop 225-2 Old Hydrofracture Tank Camera Lens Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.4: Instrumentation and Controls Test Loop 225-2 Old Hydrofracture Tank Camera Lens Rinse Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.5: Instrumentation and Controls Test Loop 230 Pipe Blow Down Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.5: Instrumentation and Controls Test Loop 230 Pipe Blow Down Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.6: Instrumentation and Controls Test Loop 235 Pipe Flush Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.6: Instrumentation and Controls Test Loop 235 Pipe Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.7: Instrumentation and Controls Test Loop 245 High Pressure Pumps Discharge Header Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.7: Instrumentation and Controls Test Loop 245 High Pressure Pumps Discharge Header Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.8: Instrumentation and Controls Test Loop 250-1 High Pressure Pumps Suction Header Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.8: Instrumentation and Controls Test Loop 250-1 High Pressure Pumps Suction Header Flush Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.9: Instrumentation and Controls Test Loop 250-2 Low Pressure Pumps Discharge Line Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.9: Instrumentation and Controls Test Loop 250-2 Low Pressure Pumps Discharge Line Flush Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.10: Instrumentation and Controls Test Loop 300 Recycle Tank Discharge Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position.

_____ Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.10: Instrumentation and Controls Test Loop 300 Recycle Tank Discharge Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.11: Instrumentation and Controls Test Loop 305 High Pressure Pumps Intake Line Pressure and Recycle Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Using discrete input simulation equipment, simulate an Intake Line Press Switch High state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate an Intake Line Press Switch Normal state. Verify alarm is cleared at display.

_____ Using analog input simulation equipment, simulate a pressure signal. Verify that the engineering units conversion is performed correctly. Verify a Low, High, and High High alarm is generated at display. Verify trend is functioning correctly.

C. Manual Control

_____ With valve field switch in the Local position, enter a valve position set point of 100% at the display and verify that valve does not Open.

_____ Change valve field switch to the Remote position. Enter a valve position set point of 100% at the display and verify that the valve position indication is 100% and that the valve status indicates Open.

_____ Enter a valve position set point of 50% at the display and verify that the valve position indication is 50% and that the valve status indicates Transition.

Checklist 4.2.5.11: Instrumentation and Controls Test Loop 305 High Pressure Pumps Intake Line Pressure and Recycle Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

_____ Enter a valve position set point of 0% at the display and verify that the valve position indication is 0% and that valve status indicates Closed.

D. Computer Interlocks

_____ Simulate a pressure signal above the High alarm limit. Verify that the valve position indication is proportional to the amount the pressure is above the high alarm limit.

_____ Simulate a pressure signal below the High alarm limit. Verify that the valve position indication matches the manually entered valve position set point.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.12: Instrumentation and Controls Test Loop 320-1 High Pressure Transfer Pump 1	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

_____ Using discrete input simulation equipment, simulate a VFD Drive Fail state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a VFD Drive Fail return to Normal state. Verify alarm is cleared at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown return to Normal state. Verify alarm is cleared at display.

Checklist 4.2.5.12: Instrumentation and Controls Test Loop 320-1 High Pressure Transfer Pump 1	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

C. Manual Control

- _____ With pump field switch in the Local position, Select pump start at display and verify that pump does not Run.
- _____ Change pump field switch to the Remote position. Select pump Start at display and verify that pump status changes to Run at display.
- _____ Enter a pump speed set point of 100% at the display and verify that the pump speed indication is 100% at display.
- _____ Enter a pump speed set point of 50% at the display and verify that the pump speed indication is 50% at display.
- _____ Enter a pump speed set point of 0% at the display and verify that the pump speed indication is 0% at display.
- _____ Select pump Stop at display and verify that pump status changes to Off at display.

D. Equipment Failure

- _____ Disable pump from running. Select pump Start at display and verify pump status indicates Off at display. After 10 seconds, verify that an equipment failure alarm is generated.
- _____ Select pump Start and verify PLC start output does not energize.
- _____ Select pump fail Reset at display. Enable pump to run and select pump Start at display and verify pump status changes to Run at display. Select pump Stop at display.

E. Interlocks

- _____ Select pump Start at display. With pump confirmed running, simulate a VFD Drive Fail condition. Verify a VFD Drive Fail Alarm is generated.

Checklist 4.2.5.12: Instrumentation and Controls Test Loop 320-1 High Pressure Transfer Pump 1	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

_____ Remove VFD Drive Fail condition. Select pump Start at display. With pump confirmed running, simulate a Pump Pressure Shutdown condition. Verify a Pump Pressure Shutdown Alarm is generated and the pump is shut off.

_____ Remove Pump Pressure Shutdown condition.

F. Auto Mode

_____ With pump in Computer Manual start/stop mode, Select pump Start at display. Enter a 50% scale pressure set point at the pump speed controller.

_____ With pump confirmed running, select Computer Auto Pressure Control at display. Verify pump status indicates Computer Auto Pressure Control at display.

_____ Simulate high transfer line pressure. Set pressure to 50% scale and verify that pump speed remains constant.

_____ Set pressure to 75% scale and verify that pump speed begins decreasing.

Set pressure to 25% scale and verify that pump speed begins increasing.

_____ Select pump Stop at display. Verify pump speed is 0%.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.13: Instrumentation and Controls Test Loop 320-2 High Pressure Transfer Pump 2	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

_____ Using discrete input simulation equipment, simulate a VFD Drive Fail state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a VFD Drive Fail return to Normal state. Verify alarm is cleared at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown return to Normal state. Verify alarm is cleared at display.

Checklist 4.2.5.13: Instrumentation and Controls Test Loop 320-2 High Pressure Transfer Pump 2	Revision: 1 Date: April 28, 1998
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C. Manual Control

- _____ With pump field switch in the Local position, Select pump start at display and verify that pump does not Run.
- _____ Change pump field switch to the Remote position. Select pump Start at display and verify that pump status changes to Run at display.
- _____ Enter a pump speed set point of 100% at the display and verify that the pump speed indication is 100% at display.
- _____ Enter a pump speed set point of 50% at the display and verify that the pump speed indication is 50% at display.
- _____ Enter a pump speed set point of 0% at the display and verify that the pump speed indication is 0% at display.
- _____ Select pump Stop at display and verify that pump status changes to Off at display.

D. Equipment Failure

- _____ Disable pump from running. Select pump Start at display and verify pump status indicates Off at display. After 10 seconds, verify that an equipment failure alarm is generated.
- _____ Select pump Start and verify PLC start output does not energize.
- _____ Select pump fail Reset at display. Enable pump to run and select pump Start at display and verify pump status changes to Run at display. Select pump Stop at display.

E. Interlocks

- _____ Select pump Start at display. With pump confirmed running, simulate a VFD Drive Fail condition. Verify a VFD Drive Fail Alarm is generated.

Checklist 4.2.5.13: Instrumentation and Controls Test Loop 320-2 High Pressure Transfer Pump 2	Revision: 1 Date: April 28, 1998
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_____ Remove VFD Drive Fail condition. Select pump Start at display. With pump confirmed running, simulate a Pump Pressure Shutdown condition. Verify a Pump Pressure Shutdown Alarm is generated and the pump is shut off.

_____ Remove Pump Pressure Shutdown condition.

F. Auto Mode

_____ With pump in Computer Manual start/stop mode, Select pump Start at display. Enter a 100 psi pressure set point at the pump speed controller.

_____ With pump confirmed running, select Computer Auto Pressure Control at display. Verify pump status indicates Computer Auto Pressure Control at display.

_____ Simulate high transfer line pressure. Set pressure to 100 psi and verify that pump speed remains constant.

_____ Set pressure to 150 psi and verify that pump speed begins decreasing.

_____ Set pressure to 50 psi and verify that pump speed begins increasing.

_____ Select pump Stop at display. Verify pump speed is 0%.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.14: Instrumentation and Controls Test Loop 330 High Pressure Transfer Line Pressure	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a pressure signal. Verify that the engineering units conversion is performed correctly. Verify a High and High High alarm is generated at display. Verify trend is functioning correctly.

_____ Using discrete input simulation equipment, simulate a High Pressure Transfer Line Pressure Switch High state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a High Pressure Transfer Line Pressure Switch Normal state. Verify alarm is cleared at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.15: Instrumentation and Controls Test Loop 340-1 High Pressure Recycle Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Local position, enter a valve position set point of 100% at the display and verify that valve does not Open.

_____ Change valve field switch to the Remote position.

_____ Enter a valve position set point of 100% at the display and verify that the valve position indication is 100% and that the valve status indicates Open.

_____ Enter a valve position set point of 50% at the display and verify that the valve position indication is 50% and that the valve status indicates Transition.

_____ Enter a valve position set point of 0% at the display and verify that the valve position indication is 0% and that valve status indicates Closed.

D. Computer Interlocks

_____ Simulate a Loop 330 pressure signal above the High alarm limit. Verify that the valve position indication is proportional to the amount the pressure is above the High alarm limit.

Checklist 4.2.5.15: Instrumentation and Controls Test Loop 340-1 High Pressure Recycle Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

_____ Simulate a Loop 330 pressure signal below the High alarm limit. Verify that the valve position indication matches the manually entered valve position set point.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.16: Instrumentation and Controls Test Loop 340-2 MVST Discharge Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Verify valve status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Local position, enter a valve position set point of 100% at the display and verify that valve does not Open.

_____ Change valve field switch to the Remote position. Enter a valve position set point of 100% at the display and verify that the valve position indication is 100% and that the valve status indicates Open.

_____ Enter a valve position set point of 50% at the display and verify that the valve position indication is 50% and that the valve status indicates Transition.

_____ Enter a valve position set point of 0% at the display and verify that the valve position indication is 0% and that valve status indicates Closed.

D. Auto Mode

_____ Enter a 50% scale flow set point at the valve flow controller. Select Computer Auto Flow Control at display. Verify valve status indicates Computer Auto Flow Control at display.

Checklist 4.2.5.16: Instrumentation and Controls Test Loop 340-2 MVST Discharge Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

- _____ In Computer Auto Flow Control, valve is clamped Closed until Operator confirms MVST discharge. Simulate operator MVST discharge selection. With MVST discharge not enabled, simulate Loop 345 flow. Set flow to 0% scale and verify that valve position indication is 0%.
- _____ With MVST discharge enabled, simulate Loop 345 flow. Set flow to 25% scale and verify that valve begins opening.
- _____ Set flow to 75% scale and verify that valve begins closing.
- _____ Set flow to 50% scale and verify that valve position remains constant.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.17: Instrumentation and Controls Test Loop 345 MVST Discharge Flow	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a flow signal. Verify that the engineering units conversion is performed correctly. Verify trend is functioning correctly.

_____ Verify flow totalization is working. Select flow totalization Reset at display and confirm flow total is set to 0.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.18: Instrumentation and Controls Test Loop 350-1 Strainer Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.18: Instrumentation and Controls Test Loop 350-1 Strainer Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.19: Instrumentation and Controls Test Loop 350-2 Strainer Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.19: Instrumentation and Controls Test Loop 350-2 Strainer Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.20: Instrumentation and Controls Test Loop 360-1 Strainer Drain Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Manual at display and verify valve status indicates Computer Manual at display.

_____ Using analog input simulation equipment, simulate a strainer differential pressure signal. (Loop 330 minus Loop 663 pressure). Verify that the engineering units conversion is performed correctly. Verify a High alarm is generated at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.20: Instrumentation and Controls Test Loop 360-1 Strainer Drain Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.21: Instrumentation and Controls Test Loop 360-2 Strainer Drain Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Manual at display and verify valve status indicates Computer Manual at display.

_____ Using analog input simulation equipment, simulate a strainer differential pressure signal. (Loop 330 minus Loop 663 pressure). Verify that the engineering units conversion is performed correctly. Verify a High alarm is generated at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.21: Instrumentation and Controls Test Loop 360-2 Strainer Drain Valve 2	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.22: Instrumentation and Controls Test Loop 410-1 Old Hydrofracture Tank 1, Pump 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.23: Instrumentation and Controls Test Loop 410-2 Old Hydrofracture Tank 1, Pump 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.24: Instrumentation and Controls Test Loop 410-1 Tank 1 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.24: Instrumentation and Controls Test Loop 410-1 Tank 1 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Project Engineer	_____	_____

Checklist 4.2.5.25: Instrumentation and Controls Test Loop 410-2 Tank 1 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.25: Instrumentation and Controls Test Loop 410-2 Tank 1 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.26: Instrumentation and Controls Test Loop 420-1 Old Hydrofracture Tank 2, Pump 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.27: Instrumentation and Controls Test Loop 420-2 Old Hydrofracture Tank 2, Pump 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.28: Instrumentation and Controls Test Loop 420-1 Tank 2 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.28: Instrumentation and Controls Test Loop 420-1 Tank 2 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Project Engineer	_____	_____

Checklist 4.2.5.29: Instrumentation and Controls Test Loop 420-2 Tank 2 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.29: Instrumentation and Controls Test Loop 420-2 Tank 2 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.30: Instrumentation and Controls Test Loop 430-1 Old Hydrofracture Tank 3, Pump 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.31: Instrumentation and Controls Test Loop 430-2 Old Hydrofracture Tank 3, Pump 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.32: Instrumentation and Controls Test Loop 430-1 Tank 3 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.32: Instrumentation and Controls Test Loop 430-1 Tank 3 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Project Engineer	_____	_____

Checklist 4.2.5.33: Instrumentation and Controls Test Loop 430-2 Tank 3 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.33: Instrumentation and Controls Test Loop 430-2 Tank 3 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.34: Instrumentation and Controls Test Loop 440-1 Old Hydrofracture Tank 4, Pump 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.35: Instrumentation and Controls Test Loop 440-2 Old Hydrofracture Tank 4, Pump 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.36: Instrumentation and Controls Test Loop 440-1 Tank 4 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.36: Instrumentation and Controls Test Loop 440-1 Tank 4 Pump Discharge Valve 1	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Project Engineer	_____	_____

Checklist 4.2.5.37: Instrumentation and Controls Test Loop 440-2 Tank 4 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Close position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.37: Instrumentation and Controls Test Loop 440-2 Tank 4 Pump Discharge Valve 2	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.38: Instrumentation and Controls Test Loop 445 Bubbler System Air Pressure	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using discrete input simulation equipment, simulate a pressure switch Low state.
Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a pressure switch return to
Normal state. Verify alarm is cleared at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.39: Instrumentation and Controls Test Loop 445-1 Recycle Tank Level (Bubbler System)	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a level signal. Verify that the engineering units conversion is performed correctly. Verify a Low, High, and High High alarm is generated at display. Verify trend is functioning correctly.

C. Manual Control

_____ Select blow down valve Open at display and verify that valve opens.

_____ Select blow down valve Close at display and verify that valve closes.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.40: Instrumentation and Controls Test Loop 445-2 Old Hydrofracture Tank Level (Bubbler System)	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a level signal. Verify that the engineering units conversion is performed correctly. Verify a Low, High, and High High alarm is generated at display. Verify trend is functioning correctly.

C. Manual Control

_____ Select blow down valve Open at display and verify that valve opens.

_____ Select blow down valve Close at display and verify that valve closes.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.41: Instrumentation and Controls Test Loop 445-3 Old Hydrofracture Tank Level (Bubbler System)	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a level signal. Verify that the engineering units conversion is performed correctly. Verify a Low, High, and High High alarm is generated at display. Verify trend is functioning correctly.

C. Manual Control

_____ Select blow down valve Open at display and verify that valve opens.

_____ Select blow down valve Close at display and verify that valve closes.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.42: Instrumentation and Controls Test Loop 450 Low Pressure Transfer Flow	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a flow signal. Verify that the engineering units conversion is performed. Verify trend is functioning correctly.

_____ Verify flow totalization is working. Select flow totalization Reset at display and confirm flow total is set to 0.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.43: Instrumentation and Controls Test Loop 455 Low Pressure Transfer Throttling Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Verify valve status indicates Computer Manual at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

C. Manual Control

_____ With valve field switch in the Local position, enter a valve position set point of 100% at the display and verify that valve does not Open.

_____ Change valve field switch to the Remote position. Enter a valve position set point of 100% at the display and verify that the valve position indication is 100% and that the valve status indicates Open.

_____ Enter a valve position set point of 50% at the display and verify that the valve position indication is 50% and that the valve status indicates Transition.

_____ Enter a valve position set point of 0% at the display and verify that the valve position indication is 0% and that valve status indicates Closed.

D. Auto Mode

_____ Valve is used to control level in recycle tank. Enter a 50% scale level set point at the valve level controller. Select Computer Auto Level Control at display. Verify valve status indicates Computer Auto Level Control at display.

Checklist 4.2.5.43: Instrumentation and Controls Test Loop 455 Low Pressure Transfer Throttling Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

_____ Simulate level. Set level to 25% scale and verify that valve begins opening.

_____ Set level to 75% scale and verify that valve begins closing.

_____ Set level to 50% scale and verify that valve position remains constant.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.44: Instrumentation and Controls Test Loop 495 Recycle Tank Pump	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.45: Instrumentation and Controls Test Loop 625 Sluicer System Pressure	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a pressure signal. Verify that the engineering units conversion is performed correctly. Verify a Low alarm is generated at display.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.46: Instrumentation and Controls Test Loop 645 Sluicer Arm Range	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a position signal. Verify that the engineering units conversion is performed correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.47: Instrumentation and Controls Test Loop 650 Sluicer Arm Extension	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a position signal. Verify that the engineering units conversion is performed correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.48: Instrumentation and Controls Test Loop 655 Sluicer Mast Angle	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a position signal. Verify that the engineering units conversion is performed correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.49: Instrumentation and Controls Test Loop 660 Sluicer Pump Intake Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Local Closed position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Local Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.49: Instrumentation and Controls Test Loop 660 Sluicer Pump Intake Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.50: Instrumentation and Controls Test Loop 663 Sluicer Pump Intake Pressure	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a pressure signal. Verify that the engineering units conversion is performed correctly. Verify a Low alarm is generated at display. Verify trend is functioning correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.51: Instrumentation and Controls Test Loop 665 Sluicer Pump	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 3
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify pump field switch status indicates Local at display.

_____ Verify pump status indicates Off at display.

_____ Select Computer Auto at display and verify pump status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify pump status indicates Computer Manual at display.

_____ Change pump field switch to the Remote position and verify pump status changes to Remote at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown state. Verify an alarm is generated at display.

_____ Using discrete input simulation equipment, simulate a Pump Pressure Shutdown return to Normal state. Verify alarm is cleared at display.

C. Manual Control

_____ With pump field switch in the Local position, Select pump Start at display and verify that pump does not Run.

_____ Change pump field switch to the Remote position. Select pump Start at display and verify that pump status changes to Run at display.

Checklist 4.2.5.51: Instrumentation and Controls Test Loop 665 Sluicer Pump	Revision: 1 Date: April 28, 1998
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- _____ Enter a pump speed set point of 65% at the display and verify that the pump speed indication is 65% at display.
- _____ Enter a pump speed set point of 50% at the display and verify that the pump speed indication is 50% at display.
- _____ Enter a pump speed set point of 25% at the display and verify that the pump speed indication is 25% at display.
- _____ Select pump Stop at display and verify that pump status changes to Off at display.

D. Equipment Failure

- _____ Disable pump from running. Select pump Start at display and verify pump status indicates Off at display. After 10 seconds, verify that an equipment failure alarm is generated.
- _____ Select pump Start and verify PLC start output does not energize.
- _____ Select pump fail Reset at display. Enable pump to run and select pump Start at display and verify pump status changes to Run at display. Select pump Stop at display.

E. Interlocks

- _____ Select pump Start at display. With pump confirmed running, simulate a Pump Pressure Shutdown condition. Verify a Pump Pressure Shutdown Alarm is generated and the pump is shut off.
- _____ Remove Pump Pressure Shutdown condition. Select pump Start at display. With pump confirmed running, simulate a Loop 445-2 High High Old Hydrofracture Tank Level condition. Verify a High High Old Hydrofracture Tank Level Alarm is generated and the pump is shut off.
- _____ Return Loop 445-2 level to normal. Verify pump does not restart.

Checklist 4.2.5.51: Instrumentation and Controls Test Loop 665 Sluicer Pump	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 3 of 3
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.52: Instrumentation and Controls Test Loop 665A Sluicer Pump Bypass Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Local Closed position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Local Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.52: Instrumentation and Controls Test Loop 665A Sluicer Pump Bypass Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.53: Instrumentation and Controls Test Loop 668 Sluicer Pump Discharge Pressure and Loop 670 Sluicer Pressure Release Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Using analog input simulation equipment, simulate a pressure signal. Verify that the engineering units conversion is performed correctly. Verify a Low, High, and High High alarm is generated at display. Verify trend is functioning correctly.

C. Manual Control

_____ With valve field switch in the Close position, select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Open position, select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve Opens.

_____ Select valve Close at display and verify that valve Closes.

D. Computer Interlocks

_____ Simulate a pressure signal above the High alarm limit. Verify that the valve Opens.

Checklist 4.2.5.53: Instrumentation and Controls Test Loop 668 Sluicer Pump Discharge Pressure and Loop 670 Sluicer Pressure Release Valve	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

_____ Simulate a pressure signal below the High alarm limit. Verify that the valve returns to the previous state.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.54: Instrumentation and Controls Test Loop 675 Sluicer Pump Discharge Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 2
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Verify valve field switch status indicates Local at display.

_____ Change valve field switch to the Remote position and verify valve status changes to Remote at display.

_____ Select Computer Auto at display and verify status indicates Computer Auto at display.

_____ Select Computer Manual at display and verify status indicates Computer Manual at display.

C. Manual Control

_____ With valve field switch in the Local Closed position, Select valve Open at display and verify that valve does not Open.

_____ With valve field switch in the Local Open position, Select valve Close at display and verify that valve does not Close.

_____ Change valve field switch to the Remote position. Select valve Open at display and verify that valve opens.

_____ Select valve Close at display and verify that valve closes.

Checklist 4.2.5.54: Instrumentation and Controls Test Loop 675 Sluicer Pump Discharge Valve	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 2 of 2
Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.55: Instrumentation and Controls Test Loop 700 Radiation Monitor – Recycle Tank	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a radiation signal. Verify that the engineering units conversion is performed correctly. Verify a High and High High alarm is generated at display. Verify trend is functioning correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.56: Instrumentation and Controls Test Loop 705 Radiation Monitor – Hydrofracture Tank	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a radiation signal. Verify that the engineering units conversion is performed correctly. Verify a High and High High alarm is generated at display. Verify trend is functioning correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.5.57: Instrumentation and Controls Test Loop 710 Radiation Monitor – Pumping Skid	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification

_____ Using analog input simulation equipment, simulate a radiation signal. Verify that the engineering units conversion is performed correctly. Verify a High and High High alarm is generated at display. Verify trend is functioning correctly.

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.2.6: Instrumentation and Controls Test Ventilation Skid	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Initials Criteria

A. Review the associated displays for layout and completeness.

_____ Display layout is correct and complete.

B. Point and display verification.

_____ Verify heater status (on/off) appears on OMI when heater is locally turned on.

_____ Verify ventilation fan status (L/R) appears correctly on OMI.

_____ Verify ventilation fan can start/stop from PLC when in Remote.

_____ Verify ventilation fan status (Running) appears on screen when fan is started.

_____ With temperature set at temperature controller at Heater Panel, verify that the heater intensity is automatically adjusted to maintain this set point.

_____ Verify temperature transmitter TT-505 signal received by PLC.

_____ Verify temperature transmitter TT-515 signal received by PLC.

_____ Verify humidity transmitter AIT-535 signal received by PLC.

_____ Verify flow transmitter FIT-540 signal received by PLC.

_____ Verify heater controller setpoint (SP1/SP2) is switched from PLC.

Checklist 4.2.6: Instrumentation and Controls Test Ventilation Skid	Revision: 1 Date: April 28, 1998
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Prepared by: CDM Federal Programs Corporation	

Comments: _____

	Signature	Date
System Operator	_____	_____
I&C Engineer	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.4.1: Support System Test Compressed Air System Inspection	Revision: 1 Date: April 28, 1998
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials	Criteria
_____	Air compressor is operating normally (i.e., no unusual noises or vibrations and no alarms on the control panel).
_____	Air dryers are operating normally (i.e., no alarms on the control panel).
_____	Air receiver tank pressure is _____ psi.
_____	Compressed air supply pressure is 100 psi.

Comments: _____

	Signature	Date
System Operator	_____	_____
Field Operations Superintendent	_____	_____

Checklist 4.4.2:	Revision: 1 Date: April 28, 1998
Support System Test Process Water Test	
OHF Tank Contents Removal Project Oak Ridge National Laboratory, Oak Ridge, Tennessee	Page 1 of 1
Prepared by: CDM Federal Programs Corporation	

Initials

Criteria

_____ Strainer STR355-1 flushed with process water while off-line.

_____ Strainer STR355-2 flushed with wastewater while off-line.

Comments:

Signature

Date

System Operator

System Operator

Field Operations Superintendent

DAILY CHECKLISTS

OHF DAILY PRE-OPERATIONAL CHECKLIST

Main Distribution Panel

_____ Place all breakers (except spares) into the "ON" position .

Comments:

Air Compressor Skid

- _____ Place main power switch to the "ON" position.
- _____ Check e-stop button to make sure it is pulled out.
- _____ Place hand switch to the "LOCAL" position.
- _____ Check sight glass on both air dryers. If pink, the desiccant is spent and must be replaced.
- _____ Record tank gauge pressure, _____ psi. Pressure should be between 100 psi and 175 psi. Report problems as necessary.
- _____ Record discharge regulator pressure, _____ psi. Pressure should read 100 psi. Report problems as necessary.

Comments:

Transfer Pump Skid

- _____ Check radiation alarm on OMI for transfer pump skid radiation levels. Ensure no alarms are present. Report problems, if any.

Motor Starters

Submersible pumps

- _____ Place main power switch to the "ON" position.
- _____ Place hand switch the "REMOTE" position.
- _____ Pull e-stop buttons out.
- _____ Make sure submersible pump power cables are connected securely to the appropriate motor starters.

Mixer

- _____ Place main power switch to the "ON" position.
- _____ Place hand switch the "REMOTE" position.
- _____ Pull e-stop buttons out.

Recycle pump

- _____ Place main power switch to the "ON" position.
- _____ Place hand switch the "REMOTE" position.
- _____ Pull e-stop buttons out.

- _____ Check connection to and from bubbler cabinet. Report problems as necessary.
- _____ Place all fail safe (MOV) hand switches on the skid to the "REMOTE" position.

Transfer Pump Skid (cont)

- _____ Place main power switch on both VFD starters to the "ON" position. Place hand switches to the "REMOTE" position. Check and report any panel alarms. Press "RESET" button as necessary.
- _____ Check oiler on air supply line to diaphragm pumps for proper oil level and operation.
- _____ Check skid secondary containment for leaks and spills. Report problems as necessary.
- _____ Check the skid for equipment problems (such as loose electrical connections, improper pipe and pump alignment, and deviations from nominal operating conditions). Report problems as necessary.

Comments:

Sluicer Pump Skid

- _____ Open each of the four fail safe boxes and place
 - _____ power switch to "ON",
 - _____ local selector switch to "AUTO",
 - _____ selector switch to "REMOTE", and
 - _____ fail position switch to the position directed on the posted operator aid.
- _____ Place sluicer pump SLCP665 hand switches to the "AUTO" position.
- _____ Verify that the sluicer pump VFD has power.
- _____ Check skid secondary containment for leaks and spills. Report problems as necessary.
- _____ Check the skid for equipment problems (such as loose electrical connections, improper pipe and pump alignment, and deviations from nominal operating conditions). Report problems as necessary.
- _____ Check oil level at the power end of the plunger pump and adjust if necessary.
- _____ Check for leakage between the fluid cylinder and frame.

Comments:

Borehole Miner

- _____ Inspect system for hydraulic and water leaks.
- _____ Inspect electrical and hydraulic connections.
- _____ Inspect bellows for tears or unusual wear.

Comments:

System Risers

- _____ Check system piping leading to and from risers for leaks and alignment. Report problems as necessary.
- _____ Check riser for collected water. Report problems as necessary.
- _____ Check riser MOV actuators, flowmeters, and rinse connections. Report problems as necessary.

Comments:

Potable Water Pump Skid

- _____ Place main power switch to the "ON" position.
- _____ Place motor starter hand switch to the "REMOTE" position.
- _____ Check e-stop button to make sure they are pulled out.
- _____ Place all hand switches on the skid to the "REMOTE" position.
- _____ Place VLV200 and VLV201 to the open position.
- _____ Check skid for leaks or mechanical problems. Report problems as necessary.
- _____ Check skid connections and hoses. Report problems as necessary.
- _____ Record number of gallons in potable water tank, _____ gallons.

Comments:

HPU Unit

- _____ Check oil level and adjust as necessary.
- _____ Walk down hydraulic lines and check for leaks. Report problems as necessary.
- _____ Oil pressure indicator on top of unit should read "OK." Report problems as necessary.
- _____ Check e-stop button to make sure it is pulled out.

Comments:

Ventilation Skid

- _____ Verify that the ventilation system is operating.
- _____ Check oiler on air supply line to diaphragm pumps for proper oil level and operation.

Comments:

Generator
TBD

Comments:

Control Room

- _____ Place two 10-amp circuit breakers in the PLC to the "ON" position.
- _____ Turn on power to both in-tank cameras.
- _____ Turn on site camera.
- _____ Turn on OMI computer and printer.
- _____ From the OMI, press the "Flow Totals" button and record total flow readings for:
 - _____ MVST Flow, _____ gallons
 - _____ Low Pressure Transfer Flow, _____ gallons
 - _____ Process Water Flow, _____ gallons
 - _____ Ventilation Line Flow, _____ cubic feet
- _____ Plug in Sluicer Control Unit.
- _____ Turn on Sluicer Visualization computer and log on to main screen.
- _____ Energize Sluicer Control Unit. Manipulate sluicer functions while monitoring the sluicer in-tank camera. Verify that changes in sluicer arm angle, arm extension, and mast rotation register correctly on the Sluicer Control Unit LEDs, OMI readouts, and visualization system.

Comments:

Signatures:

Operator: _____ Date: _____

Field Operations Superintendent: _____ Date: _____

OHF DAILY POST-OPERATIONAL CHECKLIST

Transfer Pump Skid

- _____ Check radiation alarm on OMI for transfer pump skid radiation levels. Ensure no alarms are present. Report problems, if any.
- _____ Place main power switch on both VFD starters to the "OFF" position.
- _____ Check skid secondary containment for leaks and spills. Report problems as necessary.
- _____ Check the skid for equipment problems (such as loose electrical connections, improper pipe and pump alignment, and deviations from nominal operating conditions). Report problems as necessary.
- _____ Check connection to and from bubbler cabinet. Report problems as necessary.

Comments:

Sluicer Pump Skid

- _____ Place sluicer pump VFD to the "OFF" position.
- _____ Check skid secondary containment for leaks and spills. Report problems as necessary.
- _____ Check the skid for equipment problems (such as loose electrical connections, improper pipe and pump alignment, and deviations from nominal operating conditions). Report problems as necessary.

Comments:

Borehole Miner

- _____ Inspect system for hydraulic and water leaks.
- _____ Inspect electrical and hydraulic connections.
- _____ Inspect bellows for tears or unusual wear.

Comments:

System Risers

- ___ Check system piping leading to and from risers for leaks. Report problems as necessary.
- ___ Check riser for collected water. Report problems as necessary.
- ___ Check riser MOV actuators, flowmeters, and rinse connections. Report problems as necessary.

Comments:

Potable Water Pump Skid

- ___ Place main power switch to the "OFF" position.
- ___ Place the process water holding tank hand valve to the closed position.
- ___ Check skid for leaks or mechanical problems. Report problems as necessary.
- ___ Check skid connections and hoses. Report problems as necessary.
- ___ Record number of gallons in potable water tank, ___ gallons.

Comments:

HPU Unit

- ___ Walk down hydraulic lines and check for leaks. Report problems as necessary.

Comments:

Ventilation Skid

- ___ Verify that the ventilation system is operating.

Comments:

Generator

TBD

Comments:

Control Room

____ Turn off power to both in-tank cameras.

____ Turn off site camera.

____ From the OMI, press the "Flow Totals" button and record total flow readings for:

 MVST Flow, _____ gallons

 Low Pressure Transfer Flow, _____ gallons

 Process Water Flow, _____ gallons

 Ventilation Line Flow, _____ cubic feet

____ Unplug Sluicer Control Unit.

Comments:

Signatures:

Operator: _____ Date: _____

Field Operations Superintendent: _____ Date: _____

WORK INSTRUCTIONS

Work Instruction 1: Sluicing System Setup and Configuration	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: None.

Special Tools: Two hand-held, 2-way radios.

Prerequisites: Sluicing system setup as approved by the lead engineer, successfully completed the system leak test, successfully completed instrumentation and controls test, and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. Confirm Pre-Operational Checklist is complete and issues/problems resolved.
- _____ 2. Confirm with the Field Operations Superintendent that the sluice tank gamma detector is installed in the correct dry well.
- _____ 3. Manually close strainer STR355-1 rinse valve VLV240-1.
- _____ 4. Manually close strainer STR355-2 rinse valve VLV240-2.
- _____ 5. Manually open strainer STR355-1 isolation valve VLV370-1.
- _____ 6. Manually open strainer STR355-2 isolation valve VLV370-2.
- _____ 7. Manually open or close as directed by the Field Operations Superintendent, the high pressure transfer pump HPP320-1 intake valve VLV315-1.
- _____ 8. Manually open or close as directed by the Field Operations Superintendent, the high pressure transfer pump HPP320-1 discharge valve VLV330-1.
- _____ 9. Manually open or close as directed by the Field Operations Superintendent, the high pressure transfer pump HPP320-2 intake valve VLV315-2.
- _____ 10. Manually open or close as directed by the Field Operations Superintendent, the high pressure transfer pump HPP320-2 discharge valve VLV330-2.

Work Instruction 2: Sluicing System Startup and Operation	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: None.

Special Tools: None.

Prerequisites: Completed Work Instruction 1 (Sluicing System Setup and Configuration), denaturing material must be added to target tanks, and permission from the Field Operations Superintendent.

Notes: During system operation, the PLC and the sluicer control panel are not to be left unattended.

If the sluicing system is interrupted for any reason other than the execution of Work Instruction 8 (On-Line Strainer Flushing), then Work Instruction 1 (Sluicing System Setup and Configuration) and Work Instruction 2 (Sluicing System Startup and Operation) must be re-executed prior to initiating sluicing operations.

Work Instructions:

- _____ 1. From the sluicer control panel, document the coordinate locations of any in-tank obstructions with the sluice tank camera and the sluicer location readouts.
- _____ 2. The Field Operations Superintendent will use the information obtained in step 1, as well as visual observations with the in-tank camera to establish allowable sluicing operation parameters. The Field Operations Superintendent will post operating parameters at the sluicer control panel for arm angle, arm extension, and mast angle.
- _____ 3. Select desired view of the Borehole Miner Visualization System.
- _____ 4. From the OMI, click on the "Ventilation System" button. Click on the blower (VF545) and select the "AUTO" button.
- _____ 5. From the OMI, open high pressure pump recycle valve MOV340-1 to 10%.
- _____ 6. From the OMI, set low pressure feed pump recycle valve MOV305 to 0% open.

Work Instruction 2: Sluicing System Startup and Operation	Revision: 2 Date: April 28, 1998
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- _____ 7. From the OMI, click on "Bubble Tank Select" button. Select the appropriate tank for each bubbler as designated by the Field Operations Superintendent.
- _____ 8. From the OMI, click on "OHF Pumps Motor Starters" button. Select the pump that is connected to each motor starter panel.
- _____ 9. From the OMI, click on "Sluicer Pump Bypass" button. From direction of the Field Operations Superintendent, click on the "Pump" button if the sluicer pump will be used or click on the "Bypass Valve" button if the sluicer pump will be bypassed.
- _____ 10. From the OMI, select the "Recycle Tank Level Controller" screen. Enter the set point and operational mode (auto or manual) as directed by the Field Operations Superintendent.
- _____ 11. From the OMI, select the "High Pressure Transfer Pressure Controller" screen. Enter the set point as directed by the Field Operations Superintendent and set the operational mode in "Manual."
- _____ 12. From the OMI, select the "MVST Flow Controller" screen. Set the operational mode in "Manual."
- _____ 13. From the OMI, select the sluicer pump (SLCP665) and set the speed command to 25%.
- _____ 14. The Field Operations Superintendent and the Instrumentation and Control Engineer will verify that the flowing alarm set points are initially set as outlined in operator aid OPAID-009.
 - a. High Pressure Pump Intake Pressure Set Points,
 - b. High Pressure Transfer Line Pressure Set Points,
 - c. Strainer Differential Pressure Set Point,
 - d. Sluicer Pump Discharge Set Points,
 - e. Recycle Tank Level Set Points,
 - f. Bubbler 1 Level Set Points, and
 - g. Bubbler 2 Level Set Points.
- _____ 15. From the OMI, click on "Sluicing Control" button to bring up the sluicing sequence screen.
 - a. Click on the "AUTO" button to place all of the sluicing equipment in Auto Mode.

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- b. Select the tank that is being sluiced by pressing the appropriate button at the direction of the Field Operations Superintendent.
 - c. Select sluice tank pump (1 or 2) that will be started with the auto startup sequence at the direction of the Field Operations Superintendent.
 - d. Click on the "START" button to begin sluicing.
- _____ 16. From the OMI, slowly increase the transfer pump speed in intervals of 5% or less and adjust the high pressure recycle valve MOV340-1 position until the sluicer pump intake pressure (PIT-663) reaches 120 psi.
- _____ 17. From the OMI, confirm that the sluicer pump is activated by the OMI after the sluicer pump intake pressure (PIT-663) is 120 psi or greater for 20 seconds. If not, abort the sluicing sequence.
- _____ 18. Once the sluicer pump has started, the Field Operations Superintendent will vary select process variables to maximize system performance. This includes, but is not limited to:
 - a. high pressure pump speed (HPP320-1 or HPP320-2) and discharge pressure settings on the "High Pressure Transfer Pressure Controller" screen,
 - b. MOV305 positions,
 - c. MOV340-1 positions,
 - d. sluicer pump (SLCP) speed,
 - e. pump or bypass setting on the "Sluicer Pump Bypass" screen,
 - f. tank level setting on the "Recycle Tank Level Controller" screen, and
 - g. conducting a partial MVST transfer using the "MVST Flow Controller" screen.
- _____ 19. At the direction of the Field Operations Superintendent, new sluicer operating parameters may be posted at the sluicer control panel for arm angle, arm extension, and mast angle.
- _____ 20. If the Field Operations Superintendent determines that the satisfactory mixing has occurred, proceed to Work Instruction 3 (Transfer of Slurry to MVST). If not repeat steps 18 and 19.

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APPENDIX

Failure Conditions

1. If the selected low pressure submersible pump fails, a message will appear on the screen asking if the backup pump should be run.
 - a. If "YES" is selected, the valve for the selected pump will close, the valve for the backup pump will open, and the backup pump will start. If both pumps fail, the sequence will abort.
 - b. If "NO" is selected, the sequence will abort.
2. If the recycle tank T-9 pump fails, the sequence will abort.
3. If a high strainer differential pressure occurs across strainer STR355-1 and strainer STR355-1 drain valve MOV360-1 is open for 60 seconds, a message will appear on the screen asking if the backup strainer should be used. If this message appears, the operator will select "NO" and the sequence will abort.
4. If high pressure transfer pump HPP320-1 fails, then a message will appear on the screen asking if high pressure transfer pump HPP320-2 should start. If this message appears, the operator will select "NO" and the sequence will abort.
5. If the sluicer pump fails, the sequence will abort.
6. If a high-high OHF tank level alarm occurs during sluicing operations (not when transferring to the MVST), the sequence will abort.
7. If the ventilation fan fails, the sequence will abort.

Comments:

Work Instruction 3: Transfer of Slurry to MVST	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, Field Operations Superintendent and MVST representative.

Special Permits: None.

Special Tools: None.

Prerequisites: Sluicing system operations in process, sluicing system operations in accordance with Work Instruction 2 (Sluicing System Startup and Operation), verification of on-site presence of Waste Management personnel, notification from Waste Management that the valve box for the LLLW transfer line has been valved correctly to allow transfer of slurry to MVST, and permission from the Field Operations Superintendent.

Notes: Radio or telephone contact with the MVST representative must be maintained at all times during transfer of slurry to the MVST.

Work Instructions:

- _____ 1. From the OMI, click on the "Flow Totals" button and record the total flow reading for the MVST flow in the logbook.
- _____ 2. Contact the MVST representative, by radio and telephone, to notify Waste Management personnel that a transfer is about to begin. Get confirmation from MVST representative that Waste Management is ready to receive transfer and document conversation in logbook.
- _____ 3. From the OMI, select the "MVST Flow Controller" screen. Place the controller in "AUTO" and enter a set point of 30 gpm.
- _____ 4. From the OMI, select the Sluicer pump (SLCP 665) and slowly ramp the pump speed, in intervals of 5% or less, down to 25%.
- _____ 5. From the OMI, select the "High Pressure Transfer Controller" screen and slowly ramp down the high pressure pump speed, in intervals of 5% or less, until the sluicer pump intake pressure (PIT-663) is 20 psi.

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Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 6 is executed.

- _____ 6. From the OMI, select the "Sluicer Pump Bypass" screen and click on the "BYPASS" button.
- _____ 7. From the OMI, confirm that the Sluicer pump (SLCP 665) has shut down. If not, abort the sluicing sequence.
- _____ 8. From the OMI, select the "High Pressure Transfer Controller" screen and click on the "MANUAL" button.

Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 9 is executed.

- _____ 9. From the OMI, select the "Sluicer Controller" screen. Click on the "TRANSFER" button.
- _____ 10. From the OMI, the Field Operations Superintendent will vary select process variable to maintain a minimum transfer rate of 30 gpm to a maximum transfer rate of 50 gpm. This includes, but is not limited to:
 - a. high pressure pump speed (HPP320-1 or HPP320-2) and discharge pressure settings on the "High Pressure Transfer Pressure Controller" screen,
 - b. MOV305 positions,
 - c. MOV340-1 positions,
 - d. tank level setting on the "Recycle Tank Level Controller" screen, and
 - e. the flow rate setting on the "MVST Flow Controller" screen.

Note: The MVST representative will be contacted, by radio or telephone, at least every 30 minutes during the transfer to compare volume received at MVST with volume pumped at OHF. If a significant discrepancy is noted, the MVST may request that the transfer sequence be aborted. To abort the transfer sequence, click on the "Sluicing Control" button from the OMI. From the

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sluicing sequence screen, click on the "ABORT" button. Document all conversations and actions taken in logbook.

Note: Once the transfer process has been completed, the OMI will automatically shut the system down.

- _____ 11. After the transfer process is completed, click on the "Flow Totals" button (from the OMI) and record the total flow reading for the MVST flow in the logbook.
- _____ 12. Contact the MVST representative to notify Waste Management personnel that the transfer is complete. Ask the MVST representative to provide a total gallons received reading and record it in the logbook. Notify MVST representative that line flushing is commencing.
- _____ 13. From the OMI, close demister rinse line MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2, pipe blow down valve MOV230, recycle tank bypass valves MOV250-1 and MOV250-2, feed pump discharge valve MOV300, feed pump recycle valve MOV305, high pressure recycle valve MOV340-1, strainer STR355-1 valve MOV350-1, and strainer STR355-2 valve MOV350-2.
- _____ 14. From the OMI, open pipe flush valve MOV245 and MVST discharge valve MOV340-2.
- _____ 15. From the OMI, click on the "Flow Totals" button and record total flow reading for "Process Water Flow" in the logbook.
- _____ 16. From the OMI, activate the process water pump PWP205.
- _____ 17. From the OMI, open pipe flush valve MOV235.
- _____ 18. Once 320 gallons of process water has been pumped (as shown on the process water flow totalizer), close pipe flush valve MOV235, from the OMI.
- _____ 19. From the OMI, shut down the process water pump PWP205.
- _____ 20. From the OMI, click on the "Flow Totals" button and record total flow reading for "Process Water Flow" in the logbook.
- _____ 21. Notify MVST representative that pipe flushing is complete.
- _____ 22. Execute Work Instruction 4 (Normal System Shutdown).

Work Instruction 4: Normal System Shutdown	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: None.

Special Tools: None.

Prerequisites: System must be operating normally and in a sluicing or MVST transfer mode and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. If conducting normal shutdown while sluicing in accordance with Work Instruction 2 (Sluicing System Startup and Operation) or transferring to MVST in accordance with Work Instruction 3 (Transfer of Slurry to MVST), proceed to step 2. If conducting a normal shutdown after a completed sluicing and transfer sequence, proceed with step 3.
- _____ 2. From the OMI, click on the "Sluicing Control" button to bring up the sluicing sequence screen. From the sluicing sequence screen, click on the "ABORT" button.
- _____ 3. Verify all waste has been transferred to its desired location and all system pumps are non-operational.
- _____ 4. From the OMI, open sluicer rinse valve MOV220-2.
- _____ 5. From the OMI, activate the process water pump PW205.
- _____ 6. From the sluicer controller, retract the extendible nozzle into the mast.
- _____ 7. From the OMI, shut down the process water pump PW205.
- _____ 8. From the OMI, close sluicer rinse valve MOV220-2.
- _____ 9. Perform line flushing in accordance with Work Instruction 5 (Line Flushing Sequence).

Comments:

Work Instruction 5: Line Flushing Sequence	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: None.

Special Tools: None.

Prerequisites: Completed Work Instruction 4 (Normal System Shutdown), transfer of excess supernate to tank T-3 must be completed before using supernate as a flushing agent, and permission from the Field Operations Superintendent.

Notes: The Field Operations Superintendent will verify that the positions of all system manual valves have not changed since executing Work Instruction 2 (Sluicing System Startup and Operation). If valve changes have been made, the Field Operations Superintendent will direct the realignment of manual valves to their original position.

Note: At the discretion of the Field Operations Superintendent, air drying of the lines may be performed in addition to the line flushing prescribed in this work instruction. Air drying will be considered if extended system downtime is planned or if required by Health Physics.

All actuated valves have a 30-second response time for changing position, except for sluicer pump valves, which have a 1 minute response time.

Work Instructions:

- _____ 1. The Field Operations Superintendent will determine which sections of this work instruction to execute. Each flushing sequence may be performed separately either with process water or supernatant. This work instruction is written assuming that excess supernatant will be transferred and stored in Tank T-3 after it has been sluiced.
- _____ 2. Manually open process water tank valve VLV200.
- _____ 3. Manually open pipe flush line valve VLV201 one quarter turn.

Note: Pipe flush line valve VLV201 may be adjusted manually to obtain 25 gpm from process water pump.

Work Instruction 5: Line Flushing Sequence	Revision: 2 Date: April 28, 1998
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Note: If performing all line flushing sequences, a process water flow totalizer reading is only required prior to and at the completion of line flushing.

Low Pressure Transfer System Flushing with Process Water

- _____ 4. From the OMI, close all actuated (MOV) valves.
- _____ 5. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 6. From the OMI, open pipe flush valve MOV235.
- _____ 7. From the OMI, open recycle tank bypass valve MOV250-2.
- _____ 8. From the OMI, activate the process water pump PWP205.

Note: Verify discharge is obtained through the bottom of the submersible pump corresponding to the valves exercised in step 9.

- _____ 9. From the OMI, cycle open and closed each of the submersible pump discharge valves (MOV410-1, MOV410-2, MOV420-1, MOV420-2, MOV430-1, MOV430-2, MOV440-1, and MOV440-2) used while conducting Work Instruction 2 (Sluicing System Startup and Operation).

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 10.

- _____ 10. From the OMI, cycle low pressure transfer throttle valve MOV455 open, then closed.
- _____ 11. From the OMI, shut down the process water pump PWP205.
- _____ 12. From the OMI, close recycle tank bypass valve MOV250-2.
- _____ 13. From the OMI, close pipe flush valve MOV235.
- _____ 14. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

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Low Pressure Feed System Flushing with Process Water

- _____ 15. From the OMI, close all actuated (MOV) valves.
- _____ 16. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 17. From the OMI, open pipe flush valve MOV235.
- _____ 18. From the OMI, open recycle tank bypass valve MOV250-1.
- _____ 19. From the OMI, activate the process water pump PWP205.

Note: Verify discharge is obtained through the bottom of submersible low pressure pump LPP495.
- _____ 20. From the OMI, cycle feed pump discharge valve MOV300 open, then closed.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 21.
- _____ 21. From the OMI, cycle feed pump recycle valve MOV305 open, then closed.
- _____ 22. From the OMI, shut down the process water pump PWP205.
- _____ 23. From the OMI, close recycle tank bypass valve MOV250-1.
- _____ 24. From the OMI, close pipe flush valve MOV235.
- _____ 25. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

High Pressure Pump System Flushing with Process Water

- _____ 26. From the OMI, close all actuated (MOV) valves.
- _____ 27. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 28. From the OMI, open pipe flush valve MOV235.

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_____ 29. From the OMI, open recycle tank bypass valve MOV250-1.

_____ 30. From the OMI, open high pressure pump recycle valve MOV340-1.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 31.

_____ 31. From the OMI, activate the process water pump PWP205.

_____ 32. From the OMI, shut down the process water pump PWP205.

_____ 33. From the OMI, close high pressure pump recycle valve MOV340-1.

_____ 34. From the OMI, close recycle tank bypass valve MOV250-1.

_____ 35. From the OMI, close pipe flush valve MOV235.

_____ 36. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Strainer Flushing with Process Water

_____ 37. From the OMI, close all actuated (MOV) valves.

_____ 38. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

_____ 39. From the OMI, open pipe flush valve MOV235.

_____ 40. From the OMI, open pipe flush valve MOV245.

Note: If a strainer was not used during execution of Work Instruction 2 (Sluicing System Startup and Operation) then the flushing sequence for the strainer may be skipped.

Flushing Strainer STR355-1

_____ 41. From the OMI, open strainer STR355-1 valve MOV350-1.

_____ 42. From the OMI, activate process water pump PWP205.

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Note: Verify discharge into the recycle tank (T-9) using the in-tank camera in step 43.

- _____ 43. From the OMI, cycle strainer STR355-1 drain valve MOV360-1 open, then closed.
- _____ 44. From the OMI, close strainer STR355-1 valve MOV350-1.
- _____ 45. Proceed to step 50.

Flushing Strainer STR355-2

- _____ 46. From the OMI, open strainer STR355-2 valve MOV350-2.
- _____ 47. From the OMI, activate process water pump PWP205.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera in step 48.

- _____ 48. From the OMI, cycle strainer STR355-2 drain valve MOV360-2 open, then closed.
- _____ 49. From the OMI, close strainer STR355-2 valve MOV350-2.
- _____ 50. From the OMI, shut down the process water pump PWP205.
- _____ 51. From the OMI, close pipe flush valve MOV245.
- _____ 52. From the OMI, close pipe flush valve MOV235.
- _____ 53. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Sluicer and Sluicer Pump Flushing with Process Water

- _____ 54. From the OMI, close all actuated (MOV) valves.
- _____ 55. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 56. From the OMI, open pipe flush valve MOV235.
- _____ 57. From the OMI, open pipe flush valve MOV245.

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_____ 58. From the OMI, open the strainer valve (MOV350-1 or MOV350-2) used while conducting Work Instruction 2 (Sluicing System Startup and Operation).

_____ 59. From the OMI, open sluicer pump SLCP665 intake valve MOV660.

_____ 60. From the OMI, activate the process water pump PWP205.

Note: Verify discharge through the sluicer using the in-tank camera.

_____ 61. From the OMI, open sluicer pump SLCP665 discharge valve MOV675.

_____ 62. From the OMI, close sluicer pump SLCP665 intake valve MOV660.

_____ 63. From the OMI, close sluicer pump SLCP665 discharge valve MOV675.

_____ 64. From the OMI, open sluicer pump SLCP665 bypass valve MOV665.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 65.

_____ 65. From the OMI, cycle sluicer pressure release valve MOV670 open, then closed.

_____ 66. From the OMI, shut down the process water pump PWP205.

_____ 67. From the OMI, close sluicer pump SLCP665 bypass valve MOV665.

_____ 68. From the OMI, close strainer valve opened in step 58.

_____ 69. From the OMI, close pipe flush valve MOV245.

_____ 70. From the OMI, close pipe flush valve MOV235.

_____ 71. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Low Pressure Transfer System Flushing with Supernatant from Tank T-3

_____ 72. From the OMI, close all actuated (MOV) valves.

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_____ 73. Manually open east tanks isolation valve VLV450-1 and west tanks isolation valve VLV450-2.

_____ 74. From the OMI, open pump 430-1 discharge valve MOV430-1.

_____ 75. From the OMI, activate tank T-3 low pressure transfer pump LPP430-1.

Note: Verify discharge is obtained through the bottom of the submersible pump corresponding to the valves exercised in step 76.

_____ 76. From the OMI, cycle open and closed each of the submersible pump discharge valves (MOV410-1, MOV410-2, MOV420-1, MOV420-2, MOV440-1, and MOV440-2) used while conducting Work Instruction 2 (Sluicing System Startup and Operation).

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 77.

_____ 77. From the OMI, cycle low pressure transfer throttle valve MOV455 open, then closed.

_____ 78. From the OMI, shut down tank T-3 low pressure transfer pump LPP430-1.

_____ 79. From the OMI, close pump 430-1 discharge valve MOV430-1.

Low Pressure Feed System Flushing with Supernatant from Tank T-3

_____ 80. From the OMI, close all actuated (MOV) valves.

_____ 81. Manually open east tanks isolation valve VLV450-1 and close west tanks isolation valve VLV450-2.

_____ 82. From the OMI, open pump 430-1 discharge valve MOV430-1.

_____ 83. From the OMI, activate tank T-3 low pressure transfer pump LPP430-1.

_____ 84. From the OMI, open recycle tank bypass valves MOV250-1 and MOV250-2.

Note: Verify discharge is obtained through the bottom of submersible low pressure pump LPP495.

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_____ 85. From the OMI, cycle feed pump discharge valve MOV300 open, then closed.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 86.

_____ 86. From the OMI, cycle feed pump recycle valve MOV305 open, then closed.

_____ 87. From the OMI, shut down tank T-3 low pressure transfer pump LPP430-1.

_____ 88. From the OMI, close recycle tank bypass valves MOV250-1 and MOV250-2.

_____ 89. From the OMI, close pump 430-1 discharge valve MOV430-1.

High Pressure Pump System Flushing with Supernatant from Tank T-3

_____ 90. From the OMI, close all actuated (MOV) valves.

_____ 91. Manually open east tanks isolation valve VLV450-1 and close west tanks isolation valve VLV450-2.

_____ 92. From the OMI, open pump 430-1 discharge valve MOV430-1.

_____ 93. From the OMI, activate tank T-3 low pressure transfer pump LPP430-1.

_____ 94. From the OMI, open recycle tank bypass valves MOV250-1 and MOV250-2.

_____ 95. Verify discharge into the recycle tank (T-9) using the in-tank camera for step 96.

_____ 96. From the OMI, open high pressure pump recycle valve MOV340-1.

_____ 97. From the OMI, shut down tank T-3 low pressure transfer pump LPP430-1.

_____ 98. From the OMI, close high pressure pump recycle valve MOV340-1.

_____ 99. From the OMI, close recycle tank bypass valves MOV250-1 and MOV250-2.

_____ 100. From the OMI, close pump 430-1 discharge valve MOV430-1.

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Strainer Flushing with Supernatant from Tank T-3

- _____ 101. From the OMI, close all actuated (MOV) valves.
- _____ 102. Manually open east tanks isolation valve VLV450-1 and close west tanks isolation valve VLV450-2.
- _____ 103. From the OMI, open pump 430-1 discharge valve MOV430-1.
- _____ 104. From the OMI, activate tank T-3 low pressure transfer pump LPP430-1.
- _____ 105. From the OMI, open pipe flush valve MOV245 and recycle tank bypass valve MOV250-2.

Note: If a strainer was not used during execution of Work Instruction 2 (Sluicing System Startup and Operation) then the flushing sequence for that strainer may be skipped.

Flushing Strainer STR355-1

- _____ 106. From the OMI, open strainer STR355-1 valve MOV350-1.
- Note:** Verify discharge into the recycle tank using the in-tank camera for step 107.
- _____ 107. From the OMI, cycle strainer STR355-1 drain valve MOV360-1 open, then closed.
- _____ 108. From the OMI, close strainer STR355-1 valve MOV350-1.
- _____ 109. Proceed to step 113.

Flushing Strainer STR355-2

- _____ 110. From the OMI, open strainer STR355-2 valve MOV350-2.
- Note:** Verify discharge into the recycle tank using the in-tank camera for step 111.
- _____ 111. From the OMI, cycle strainer STR355-2 drain valve MOV360-2 open, then closed.
- _____ 112. From the OMI, close strainer STR355-2 valve MOV350-2.
- _____ 113. From the OMI, shut down tank T-3 low pressure transfer pump LPP430-1.

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_____ 114. From the OMI, close pipe flush valve MOV245 and recycle tank bypass valve MOV250-2.

_____ 115. From the OMI, close pump 430-1 discharge valve MOV430-1.

Sluicer and Sluicer Pump Flushing with Supernatant from Tank T-3

_____ 116. From the OMI, close all actuated (MOV) valves.

_____ 117. Manually open east tanks isolation valve VLV450-1 and close west tanks isolation valve VLV450-2.

_____ 118. From the OMI, open pump 430-1 discharge valve MOV430-1.

_____ 119. From the OMI, activate tank T-3 low pressure transfer pump LPP430-1.

_____ 120. From the OMI, open pipe flush valve MOV245 and recycle tank bypass valve MOV250-2.

_____ 121. From the OMI, open the strainer valve (MOV350-1 or MOV350-2) used while conducting Work Instruction 2 (Sluicing System Startup and Operation).

_____ 122. From the OMI, open sluicer pump SLCP665 intake valve MOV660.

Note: Verify discharge through sluicer using the in-tank camera for step 123.

_____ 123. From the OMI, open sluicer pump SLCP665 discharge valve MOV675.

_____ 124. From the OMI, close sluicer pump SLCP665 intake valve MOV660.

_____ 125. From the OMI, close sluicer pump SLCP665 discharge valve MOV675.

_____ 126. From the OMI, open sluicer pump SLCP665 bypass valve MOV665.

Note: Verify discharge into the recycle tank (T-9) using the in-tank camera for step 127.

_____ 127. From the OMI, cycle sluicer pressure release valve MOV670 open, then closed.

_____ 128. From the OMI, shut down tank T-3 low pressure transfer pump LPP430-1.

_____ 129. From the OMI, close sluicer pump SLCP665 bypass valve MOV665.

Work Instruction 5: <div style="text-align: center;">Line Flushing Sequence</div>	Revision: 2 Date: April 28, 1998
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- _____ 130. From the OMI, close strainer valve opened in step 121.
- _____ 131. From the OMI, close pipe flush valve MOV245 and recycle tank bypass valve MOV250-2.
- _____ 132. From the OMI, close pump 430-1 discharge valve MOV430-1.

Comments:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Work Instruction 6: Emergency System Shutdown	Revision: 2 Date: April 28, 1998
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Personnel: One system operator.

Special Permits: None.

Special Tools: None.

Prerequisites: Emergency condition requiring shutdown. This will be any time that the system is beyond its operational parameters including leaks in system, pressure changes beyond normal fluctuations, leaks, power failure, elevated radiation readings from monitors, any condition that presents possible danger to human health or the environment, and site emergencies such as fire, tornado, plant evacuation, etc.

Work Instructions:

- _____ 1. From the OMI, click on the "Sluicer Control" button and click on the "Emergency Stop" button.
- _____ 2. Notify the Field Operations Superintendent.
- _____ 3. If the situation allows and the Field Operations Superintendent approves, restart the HPU and retract the extendible nozzle into the mast from the sluicer controller.
- _____ 4. If the situation allows and the Field Operations Superintendent approves, perform line flushing in accordance with Work Instruction 5 (Line Flushing Sequence).
- _____ 5. Determine and document the cause/reason for the emergency shutdown in the logbook.

Comments:

Work Instruction 7: <p style="text-align: center;">Line Leak Response</p>	Revision: 2 Date: April 28, 1998
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Personnel: One system operator.

Special Permits: None.

Special Tools: None.

Prerequisites: A leak has occurred anywhere in the system.

Work Instructions:

- _____ 1. Execute Work Instruction 6 (Emergency System Shutdown).
- _____ 2. From the OMI, verify the PLC has started the appropriate skid drip pan pump.
- _____ 3. Turn the site cameras toward the drip pan that alarmed and start the video recorder.
- _____ 4. Notify the Field Operations Superintendent.
- _____ 5. If the situation allows and the Field Operations Superintendent approves, perform line flushing by method in Work Instruction 5 (Line Flushing Sequence).
- _____ 6. Determine and document the cause/reason for the leak in the logbook.

Note: Do not attempt any repairs on the system or spill response until an evaluation has been performed by the project team and direction for action has been provided by the Field Operations Superintendent.

Comments:

Work Instruction 8: On-Line Strainer Flushing	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, one system operator, I&C engineer, and Field Operations Superintendent.

Special Permits: None.

Special Tools: None.

Prerequisites: Sluicing system must be operating in accordance with Work Instruction 2 (Sluicing System Startup and Operation) and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. The Field Operations Superintendent will select strainer to be flushed. If flushing strainer STR355-1, proceed to step 2. If flushing strainer STR355-2, proceed to step 8.

Flushing Strainer STR355-1

- _____ 2. From the OMI, note differential pressure across strainer STR355-1.
- _____ 3. From the OMI, select the Sluicer pump (SLCP 665) and slowly ramp the pump speed down to 25%.
- _____ 4. From the OMI, select the "High Pressure Transfer Controller" screen and slowly ramp down the high pressure pump until the sluicer pump intake pressure (PIT-663) is 20 psi.

Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 5 is executed.

- _____ 5. From the OMI, select the "Sluicer Pump Bypass" screen and click on the "BYPASS" button.
- _____ 6. From the OMI, select the "High Pressure Transfer Controller" screen and click on the "MANUAL" button.
- _____ 7. Turn recycle tank camera toward strainer drain line discharge.

Work Instruction 8: On-Line Strainer Flushing	Revision: 2 Date: April 28, 1998
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Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 8 is executed.

- _____ 8. From the OMI, open strainer drain valve MOV360-1 and verify discharge with camera in recycle tank.
- _____ 9. After operating for approximately 1 minute, close strainer drain valve MOV360-1.
- _____ 10. Check differential pressure across strainer STR355-1. If pressure has not dropped sufficiently, repeat steps 4 and 5 until strainer is clean or the Field Operations Superintendent has determined that no progress is being made.
- _____ 11. Proceed with step 13.

Flushing Strainer STR355-2

- _____ 12. From the OMI, note differential pressure across strainer STR355-2.
- _____ 13. From the OMI, select the Sluicer pump (SLCP 665) and slowly ramp the pump speed down to 25%.
- _____ 14. From the OMI, select the "High Pressure Transfer Controller" screen and slowly ramp down the high pressure pump until the sluicer pump intake pressure (PIT-663) is 20 psi.

Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 15 is executed.

- _____ 15. From the OMI, select the "Sluicer Pump Bypass" screen and click on the "BYPASS" button.
- _____ 16. From the OMI, select the "High Pressure Transfer Controller" screen and click on the "MANUAL" button.
- _____ 17. Turn recycle tank camera toward strainer drain line discharge.

Note: The Field Operations Superintendent will stand by to make manual adjustment on the "High Pressure Transfer Controller" screen to stabilize the system when step 18 is executed.

Work Instruction 9: Process Water Strainer Backflushing	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP.

Special Tools: Two hand-held, 2-way radios.

Prerequisites: Work Instruction 8 (On-Line Strainer Flushing) did not effectively clean the strainer, completed Work Instruction 4 (Normal System Shutdown), and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. The Field Operations Superintendent will select the strainer to be backflushed. If backflushing strainer STR355-1, proceed to step 2. If backflushing strainer STR355-2, proceed to step 27.

Backflushing Strainer STR355-1

- _____ 2. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 3. Turn recycle tank camera toward strainer drain line discharge.
- _____ 4. Manually open process water tank valve VLV200.
- _____ 5. Manually open pipe flush line valve VLV201.
- _____ 6. Manually open strainer STR355-1 rinse valve VLV240-1.
- _____ 7. Manually close strainer STR355-2 rinse valve VLV240-2.
- _____ 8. From the OMI, close demister rinse valve MOV220-1.
- _____ 9. From the OMI, close sluicer rinse valve MOV220-2.
- _____ 10. From the OMI, close camera lens rinse valve MOV225-1.
- _____ 11. From the OMI, close camera lens rinse valve MOV225-2.

Work Instruction 9: Process Water Strainer Backflushing	Revision: 2 Date: April 28, 1998
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- _____ 12. From the OMI, close strainer STR355-1 valve MOV350-1.
- _____ 13. From the OMI, close pipe blowdown valve MOV230, pipe flush valve MOV245, recycle tank bypass valves MOV250-1 and MOV250-2, strainer STR355-2 valve MOV350-2, and strainer STR355-2 drain valve MOV360-2.
- _____ 14. From the OMI, close sluicer pump intake valve MOV660.
- _____ 15. From the OMI, close sluicer pump bypass valve MOV665.
- _____ 16. From the OMI, open strainer STR355-1 drain valve MOV360-1.
- _____ 17. From the OMI, activate the process water pump PWP205.
- _____ 18. From the OMI, open pipe flush valve MOV235.
- _____ 19. Verify discharge with camera in recycle tank.
- _____ 20. After operating for approximately 2 minutes, close strainer STR355-1 drain valve MOV360-1.
- _____ 21. From the OMI, close pipe flush valve MOV235.
- _____ 22. From the OMI, shut down process water pump PWP205.
- _____ 23. Repeat steps 16 through 22.
- _____ 24. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 25. Manually close strainer STR355-1 rinse valve VLV240-1.
- _____ 26. Proceed with step 51.

Backflushing Strainer STR355-2

- _____ 27. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Work Instruction 9: Process Water Strainer Backflushing	Revision: 2 Date: April 28, 1998
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- _____ 28. Turn recycle tank camera toward strainer drain line discharge.
- _____ 29. Manually open process water tank valve VLV200.
- _____ 30. Manually open pipe flush line valve VLV201.
- _____ 31. Manually close strainer STR355-1 rinse valve VLV240-1.
- _____ 32. Manually open strainer STR355-2 rinse valve VLV240-2.
- _____ 33. From the OMI, close demister rinse valve MOV220-1.
- _____ 34. From the OMI, close sluicer rinse valve MOV220-2.
- _____ 35. From the OMI, close camera lens rinse valve MOV225-1.
- _____ 36. From the OMI, close camera lens rinse valve MOV225-2.
- _____ 37. From the OMI, close strainer STR355-2 valve MOV350-2.
- _____ 38. From the OMI, close pipe blowdown valve MOV230, pipe flush valve MOV245, recycle tank bypass valves MOV250-1 and MOV250-2, strainer STR355-1 valve MOV350-1 and strainer STR355-1 drain valve MOV360-1.
- _____ 39. From the OMI, close sluicer pump intake valve MOV660.
- _____ 40. From the OMI, close sluicer pump bypass valve MOV665.
- _____ 41. From the OMI, open strainer STR355-2 drain valve MOV360-2.
- _____ 42. From the OMI, activate the process water pump PWP205.
- _____ 43. From the OMI, open pipe flush valve MOV235.
- _____ 44. Verify discharge with camera in recycle tank.
- _____ 45. After operating for approximately 2 minutes, close strainer STR355-2 drain valve MOV360-2.

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- _____ 46. From the OMI, close pipe flush valve MOV235.
- _____ 47. From the OMI, shut down process water pump PWP205.
- _____ 48. Repeat steps 41 through 47.
- _____ 49. From the OMI, click on the “Flow Totals” button and record the total flow reading for “Process Water Flow” in the logbook.
- _____ 50. Manually close strainer STR355-2 rinse valve VLV240-2.

Strainer Check

51. If strainer continues to show high differential pressure, the team will decide if the strainers will be switched and/or if the clogged basket will be changed by the method in Work Instruction 10 (Strainer Basket Changeout).

Comments:

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Work Instruction 10: Strainer Basket Changeout	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, three system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout for strainer to be repaired.

Special Tools: Two hand-held, 2-way radios,
impact socket (1 $\frac{5}{8}$ "),
impact wrench,
one open end wrench (1 $\frac{5}{8}$ "),
replacement strainer basket,
replacement strainer gasket,
spare bolts,
Anti-Seize,
radioactive waste container for used basket, and
plastic radioactive waste bags.

Prerequisites: System must not be operating,
completed Work Instruction 4 (Normal System Shutdown),
completed Work Instruction 5 (Line Flushing Sequence),
completed Work Instruction 8 (On-Line Strainer Flushing),
completed Work Instruction 9 (Process Water Strainer Backflushing), and
permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. From the OMI, check radiation levels on the monitors and report findings to on-site health physics representative.
- _____ 2. Select strainer to be replaced. If replacing strainer STR355-1 basket, proceed to step 3. If replacing strainer STR355-2 basket, proceed to step 29.

Replacing Strainer STR355-1 Basket

- _____ 3. From the OMI, open strainer drain valve MOV360-1 and check the pressure reading for the high pressure pumps discharge (PIT330) and the sluicer pump intake (PIT663). If the pressure is less than 1 psi, lockout/tagout the valve in the open position and proceed to the next step. If not, stop work and notify the Field Operations Superintendent for further evaluation.

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- _____ 4. Manually close (do **not** lock out and tag out) strainer STR355-2 rinse valve VLV240-2.
 - _____ 5. Close, lock out, and tag out strainer rinse valve VLV240-1 (manually), strainer isolation valve VLV370-1 (manually), and strainer valve MOV350-1 (from the OMI).
 - _____ 6. Deactivate and lock out/tag out the high pressure pump VFD (HPP320-1 and HPP320-2).
 - _____ 7. Issue lockout/tagout permit.
 - _____ 8. Attach winch system to the top of strainer STR355-1 and prep work area.
 - _____ 9. Unbolt strainer STR355-1 top with impact wrench. Leave bolts in top.
- Note:** The strainer top will remain attached to the winch for step 10.
- _____ 10. Remove strainer top and slide into a plastic bag.
 - _____ 11. Remove old gasket, place in waste bag, and place in waste container.
 - _____ 12. Remove strainer basket, place in waste bag, and place in waste container.
 - _____ 13. Insert new basket.
 - _____ 14. Place a new gasket on strainer STR355-1.
 - _____ 15. Place the top back on strainer STR355-1.
 - _____ 16. Check bolts. If damaged, place in waste bag and place in container. Replace damaged bolts with new bolts.
 - _____ 17. Tighten bolts.
 - _____ 18. Remove lockout/tagout permit and locks.
 - _____ 19. Energize transfer pump skid at main power panel.
 - _____ 20. From the OMI, close strainer drain valve MOV360-1.

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_____ 21. From the OMI, close demister rinse valve MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2, pipe blow down valve MOV230, recycle tank bypass valves MOV250-1 and MOV250-2, feed pump discharge valve MOV300, feed pump recycle valve MOV305, high pressure recycle valve MOV340-1, MVST discharge valve MOV340-2, and strainer STR355-2 valve MOV350-2.

_____ 22. From the OMI, open the pipe flush valve MOV245 and strainer STR355-1 valve MOV350-1.

_____ 23. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Note: Prior to executing step 24, all personnel must leave the transfer pump skid.

_____ 24. From the OMI, activate the process water pump PWP205.

_____ 25. From the OMI, open pipe flush valve MOV235.

_____ 26. Check the strainer basket flange for leaks. If leaks are observed, immediately shut down the process water pump PWP205 and notify the Field Operations Superintendent for further evaluation.

_____ 27. From the OMI, close pipe flush valve MOV235.

_____ 28. From the OMI, shut down the process water pump PWP205.

_____ 29. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Note: If not replacing strainer STR355-2, do not perform steps 30 through 54.

Replacing Strainer STR355-2 Basket

_____ 30. From the OMI, open strainer drain valve MOV360-2 and check the pressure reading for the high pressure pumps discharge (PIT330) and the sluicer pump intake (PIT663). If the pressure is less than 1 psi, lockout/tagout the valve in the open position and proceed to the next step. If not, stop work and notify the Field Operations Superintendent for further evaluation.

_____ 31. Manually close (do **not** lock out and tag out) strainer STR355-1 valve VLV240-1.

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- _____ 32. Close, lock out, and tag out strainer rinse valve VLV240-2 (manually), strainer isolation valve VLV370-2 (manually), and strainer valve MOV350-2 (from the OMI).
- _____ 33. Deactivate and lock out/tag out the high pressure pump VFD (HPP320-1 and HPP320-2).
- _____ 34. Issue lockout/tagout permit.
- _____ 35. Attach winch system to the top of strainer STR355-2 and prep work area.
- _____ 36. Unbolt strainer STR355-2 top with impact wrench. Leave bolts in top.
- Note:** The strainer top will remain attached to the winch for step 37.
- _____ 37. Remove strainer top and slide into a plastic bag.
- _____ 38. Remove all gaskets, place in waste bag, and place in waste container.
- _____ 39. Remove strainer basket, place in waste bag, and place in waste container.
- _____ 40. Insert new basket.
- _____ 41. Place a new gasket on strainer STR355-2.
- _____ 42. Place the top back on strainer STR355-2.
- _____ 43. Check bolts. If damaged, place in waste bag and place in container. Replace damaged bolts with new bolts.
- _____ 44. Tighten bolts.
- _____ 45. Remove lockout/tagout permit and locks.
- _____ 46. Energize transfer pump skid at main power panel.
- _____ 47. From the OMI, close strainer drain valve MOV360-2.
- _____ 48. From the OMI, close demister rinse valve MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2, pipe blow down valve MOV230, recycle tank bypass valves MOV250-1 and MOV250-2, feed pump discharge valve MOV300, feed pump

Work Instruction 10: Strainer Basket Changeout	Revision: 2 Date: April 28, 1998
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recycle valve MOV305, high pressure recycle valve MOV340-1, MVST discharge valve MOV340-2, and strainer STR355-1 valve MOV350-1.

_____ 49. From the OMI, open the pipe flush valve MOV245 and strainer STR355-2 valve MOV350-2.

_____ 50. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Note: Prior to executing step 51, all personnel must leave the transfer pump skid.

_____ 51. From the OMI, activate the process water pump PWP205.

_____ 52. From the OMI, open pipe flush valve MOV235.

_____ 53. Check the strainer basket flange for leaks. If leaks are observed, immediately shut down the process water pump PWP205 and notify the Field Operations Superintendent for further evaluation.

_____ 54. From the OMI, close pipe flush valve MOV235.

_____ 55. From the OMI, shut down the process water pump PWP205.

_____ 56. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Comments:

Work Instruction 11: Sluicer Mast Placement	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, crane operator, rigging crew, rigging foreman, three system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout for sluicer disconnection.

Special Tools: Extendible nozzle operations manuals,
crane,
rigging,
two hand-held, 2-way radios,
two crescent wrenches (7/8"),
impact wrench,
18-in. blind flange plate,
flange plate nuts and bolts,
18-in. flange gasket,
Anti-Seize,
level,
five tag lines (2 lines for sluicer base, 2 lines for bellows, 1 line for hoses),
four base plates,
drip pan,
drip pan liner,
drip pan adsorbent,
drip pan clamps, and
plastic radioactive waste bags.

Prerequisites: System must not be operating,
completed Work Instruction 4 (Normal System Shutdown),
completed Work Instruction 5 (Line Flushing Sequence), and
permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. Prepare drip pan by inserting a new plastic liner and adsorbent.
- _____ 2. Establish footprint for new location of sluicer using the four base plates as markers.
- _____ 3. Install plastic for drip and spill prevention as designated by the Field Operations Superintendent, health physics, and SSHO.
- _____ 4. If installing sluicer mast for the first time, proceed to step 19. If not, proceed to step 5.

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- _____ 5. With the sluice tank camera, verify the sluicer nozzle is fully retracted into the mast.
- _____ 6. With the sluice tank camera, verify that the lifting brackets are in place and the bolts are secure.
- _____ 7. From the OMI, close the sluice tank camera lens rinse valve MOV225-2.
- _____ 8. From the OMI, close the recycle tank camera lens rinse valve MOV225-1.
- _____ 9. From the OMI, close the pipe flush valve MOV235.
- _____ 10. From the OMI, close the sluicer rinse valve MOV220-2.
- _____ 11. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 12. From the OMI, activate the process water pump PWP205.
- _____ 13. From the OMI, open the sluicer rinse valve MOV220-2.
- _____ 14. Wait 5 minutes.
- _____ 15. From the OMI, deactivate the process water pump PWP205.
- _____ 16. From the OMI, close the sluicer rinse valve MOV220-2.
- _____ 17. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 18. Wait a minimum of 15 minutes to allow the excess rinse water to drip off the sluicer.
- _____ 19. De-energize and lock out/tag out the process water skid, sluicer skid, transfer pump skid and hydraulic power unit (HPU) at the main distribution panel. Also lock out/tag out sluicer pump discharge valve MOV675 by switching the motor starter box hand switch to the "OFF" position, as well as tagging out switch.
- _____ 20. Issue lockout/tagout permit.
- _____ 21. Employ all levers on the sluicer control panel to each extreme. This releases pressure in the hydraulic hoses.

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- _____ 22. Remove the bolts from the blind flange cover of the riser that the sluicer is to be moved to and place the bolts in a waste bag.
- _____ 23. Disconnect all hydraulic, process water, and electrical lines leading to the sluicer. Bundle lines with a tag line.

Note: The only yellow electrical cable to be disconnected is labeled ARM EXTENSION BOX.

- _____ 24. Release the lower containment adapter clamps bellows.
- _____ 25. Attach tag lines to the sluicer platform and bellows.
- _____ 26. Connect the crane tackle to the lifting lug on the top of the sluicer mast.
- _____ 27. Clear the immediate area of any personnel not directly involved in moving the sluicer.
- _____ 28. Lift the mast until the sluicer weight is beginning to come off the platform feet and hold.
- _____ 29. Raise legs on sluicer base to fullest extent.
- _____ 30. Raise mast and platform until the legs of the sluicer base are approximately five feet above the riser flange and hold.
- _____ 31. Clamp drip pan onto bellows rinse ring.

Note: In order to prevent work under a suspended load, it may be necessary to stop movement of sluicer to the second tank so that the blind flanges can be installed and removed.

- _____ 32. Lift the mast and platform from the first tank and move to second tank. While the sluicer is being moved, place a blind flange on the riser of the first tank and remove the blind flange on the riser of the second tank.
- _____ 33. Lower mast and platform until the drip pan is just above the riser of the second tank (tank sluicer has been moved to) and hold.
- _____ 34. Remove drip pan from bellows rinse ring. Remove plastic drip liner and adsorbent from drip pan and place in plastic radioactive waste bag. Place drip pan into a plastic bag for storage.

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- _____ 35. Lower the mast and platform until the sluicer base just touches the placement markers at the second tank and the bellows are just above the riser.
- _____ 36. Clamp lower bellows to riser flange.
- _____ 37. Complete lowering the sluicer mast onto the riser and ensure that the mast key is properly engaged in the bridge mount clamp.
- _____ 38. Adjust the platform legs to level the platform using a level.
- _____ 39. Disconnect the crane from the sluicer.
- _____ 40. Reconnect all hydraulic, process water, and electrical lines to the sluicer.
- _____ 41. Position the high pressure hose feeding slurry to the sluicer so that it will not become entangled during sluicer operation.
- _____ 42. Tighten bolts on blind flange over the riser opening of the tank that the sluicer has been moved from.
- _____ 43. Remove the lockout/tagout permit and locks.

Comments:

Work Instruction 12: Installing and Moving In-tank Camera	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, crane operator, rigging crew, rigging foreman, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout for the camera assembly disconnection.

Special Tools: Crane,
rigging,
two hand-held, 2-way radios,
impact wrench,
impact socket (1¼"),
box end wrench (1¼"),
ratchet,
6-in. blind flange plate,
flange plate nuts and bolts,
two 6-in. flange gaskets,
Anti-Seize,
plastic radioactive waste bags, and
plastic sleeves.

Prerequisites: System must not be operating,
completed Work Instruction 4 (Normal System Shutdown),
completed Work Instruction 5 (Line Flushing Sequence), and
permission from the Field Operations Superintendent.

Notes: Health Physics and industrial monitoring will be conducted at various times during this work instruction. Workers will follow all instructions of the Health Physics and SSHO representatives.

Work Instructions:

- _____ 1. If installing the camera assembly (includes camera, camera support assembly, power and data cable, and lens rinse line) for the first time, proceed to step 23. If not, proceed to step 2.

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- _____ 2. With the sluice tank camera, verify that there are no obstructions around the camera assembly which would impede its removal.
- _____ 3. From the OMI, close the sluice tank camera lens rinse valve MOV225-2.
- _____ 4. From the OMI, close the recycle tank camera lens rinse valve MOV225-1.
- _____ 5. From the OMI, close the pipe flush valve MOV235.
- _____ 6. From the OMI, close the sluicer rinse valve MOV220-2.
- _____ 7. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 8. From the OMI, activate process water pump PWP205.
- _____ 9. From the OMI, open the sluice tank camera lens rinse valve MOV225-2.
- _____ 10. Wait 1 minute.
- _____ 11. From the OMI, stop the process water pump PWP205.
- _____ 12. From the OMI, close the sluice tank camera lens rinse valve MOV225-2.
- _____ 14. Disconnect camera rinse line from quick connect and connect it to the camera spray ring.
- _____ 15. From the OMI, activate process water pump PWP205.
- _____ 16. From the OMI, open the sluice tank camera lens rinse valve MOV225-1.
- _____ 17. Wait 1 minute.
- _____ 18. From the OMI, stop the process water pump PWP205.
- _____ 19. From the OMI, close the sluice tank camera lens rinse valve MOV225-1.
- _____ 20. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

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- _____ 21. Wait a minimum of 15 minutes to allow the excess rinse water to drip off the camera assembly. Inspect tank with camera to verify that drips have stopped.
- _____ 22. From the control room, using the in-tank camera video screen, ensure camera tilt reading is between -10 and +10 (no units given), camera is turned off, and camera lights are out.
- _____ 23. Lock out/tag out the process water skid, sluicer skid, and transfer pump skid.
- _____ 24. Issue lockout/tagout permit.
- _____ 25. If installing camera for the first time, place plastic storage bag over camera access point on riser receiving the camera.
- _____ 26. Remove the bolts from the blind flange cover of the camera access point receiving the camera. Place the bolts on top of plastic for temporary storage.
- _____ 27. Remove blind flange and place in a plastic bag. Move blind flange to riser where the camera is currently located. Inspect gasket for damage and replace if necessary.

Note: Skip step 28 if installing the camera assembly for the first time.
- _____ 28. Remove the bolts from the camera assembly and place the bolts on top of plastic for temporary storage.
- _____ 29. Rig and prepare the camera assembly for the transfer lift.
- _____ 30. Secure the plastic storage sleeve to the camera assembly.
- _____ 31. Clear the immediate area of any personnel not directly involved in moving the camera assembly.

Note: Ensure that care is taken to protect the camera power and data cable when the camera assembly is being moved.
- _____ 32. Lift the camera assembly from its current location ensuring that the plastic storage bag is properly fitted on camera assembly. Once the camera assembly clears the riser, secure plastic storage bag at bottom by twisting the end and taping.
- _____ 33. Transfer camera assembly to its new location.

Work Instruction 13: OHF Riser Spool and Submersible Pump Installation	Revision: 2 Date: April 28, 1998
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Personnel: Construction Foreman, two pipe fitters, Radiological Control Technician (RCT), Site Safety and Health Officer (SSHO), Nuclear Criticality Safety (NCS) Level 2 Trained Supervisor, crane operator, two riggers, and rigging foreman.

Note: Only the Construction Foreman and pipe fitters will be performing radiological work. The SSHO and RCT will provide job coverage in the radiologically controlled area and perform measurements in the vicinity of each riser opening.

Special Permits: RWP, Critical Lift Plan, ALARA Review, NCS Approval (NCSA), Unresolved Safety Question Determination (USQD) Prescreening Package.

Special Tools: An air impact wrench.
A generator and air compressor will be necessary to power and drive the air impact wrench.
A garden sprayer filled with a dilute decontamination solution (or water) will be available to rinse some contamination from a submersible pump if a pump that comes in contact with tank contents must be removed from a tank. A 55-gal drum with double liners should also be available to provide temporary storage of the contaminated pump.
Electronic pocket dosimeters with audible and visual alarms will be used.
Plastic radioactive waste bags.

Prerequisites: Appropriate site work zones will be established including a designated Radiological Buffer Area (Contamination Reduction Zone) and a single egress point from the Exclusion Zone.

The riser spool assemblies will be fully configured with all components before they are moved into the Exclusion Zone. Components (e.g., valve actuators, pumps) should be tested or verified before the assemblies are moved.

A pre-job briefing will be provided to all members of the work crew before the task proceeds. The pre-job briefing will include the following:

- Construction Foreman provides a detailed discussion of the planned work;
- SSHO provides a Site Safety and Health briefing on chain of command, site facilities, task checklist in Site-Specific Health and Safety Plan (SSHASP), NCSA No. 56 conditions, Personal Protective Equipment (PPE), work zones, and site emergency response; and

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- RCT discusses ALARA principles and reinforces the proper radiological controls and responses to potential radiological hazards.

The SSHO will contact the Laboratory Shift Superintendent (LSS) to determine the current local weather conditions before authorizing the task to proceed. The SSHO will also review worker training documentation to ensure that workers are qualified to perform the work.

The work site will be prepared for contamination control by spreading plastic in the vicinity of each riser and along designated paths.

Applicable provisions contained in the Basis for Interim Operations, NCSA No. 56, and the USQD Prescreening Package, prohibit "activities that cause significant resuspension of sludges into the supernate." Workers will be briefed on the importance of minimizing any sludge disturbance during the placement of the north tank riser assemblies where the submersible pumps will be lowered into the sludge.

Work Instructions:

- _____ 1. Inspect each riser assembly to ensure that all components are installed properly and submersible pump cable lengths are set.
- _____ 2. Use the impact wrench to "hot bolt" the subject riser cover by removing bolts on the flange except for one or two opposing bolts. Place the removed bolts into a plastic bag.
- _____ 3. With one loosened bolt remaining to secure the riser lid, gently pivot the lid to allow a 4-in. to 6-in. opening.
- _____ 4. The riser should be vented to the open air for 10 to 15 minutes.
- _____ 5. Perform health and safety measurements at the riser opening during the venting process, as required in the SSHASP.
- _____ 6. When venting is complete, remove lid (and gasket if necessary) with the following steps:
 - Rotate the riser lid away from the riser so that it is still attached by the single loosened bolt.
 - Bag the lid while it is supported by the bolt.
 - Remove the last bolt and remove the lid.

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- Completely double bag the lid and place it in a designated area.
- If required, remove the gasket and prepare the flange surface for a new gasket.

- _____ 7. Inspect the rigging before each lift.
- _____ 8. Rig the riser assembly and attach tag lines to the submersible pump.
- _____ 9. If a new gasket is required, attach the gasket to the riser flange before lifting.

WARNING: Do not place any body part near or beneath a suspended load.

- _____ 10. Use the tag lines to guide the submersible pump into the riser opening without walking near or under the suspended riser assembly.

WARNING: Sludge disturbances must be minimized when lowering the submersible pumps into the tanks. Pumps will penetrate the sludge layer as they are lowered to the bottom of the tanks in the north risers.

Note: Tanks T-3 and T-4 may have obstructions near the bottom of the tank. Since the north riser assemblies will be lowered to the bottom, the crane operator may need to slightly shift the load to one side to allow the pump to settle to the tank bottom in an upright position.

- _____ 11. Slowly lower the pump into the tank in a way that guides the cables and hose into the riser without human assistance.

WARNING: Do not place a hand or finger between the flanges as the riser assembly is lowered in place.

- _____ 12. Align the riser assembly with the flange holes when it is approximately 2 in. to 4 in. above the top of the flange. Use two or more bolts to ensure that holes are aligned when the riser assembly is placed on the flange.
- _____ 13. Use new bolts to "hot bolt" the riser assembly with at least two opposing bolts.
- _____ 14. Remove the rigging after the riser assembly is "hot bolted."
- _____ 15. Complete the bolt installation with new bolts, and apply torque in accordance with the gasket manufacturer's specifications.

Work Instruction 14: Switching High Pressure Pumps	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, two system operators and Field Operations Superintendent.

Special Permits: RWP.

Special Tools: None.

Prerequisites: System must not be operating, completed Work Instruction 4 (Normal System Shutdown), completed Work Instruction 5 (Line Flushing Sequence), and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. Deactivate and lock out/tag out the transfer pump skid at the main distribution panel.
- _____ 2. The Field Operations Superintendent will select which high pressure pump will be switched. If switching high pressure transfer pumps from HPP320-1 to HPP320-2, proceed to step 3. If switching high pressure transfer pumps from HPP320-2 to HPP320-1, proceed to step 6.

Switching from HPP320-1 to HPP320-2

- _____ 3. Manually close high pressure transfer pump HPP320-1 valves VLV315-1 and VLV330-1.
- _____ 4. Manually open high pressure transfer pump HPP320-2 valves VLV330-2 and VLV315-2.
- _____ 5. Proceed to step 8.

Switching from HPP320-2 to HPP320-1

- _____ 6. Manually close high pressure transfer pump HPP320-2 valves VLV315-2 and VLV330-2.
- _____ 7. Manually open high pressure transfer pump HPP320-1 valves VLV330-1 and VLV315-1.
- _____ 8. Remove lockout/tagout permits and locks.

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Personnel: Health physics, SSHO, two system operators, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout for rupture disk being repaired.

Special Tools: Two 2-in. gaskets,
Anti-Seize,
ratchet,
socket (1 1/16"),
open-end wrench (1 1/16"),
2 wrenches (1 7/16"),
2 1-in. gaskets rated to 1500 psi
spare nuts and bolts,
replacement rupture disk assembly,
plastic radioactive waste bags, and
drip containment.

Prerequisites: System must not be operating,
complete Work Instruction 4 (Normal System Shutdown),
complete Work Instruction 5 (Line Flushing Sequence), and
permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. Inspect rupture disk assembly (includes safety head flange and rupture disk) replacement to ensure that it has been assembled correctly.
- _____ 2. The Field Operations Superintendent will determine which rupture disk is to be changed. If replacing the rupture disk assembly for high pressure pump HPP320-1, proceed to step 3. If replacing the rupture disk assembly for high pressure pump HPP320-2, proceed to step 28. If replacing the rupture disk assembly for the sluicer pump SLCP665, proceed to step 53.

High Pressure Pump HPP320-1 Rupture Disk

- _____ 3. Verify that rupture disk is rated for 240 (± 5) psi.
- _____ 4. Manually close strainer STR355-1 rinse valve VLV240-1, strainer STR355-2 rinse valve VLV240-2, and high pressure pump HPP320-2 valves VLV315-2 and VLV330-2.

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- _____ 5. Manually open high pressure pump HPP320-1 valves VLV315-1 and VLV330-1 and high pressure recycle valve VLV350.
- _____ 6. From the OMI, close pipe flush valves MOV235 and MOV245, recycle tank bypass valve MOV250-2, feed pump discharge valve MOV300, feed pump recycle valve MOV305, MVST discharge valve MOV340-2, strainer STR355-1 valve MOV350-1, and strainer STR355-2 valve MOV350-2.
- _____ 7. From the OMI, open pipe blow down valve MOV230, recycle tank bypass valve MOV250-1, and high pressure recycle valve MOV340-1.
- _____ 8. Using the recycle tank in-tank camera, verify that water is being forced through the high pressure pump recycle line HS204-3 and into the recycle tank T-9. Continue air drying until no more water is observed entering the recycle tank T-9.
- _____ 9. From the OMI, close pipe blow down valve MOV230.
- _____ 10. Lock out/tag out rupture disk. Place the high pressure pump HPP320-1 VFD in the "OFF" position and manually close valves VLV315-1 and VLV330-1. Lock out/tag out the VFD hand switch and both manual valves.
- _____ 11. Place drip containment under piping to capture any leaks.
- _____ 12. Unbolt rupture disk assembly, remove from the line, and place in waste bag.
- _____ 13. Inspect used gaskets for damage and replace if necessary. Place used gaskets in waste bag.
- _____ 14. Place the new rupture disk assembly with the curved-out side facing the high pressure side ("upstream") and the red side of the label facing the low pressure side.
- _____ 15. Tighten the rupture disk assembly in place.
- _____ 16. Remove the lockout/tagout permit and locks.
- _____ 17. Place high pressure pump HPP320-1 VFD in the "ON" position.
- _____ 18. Manually open high pressure transfer pump HPP320-1 valve VLV315-1.

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_____ 19. From the OMI, close demister rinse line MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2, and high pressure recycle valve MOV340-1.

_____ 20. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

Note: Prior to executing step 21, all personnel must leave the transfer pump skid.

_____ 21. From the OMI, activate the process water pump PWP205.

_____ 22. From the OMI, open pipe flush valve MOV235.

_____ 23. Check the rupture disk for leaks. If leaks are observed, immediately shut down the process water pump PWP205 and notify the Field Operations Superintendent for further evaluation.

_____ 24. From the OMI, close pipe flush valve MOV235.

_____ 25. From the OMI, shut down the process water pump PWP205.

_____ 26. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

_____ 27. Manually open high pressure transfer pump HPP320-1 valve VLV330-1.

Note: If not replacing high pressure pump HPP320-2 rupture disk, do not perform steps 28 through 52.

High Pressure Pump HPP320-2 Rupture Disk

_____ 28. Verify that rupture disk is rated for 240 (± 5) psi.

_____ 29. Manually close strainer STR355-1 rinse valve VLV240-1, strainer STR355-2 rinse valve VLV240-2, and high pressure pump HPP320-1 valves VLV315-1 and VLV330-1.

_____ 30. Manually open high pressure pump HPP320-2 valves VLV315-2 and VLV330-2 and high pressure recycle valve VLV350.

_____ 31. From the OMI, close pipe flush valves MOV235 and MOV245, recycle tank bypass valve MOV250-2, feed pump discharge valve MOV300, feed pump recycle valve MOV305, MVST

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discharge valve MOV340-2, strainer STR355-1 valve MOV350-1, and strainer STR355-2 valve MOV350-2.

- _____ 32. From the OMI, open pipe blow down valve MOV230, recycle tank bypass valve MOV250-1, and high pressure recycle valve MOV340-1.
- _____ 33. Using the recycle tank in-tank camera, verify that water is being forced through the high pressure pump recycle line HS204-3 and into the recycle tank T-9. Continue air drying until no more water is observed entering the recycle tank T-9.
- _____ 34. From the OMI, close pipe blow down valve MOV230.
- _____ 35. Lock out/tag out rupture disk. Place the high pressure pump HPP320-2 VFD in the "OFF" position and manually close valves VLV315-2 and VLV330-2. Lock out/tag out the VFD hand switch and both manual valves.
- _____ 36. Place drip containment under piping to capture any leaks.
- _____ 37. Unbolt rupture disk assembly, remove from the line, and place in waste bag.
- _____ 38. Inspect used gaskets for damage and replace if necessary. Place used gaskets in waste bag.
- _____ 39. Place the new rupture disk assembly with the curved-out side facing the high pressure side ("upstream") and the red side of the label facing the low pressure side.
- _____ 40. Tighten the rupture disk assembly in place.
- _____ 41. Remove the lockout/tagout permit and locks.
- _____ 42. Place high pressure pump HPP320-2 VFD in the "ON" position.
- _____ 43. Manually open high pressure transfer pump HPP320-2 valve VLV315-2.
- _____ 44. From the OMI, close demister rinse line MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2, and high pressure recycle valve MOV340-1.
- _____ 45. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.

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Note: Prior to executing step 46, all personnel must leave the transfer pump skid.

- _____ 46. From the OMI, activate the process water pump PWP205.
- _____ 47. From the OMI, open pipe flush valve MOV235.
- _____ 48. Check the rupture disk for leaks. If leaks are observed, immediately shut down the process water pump PWP205 and notify the Field Operations Superintendent for further evaluation.
- _____ 49. From the OMI, close pipe flush valve MOV235.
- _____ 50. From the OMI, shut down the process water pump PWP205.
- _____ 51. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- _____ 52. Manually open high pressure transfer pump HPP320-2 valve VLV330-2.

Sluicer Pump SLCP665 Rupture Disk

- _____ 53. Verify that rupture disk is rated for 1875 psi.

Note: Steps 53–73 are written assuming strainer STR355-1 is on line and not closed. If this is not the case, positions for strainer STR355-1 valve MOV350-1 and strainer STR355-2 valve MOV350-2 must be opposite of those stated in the steps.

- _____ 54. From the OMI, close pipe flush valves MOV235, recycle tank bypass valves MOV250-1 and MOV250-2, feed pump discharge valve MOV300, feed pump recycle valve MOV305, high pressure recycle valve MOV340-1, MVST discharge valve MOV340-2, strainer STR355-2 valve MOV350-2, strainer STR355-1 drain valve MOV360-1, strainer STR355-2 drain valve MOV360-2, sluicer pump intake valve MOV660, and sluicer pump discharge valve MOV675.
- _____ 55. From the OMI, open pipe blow down valve MOV230, pipe flush valve MOV245, strainer STR355-1 valve MOV350-1, sluice pump bypass valve MOV665, and sluicer pressure release valve MOV670.
- _____ 56. Using the recycle tank in-tank camera, verify that water is being forced through the sluicer pressure relief line RS213-2 and into the recycle tank T-9. Continue air drying until no more water is observed entering the recycle tank T-9.

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- _____ 57. From the OMI, close pipe blow down valve MOV230 and sluicer pressure release valve MOV670.
 - _____ 58. Lock out/tag out rupture disk. Place the sluicer pump SLCP665 VFD in the "OFF" position. From the OMI, close valves sluicer pump bypass valve MOV665 and sluicer pump discharge valve MOV675. Lock out/tag out the VFD hand switch and both manual valves.
 - _____ 59. Place drip containment under piping to capture any leaks.
 - _____ 60. Unbolt rupture disk assembly, remove from the line, and place in waste bag.
 - _____ 61. Inspect used gaskets for damage and replace if necessary. Place used gaskets in waste bag.
 - _____ 62. Place the new rupture disk assembly with the curved-out side facing the high pressure side ("upstream") and the red side of the label facing the low pressure side.
 - _____ 63. Tighten the rupture disk assembly in place.
 - _____ 64. Remove the lockout/tagout permit and locks.
 - _____ 65. Place sluicer pump SLCP665 VFD in the "ON" position.
 - _____ 66. From the OMI, close demister rinse line MOV220-1, sluicer rinse valve MOV220-2, camera lens rinse valves MOV225-1 and MOV225-2.
 - _____ 67. From the OMI, click on the "Flow Totals" button and record the total flow reading for "Process Water Flow" in the logbook.
- Note:** Prior to executing step 68, all personnel must leave the sluicer pump skid.
- _____ 68. From the OMI, activate the process water pump PWP205.
 - _____ 69. From the OMI, open pipe flush valve MOV235 and sluicer pump bypass valve MOV665.
 - _____ 70. Check the rupture disk for leaks. If leaks are observed, immediately shut down the process water pump PWP205 and notify the Field Operations Superintendent for further evaluation.
 - _____ 71. From the OMI, close pipe flush valve MOV235 and sluicer pump bypass valve MOV665.

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- _____ 72. From the OMI, shut down the process water pump PWP205.
- _____ 73. From the OMI, click on the “Flow Totals” button and record the total flow reading for “Process Water Flow” in the logbook.

Comments:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Field Operations Superintendent

Date _____

Work Instruction 16: Ventilation System Filter Changeout	Revision: 2 Date: April 28, 1998
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Personnel: Health physics, SSHO, three system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout permit.

Special Tools: Nylon wire ties,
duct tape,
utility knife,
required filters (90% ash rate filter, 30% ash rate filter, 99.97% DOP filter)
filter stand,
filter bags, and
tape measure.

Prerequisites: Filter bag-in/bag-out training,
high differential pressure across the filter being changed, and
permission from the Field Operations Superintendent.

Work Instructions:

Preinstallation Checks and Instructions

- _____ 1. Obtain filter bags.
- _____ 2. Slit open the top of the filter carton.
- _____ 3. Bend all four carbon flaps over and remove fiberboard pad.
- _____ 4. Rotate the carbon 180° so the filter frame touches the floor.

CAUTION: Do not touch the white filter media or the filter face guards, because this will permanently damage the filter. Handle the filter only by the metal frame, making certain not to allow the fingers to extend over the edge.

- _____ 5. Lift the box and sleeve straight up and away from the filter.
- _____ 6. Inspect the filter for shipping and/or unpacking damage.
- _____ 7. Measure filter squareness by measuring the two corner to corner diagonals on the filter frame. The two measurements must be within +/- 1/2 inch or a new filter must be used.

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- _____ 8. Rotate filter so the filter pleats are horizontal.
- _____ 9. Slide a new filter bag over the replacement filter.
- _____ 10. Transport the new bagged filter to the ventilation skid.

Installation Instructions

- _____ 11. From the OMI, shut down the ventilation system and allow system to come to a complete stop.
- _____ 12. Deactivate and lock out/tag out the ventilation skid from the main distribution panel.
- _____ 13. Remove filter door.

Note: Bag stub will not be present for the first changeout.

- _____ 14. Stretch the bag out. If there is a bag stub in the bag, keep it at the end of the bag so that it will be removed with the filter.
- _____ 15. Working through the mittens in the bag, press the locking arm firmly inward toward the filter. The latch will spring aside to release the arm.
- _____ 16. Pull the locking arm outward to the open position. This backs the filter off the knife edge of the filter bracket.
- _____ 17. Place filter stand outside the filter housing.
- _____ 18. Pull the filter out of the housing, into the bag. Slide the filter as far back into the bag as possible.
- _____ 19. Seal the contaminated filter in the bag. Clinch the bag tight at two points between the contaminated filter and the housing using nylon wire ties or by using the twisting/taping method approximately 6 to 8 inches apart.
- _____ 20. Cut the end of the bag containing the contaminated filter free, leaving the sealed-off bag stub on the housing.

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CAUTION: Handle the filter by its frame only, taking care not to touch the white filter medium, because this can easily rupture the filter.

- _____ 21. Move old bagged filter out of the way.

Note: Air flow is left to right when facing the filter housing.

- _____ 22. Place the bag containing the new filter on the bag-out stand, making certain that the fluid seal channel of the filter is on the upstream side of the filter housing and pleats in the filter are oriented vertically.
- _____ 23. Loosen the safety strap, using extreme caution to prevent the bag from slipping off the bag-out port.
- _____ 24. Carefully work the elastic shock cord in the mouth of the bag stub from the second rib to the first rib of the bag-out port.
- _____ 25. Carefully remove the safety strap from around the bag stub.
- _____ 26. Place the new bag with filter around the bag-out port.
- _____ 27. Stretch the elastic cord in the mouth of the new bag containing the replacement filter over the old bag stub and past the second rib of the bag-out port.

Note: The old bag should now be completely within the new bag.

- _____ 28. Remove the old bag stub by furling the new bag near a corner of the housing, then grasp the bag stub and pull it until comes off the port. The furling leaves slack in the bag to prevent it from being pulled off the bag-out port. Repeat this procedure around the port until the stub falls free into the new bag.
- _____ 29. Securely replace the safety strap around the new bag on the bag-out port at a position between the two ribs.
- _____ 30. Using the loop that is attached to the safety strap, tighten the strap as much as possible.
- _____ 31. Pull on the bag carefully, but firmly, to make certain the strap is secure and that it prevents any movement of the bag. If the bag moves, tighten the straps some more and repeat the process until it is secure.

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_____ 32. Work the old bag stub around behind the replacement filter and into the end of the bag.

CAUTION: Make certain that the filter bag does not get caught between the filter and the housing, which will cause a hole in the filter bag.

_____ 33. Slide the filter into the housing, making certain that all four clips on the filter overlap the angles attached to the locking mechanism (two on top and two on bottom of the downstream side of the filter).

_____ 34. When the clips all overlap the angles, push the filter in as far as it will go.

_____ 35. Working through the mittens in the bag, slowly move the filter locking arm toward the filter. This will press the fluid seal channel onto the knife edges in the housing. If the filter meets resistance before the knife edge penetrates the channel, back the filter away and reposition the filter and repeat.

_____ 36. When the filter is properly seated, close the filter locking arm.

_____ 37. Relieve the filter bag of air. Gather the bag so that it is taut across the opening of the housing (leaving space for the bag end when the door is closed) and secure the clinching strap.

CAUTION: Make certain not to pull the bag off the port or to pinch the bag between the door and the housing.

_____ 38. Fold or roll the slack in the bag and replace the door with the bag inside.

_____ 39. Replace and tighten all door latches and hand tighten. Tightening of the latches should be done in a gradual and equal sequence.

_____ 40. Notify the lead engineer to have the filter DOP-tested.

Comments:

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Personnel: Health physics, SSHO, two system operators, I&C engineer, and Field Operations Superintendent.

Special Permits: RWP and lockout/tagout permit.

Special Tools: Two impact wrenches or two ratchets, socket (9/16"), open end/box end wrench (9/16"), screwdriver, vice grips, extra bolts (3/8" x 2" with nut and two washers), container to store bolts during changeout, new demister pad, and radioactive waste bag.

Prerequisites: High differential pressure must exist across the demister pad and permission from the Field Operations Superintendent.

Work Instructions:

- _____ 1. From the OMI, shut down the ventilation system and allow system to come to a complete stop.
- _____ 2. Deactivate and lock out/tag out the ventilation skid at the main distribution panel.
- _____ 3. From the OMI, shut down the demister backwash spray.
- _____ 4. Remove top/man way of the demister vessel.
- _____ 5. Remove the old demister pad using a pair of vice grips.
- _____ 6. Place old demister pad in a radioactive waste bag.
- _____ 7. Place the new mesh pad into position. This will require some force to push it in to place because it is a compression fitting.
- _____ 8. Place the top/man way back on to the demister, ensuring that the marks on the top and base are aligned.

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- _____ 9. Hand tighten all bolts.
- _____ 10. Tighten the bolts in the following sequence (the numbers are marked on the cover):
- Tighten two bolts that are 180° apart (1, 2).
 - Move 90° and tighten two bolts that are 180° apart (3, 4).
 - Tighten the remaining bolts, working around the top on bolts that are 180° apposing (5, 6, etc.).

- _____ 11. Remove lockout/tagout permits.
- _____ 12. Energize the ventilation skid at the main power panel.
- _____ 13. From the OMI, activate the ventilation system.
- _____ 14. From the OMI, activate the demister backwash spray.
- _____ 15. Check the differential pressure across the demister pad to ensure it is within normal operating ranges.

Comments:

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