

Table 10.II.3.1 HI-STORM 100S VERSION E LOADING OPERATIONS USING THE HI-TRAC VERSION MS TRANSFER CASK ESTIMATED OPERATIONAL EXPOSURES[†]							
ACTION	DURATION (MINUTES)	OPERATOR LOCATION (FIGURE 10.3.1)	NUMBER OF OPERATORS	DOSE RATE AT OPERATOR LOCATION (MREM/HR)	DOSE TO INDIVIDUAL (MREM)	TOTAL DOSE (PERSON- MREM)	ASSUMPTIONS
Section 8.1.4							
LOAD PRE-SELECTED FUEL ASSEMBLIES INTO MPC	1020	1	2	3	51.0	102.0	15 MINUTES PER ASSEMBLY/68 ASSY
PERFORM POST-LOADING VISUAL VERIFICATION OF ASSEMBLY IDENTIFICATION	68	1	2	3	3.4	6.8	1 MINUTES PER ASSY/68 ASSY
Section 8.1.5							
INSTALL MPC LID AND ATTACH LIFT YOKE	45	2	2	3	2.3	4.5	CONSULTATION WITH CALVERT CLIFFS
RAISE HI-TRAC TO SURFACE OF SPENT FUEL POOL	20	2	2	3	1.0	2.0	40 FEET @ 2 FT/MINUTE (CRANE SPEED)
SURVEY MPC LID FOR HOT PARTICLES	3	3A	1	31.0	1.6	1.6	TELESCOPING DETECTOR USED
VERIFY MPC LID IS SEATED	0.5	3A	1	31.0	0.3	0.3	VISUAL VERIFICATION FROM 3 METERS
INSTALL LID RETENTION SYSTEM BOLTS	6	3B	2	74.5	7.5	14.9	24 BOLTS @ 2/PERSON-MINUTE
REMOVE HI-TRAC FROM SPENT FUEL POOL	8.5	3C	1	668.8	94.7	94.7	17 FEET @ 2 FT/MIN (CRANE SPEED)
DECONTAMINATE HI-TRAC BOTTOM	10	3D	1	607.4	101.2	101.2	LONG HANDLED TOOLS, PRELIMINARY DECON
TAKE SMEARS OF HI-TRAC EXTERIOR SURFACES	5	5B	1	872.5	72.7	72.7	50 SMEARS @ 10 SMEARS/MINUTE
DISCONNECT ANNULUS OVERPRESSURE SYSTEM	0.5	5C	1	308.9	2.6	2.6	QUICK DISCONNECT COUPLING
SET HI-TRAC IN CASK PREPARATION AREA	10	4A	1	74.5	12.4	12.4	100 FT @ 10 FT/MIN (CRANE SPEED)
REMOVE NEUTRON SHIELD JACKET FILL PLUG	2	4A	1	74.5	2.5	2.5	SINGLE PLUG, NO SPECIAL TOOLS
INSTALL NEUTRON SHIELD JACKET FILL PLUG	2	5B	1	872.5	29.1	29.1	SINGLE PLUG, NO SPECIAL TOOLS
DISCONNECT LID RETENTION SYSTEM	6	5A	2	57.6	5.8	11.5	24 BOLTS @ 2 BOLT/PERSON MINUTES
MEASURE DOSE RATES AT MPC LID	3	5A	1	57.6	2.9	2.9	TELESCOPING DETECTOR USED

[†] See notes at bottom of Table 10.3.4.

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ACTION	DURATION (MINUTES)	OPERATOR LOCATION (FIGURE 10.3.1)	NUMBER OF OPERATORS	DOSE RATE AT OPERATOR LOCATION (MREM/HR)	DOSE TO INDIVIDUAL (MREM)	TOTAL DOSE (PERSON-MREM)	ASSUMPTIONS
DECONTAMINATE AND SURVEY HI-TRAC	103	5B	1	872.5	1497.7	1497.7	490 SQ-FT@5 SQ-FT/PERSON-MINUTE+50 SMEARS@10 SMEARS/MINUTE
INSTALL TEMPORARY SHIELD	16	6A	2	28.2	7.5	15.1	8 SEGMENTS @ 1 SEGMENT/PERSON MIN
FILL TEMPORARY SHIELD RING	25	6A	1	28.2	11.8	11.8	230 GAL @10GPM, LONG HANDLED SPRAY WAND
ATTACH DRAIN LINE TO HI-TRAC DRAIN PORT	0.5	5C	1	308.9	2.6	2.6	QUICK DISCONNECT COUPLING
INSTALL RVOAs	2	6A	1	28.2	0.9	0.9	SINGLE THREADED CONNECTION X 2 RVOAs
ATTACH WATER PUMP TO DRAIN PORT	2	6A	1	28.2	0.9	0.9	POSITION PUMP SELF PRIMING
DISCONNECT WATER PUMP	5	6A	1	28.2	2.4	2.4	DRAIN HOSES MOVE PUMP
DECONTAMINATE MPC LID TOP SURFACE AND SHELL AREA ABOVE INFLATABLE ANNULUS SEAL	6	6A	1	28.2	2.8	2.8	30 SQ-FT @ 5 SQ-FT/MINUTE+10 SMEARS@10 SMEARS/MINUTE
REMOVE INFLATABLE ANNULUS SEAL	3	6A	1	28.2	1.4	1.4	SEAL PULLS OUT DIRECTLY
SURVEY MPC LID TOP SURFACES AND ACCESSIBLE AREAS OF TOP THREE INCHES OF MPC SHELL	1	6A	1	28.2	0.5	0.5	10 SMEARS@10 SMEARS/MINUTE
INSTALL ANNULUS SHIELD	2	6A	1	28.2	0.9	0.9	SHIELD PLACED BY HAND
CENTER LID IN MPC SHELL	20	6A	3	28.2	9.4	28.2	CONSULTATION WITH CALVERT CLIFFS
INSTALL MPC LID SHIMS	12	6A	2	28.2	5.6	11.3	MEASURED DURING WELD MOCKUP TESTING
POSITION AWS BASEPLATE SHIELD ON MPC LID	20	7A	2	28.2	9.4	18.8	ALIGN AND REMOVE 4 SHACKLES
INSTALL AUTOMATED WELDING SYSTEM ROBOT	8	7A	2	28.2	3.8	7.5	ALIGN AND REMOVE 4 SHACKLES/4 QUICK CONNECTS@1/MIN
PERFORM NDE ON LID WELD	230	7A	1	28.2	108.2	108.2	MEASURED DURING WELD MOCKUP TESTING
ATTACH DRAIN LINE TO VENT PORT	1	7A	1	28.2	0.5	0.5	1" THREADED FITTING NO TOOLS

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ESTIMATED OPERATIONAL EXPOSURES[†]

ACTION	DURATION (MINUTES)	OPERATOR LOCATION (FIGURE 10.3.1)	NUMBER OF OPERATORS	DOSE RATE AT OPERATOR LOCATION (MREM/HR)	DOSE TO INDIVIDUAL (MREM)	TOTAL DOSE (PERSON-MREM)	ASSUMPTIONS
VISUALLY EXAMINE MPC LID-TO-SHELL WELD FOR LEAKAGE OF WATER	10	7A	1	28.2	4.7	4.7	10 MIN TEST DURATION
DISCONNECT WATER FILL LINE AND DRAIN LINE	2	7A	1	28.2	0.9	0.9	1" THREADED FITTING NO TOOLS X 2
REPEAT LIQUID PENETRANT EXAMINATION ON MPC LID FINAL PASS	45	7A	1	28.2	21.2	21.2	5 MIN TO APPLY, 7 MIN TO WIPE, 5 APPLY DEV, INSP (24 IN/MIN)
ATTACH GAS SUPPLY TO VENT PORT	1	7A	1	28.2	0.5	0.5	1" THREADED FITTING NO TOOLS
ATTACH DRAIN LINE TO DRAIN PORT	1	7A	1	28.2	0.5	0.5	1" THREADED FITTING NO TOOLS
ATTACH DRAIN LINE TO VENT PORT	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
ATTACH WATER FILL LINE TO DRAIN PORT	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
DISCONNECT WATER FILL DRAIN LINES FROM MPC	2	8A	1	65.6	2.2	2.2	1" THREADED FITTING NO TOOLS X 2
ATTACH HELIUM SUPPLY TO VENT PORT	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
ATTACH DRAIN LINE TO DRAIN PORT	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
DISCONNECT GAS SUPPLY LINE FROM MPC	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
DISCONNECT DRAIN LINE FROM MPC	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
ATTACH MOISTURE REMOVAL SYSTEM () TO VENT AND DRAIN PORT RVOAs	2	8A	1	65.6	2.2	2.2	1" THREADED FITTING NO TOOLS
DISCONNECT MOISTURE REMOVAL SYSTEM FROM MPC	2	8A	1	65.6	2.2	2.2	1" THREADED FITTING NO TOOLS X 2
CLOSE DRAIN PORT RVOA CAP AND REMOVE DRAIN PORT RVOA	1.5	8A	1	65.6	1.6	1.6	SINGLE THREADED CONNECTION (1 RVOA)
ATTACH HELIUM BACKFILL SYSTEM TO VENT PORT	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
DISCONNECT HBS FROM MPC	1	8A	1	65.6	1.1	1.1	1" THREADED FITTING NO TOOLS
CLOSE VENT PORT RVOA AND DISCONNECT VENT PORT RVOA	1.5	8A	1	65.6	1.6	1.6	SINGLE THREADED CONNECTION (1 RVOA)

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ESTIMATED OPERATIONAL EXPOSURES[†]

ACTION	DURATION (MINUTES)	OPERATOR LOCATION (FIGURE 10.3.1)	NUMBER OF OPERATORS	DOSE RATE AT OPERATOR LOCATION (MREM/HR)	DOSE TO INDIVIDUAL (MREM)	TOTAL DOSE (PERSON-MREM)	ASSUMPTIONS
WIPE INSIDE AREA OF VENT AND DRAIN PORT RECESSES	2	8A	1	65.6	2.2	2.2	2 PORTS, 1 MIN/PORT
PLACE COVER PLATE OVER VENT PORT RECESS	1	8A	1	65.6	1.1	1.1	INSTALLED BY HAND NO TOOLS (2/MIN)
PERFORM NDE VENT AND DRAIN COVER PLATE WELD	100	8A	1	65.6	109.3	109.3	MEASURED DURING WELD MOCKUP TESTING
FLUSH CAVITY WITH HELIUM AND INSTALL SET SCREWS	2	8A	1	65.6	2.2	2.2	4 SET SCREWS @2/MINUTE
PLUG WELD OVER ET SCREWS	8	8A	1	65.6	8.7	8.7	FOUR SINGLE SPOT WELDS @ 1 PER 2 MINTES
INSTALL MSLD OVER VENT PORT COVER PLATE	2	8A	1	65.6	2.2	2.2	INSTALLED BY HAND, NO TOOLS
INSTALL MSLD OVER DRAIN PORT COVER PLATE	2	8A	1	65.6	2.2	2.2	INSTALLED BY HAND, NO TOOLS
INSTALL AND ALIGN CLOSURE RING	5	8A	1	65.6	5.5	5.5	INSTALLED BY HAND NO TOOLS
PERFORM NDE ON CLOSURE RING WELDS	185	8A	1	65.6	202.3	202.3	MEASURED DURING WELD MOCKUP TESTING
RIG AWS TO CRANE	12	8A	1	65.6	13.1	13.1	10 MIN TO DISCONNECT LINES, 4 SHACKLES @2/MIN
Section 8.1.6							
REMOVE ANNULUS SHIELD	1	8A	1	65.6	1.1	1.1	SHIELD PLACED BY HAND
ATTACH DRAIN LINE TO HI-TRAC	1	9D	1	2397.8	40.0	40.0	1" THREADED FITTING NO TOOLS
POSITION HI-TRAC TOP LID	10	9B	2	65.6	10.9	21.9	VERTICAL FLANGED CONNECTION
TORQUE TOP LID BOLTS	12	9B	1	65.6	13.1	13.1	24 BOLTS AT 2/MIN (INSTALL AND TORQUE,1 PASS)
INSTALL MPC LIFT CLEATS AND MPC SLINGS	25	9A	2	2463.1	1026.3	2052.6	INSTALL CLEATS AND HYDRO TORQUE 4 BOLTS
REMOVE TEMPORARY SHIELD RING DRAIN PLUGS	1	9B	1	65.6	1.1	1.1	8 PLUGS @ 8/MIN
REMOVE TEMPORARY SHIELD RING SEGMENTS	4	9A	1	2463.1	164.2	164.2	REMOVED BY HAND NO TOOLS (8 SEGS@2/MIN)
ATTACH MPC SLINGS TO LIFT YOKE	4	9A	2	2463.1	164.2	328.4	INSTALLED BY HAND NO TOOLS
POSITION HI-TRAC ABOVE TRANSFER STEP	15	9C	1	719.9	180.0	180.0	100 FT @ 10 FT/MIN (CRANE SPEED)+ 5MIN TO ALIGN
REMOVE BOTTOM LID BOLTS	6	10A	1	2397.8	239.8	239.8	36 BOLTS@6 BOLTS/MIN IMPACT TOOLS USED

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INSTALL TRANSFER LID BOLTS	18	11B	1	2397.8	719.4	719.4	36 BOLTS @ 2/MIN IMPACT TOOLS USED 1 PASS
DISCONNECT MPC SLINGS	4	9A	2	2463.1	164.2	328.4	INSTALLED BY HAND NO TOOLS
Section 8.1.7							
POSITION HI-TRAC ON TRANSPORT DEVICE	20	11A	2	719.9	240.0	479.9	ALIGN TRUNNIONS, DISCONNECT LIFT YOKE
TRANSPORT HI-TRAC TO OUTSIDE TRANSFER LOCATION	90	12A	3	201.2	301.8	905.4	DRIVER AND 2 SPOTTERS
ATTACH OUTSIDE LIFTING DEVICE LIFT LINKS	2	12A	2	201.2	6.7	13.4	2 LINKS@1/MIN
MATE OVERPACKS	10	13B	2	757.6	126.3	252.5	ALIGNMENT GUIDES USED
ATTACH MPC SLINGS TO MPC LIFT CLEATS	10	13A	2	2463.1	410.5	821.0	2 SLINGS@5MIN/SLING NO TOOLS
REMOVE TRANSFER LID DOOR LOCKING PINS AND OPEN DOORS	4	13B	2	757.6	50.5	101.0	2 PINS@2MIN/PIN
INSTALL TRIM PLATES	4	13B	2	757.6	50.5	101.0	INSTALLED BY HAND
DISCONNECT SLINGS FROM MPC LIFTING DEVICE	10	13A	2	2463.1	410.5	821.0	2 SLINGS@5MIN/SLING
REMOVE MPC LIFT CLEATS AND MPC SLINGS	10	14A	1	3299.9	550.0	550.0	4 BOLTS,NO TORQUING
INSTALL HOLE PLUGS IN EMPTY MPC BOLT HOLES	2	14A	1	3299.9	110.0	110.0	4 PLUGS AT 2/MIN NO TORQUING
REMOVE HI-STORM VENT DUCT SHIELD INSERTS	2	15A	1	51.3	1.7	1.7	4 SHACKLES@2/MIN
REMOVE ALIGNMENT DEVICE	4	15A	1	51.3	3.4	3.4	REMOVED BY HAND NO TOOLS (4 PCS@1/MIN)
INSTALL HI-STORM LID AND INSTALL LID STUDS/NUTS	25	16A	2	13.7	5.7	11.4	INSTALL LID AND HYDRO TORQUE 4 BOLTS
INSTALL HI-STORM EXIT VENT GAMMA SHIELD CROSS PLATES	4	16B	1	124.2	8.3	8.3	4 PCS @ 1/MIN INSTALL BY HAND NO TOOLS
INSTALL TEMPERATURE ELEMENTS	20	16B	1	124.2	41.4	41.4	4@5MIN/TEMPERATURE ELEMENT
INSTALL EXIT VENT SCREENS	20	16B	1	124.2	41.4	41.4	4 SCREENS@5MIN/SCREEN
REMOVE HI-STORM LID LIFTING DEVICE	2	16A	1	13.7	0.5	0.5	4 SHACKLES@2/MIN
INSTALL HOLE PLUGS IN EMPTY HOLES	2	16A	1	13.7	0.5	0.5	4 PLUGS AT 2/MIN NO TORQUING

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ESTIMATED OPERATIONAL EXPOSURES[†]

ACTION	DURATION (MINUTES)	OPERATOR LOCATION (FIGURE 10.3.1)	NUMBER OF OPERATORS	DOSE RATE AT OPERATOR LOCATION (MREM/HR)	DOSE TO INDIVIDUAL (MREM)	TOTAL DOSE (PERSON-MREM)	ASSUMPTIONS
PERFORM SHIELDING EFFECTIVENESS TESTING	16	16D	2	576.7	153.8	307.6	16 POINTS@1 MIN
SECURE HI-STORM TO TRANSPORT DEVICE	10	16A	2	13.7	2.3	4.6	ASSUMES AIR PAD
TRANSFER HI-STORM TO ITS DESIGNATED STORAGE LOCATION	40	16C	1	66.8	44.5	44.5	200 FEET @ 4FT/MIN
INSERT HI-STORM LIFTING JACKS	4	16D	1	576.7	38.4	38.4	4 JACKS@1/MIN
REMOVE AIR PAD	5	16D	2	576.7	48.1	96.1	1 PAD MOVED BY HAND
REMOVE HI-STORM LIFTING JACKS	4	16D	1	576.7	38.4	38.4	4 JACKS@1/MIN
INSTALL INLET VENT SCREENS/CROSS PLATES	20	16D	1	576.7	192.2	192.2	4 SCREENS@5MIN/SCREEN
PERFORM AIR TEMPERATURE RISE TEST	8	16B	1	124.2	16.6	16.6	8 MEASUREMENTS@1/MIN
TOTAL						11660.5 PERSON-MREM	

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