Traveler Title	Cavity Pair Second Assembly			
Traveler Abstract	The following procedure is to define the steps for the second assembly of a single 5-cell cavity. Before initiating this procedure, the cavity must have been assembled as per the Pair Assembly-1st Assembly procedure and then rinsed as per the HPR Procedure			
Traveler ID	C75-CPR-ASSY-SCND			
Traveler Revision	R1			
Traveler Author	D. Forehand			
Traveler Date	9-Dec-2019			
NCR Emails	forehand			
Approval Names	D. Forehand	C. Dreyfuss	K. Macha	
Approval Signatures				
Approval Dates	9-Dec-2019	9-Dec-2019	9-Dec-2019	
Approval Title	Author	Reviewer	Project Manager	

References	List and Hyperlink all documents related to this traveler. This includes, but is not limited to: safety (THAs, SOPs, etc), drawings, procedures, and facility related documents.			
CRM-088-2005-0001 CEBAF Rework Cavity Pair (sheets 1 & 2)	Indium Wire Cleaning Procedure	Indium Pressing Procedure	Ionized Nitrogen Cleaning with Particle Counter Procedure	Cavity Field Probe Length Spreadsheet

Revision Note	
R1	Initial release of this Traveler.

Step No.	Instructions	Data Input
0	Record Cavity Serial Number Operators login :	[[CAVSN]] <<CAVSN>> [[CPRSN]] <<CPRSN>> [[Technician]] <<SRFCVP>> [[Technician2]] <<SRFCVP>> [[AssyStartDate]] <<TIMESTAMP>>

Step No.	Instructions	Data Input
1	**Hardware Needed for This Assembly:**	[[HRDWRTech]] <<SRFCVP>>
2	Check the cleanroom passthru for the following UHV cleaned subcomponents and hardware.	
3	**Field probe assembly:** 1 pc. Field probe feed through 1 set Field probe with jamb nut 1 pc. 316 SS Probe clamp ring 2 pcs. 316 SS field probe feed through split flange ring (clear holes) 2 pcs. 316 SS field probe feed through split flange ring (tapped holes) 6 pcs. 6-32 x .875" lg. 316 SS SHCS with dicronite coating 30 pcs. #6 SS belleville washer	
4	**HOM load assembly:** 25 pcs. 1/4-20 SiBr nut 96 pcs. 1/4" SS belleville washers 24 pcs. 1/4" 316 SS flat washer 24 pcs. 1/4-20 x 1.5" lg. 316 SS hex head CS 2 pcs. HOM Load	
5	**Indium wire 99.99% pure** 2 pcs. indium wire, .040" diameter, 12" long 1 pc. indium wire, .025" diameter, 2.5" long	
6	**Protective flange covers and spring clamps needed:** 2 pcs. Beamline flange cover 2 pcs. HOM elbow cover 1 pc. FPC flange cover 1 pc. Field probe flange cover	
7	**Tools needed:** 1/4" drive 7/64" hex key socket 7/64" hex key balldriver 1/4" drive 7/16" socket 1/4" drive torque wrench (0-50 in. lb. range) 1/4" drive torque wrench (40-200 in. lb. range) 7/16" combination wrench	

	6" dial calipers Specialized tooling to tighten field probe jamb nut	

Step No.	Instructions	Data Input
8	**Prepare and Organize:** Clean the handles and upper shelf of a clean room cart with an isopropyl soaked wiper. Clean the cart with ionized nitrogen. Prepare the cleaned cart with clean room wipes arranged on the upper shelf to place clean components on. Individually remove HOM loads from the plastic container and clean with ionized nitrogen. Visually inspect the seal path and ceramic absorber. It should be smooth and free of cracks, scratches, stains, and residual indium. Contact the supervisor if there are any discrepancies. Carefully place each HOM load on a wiper onto top shelf of the clean room cart. Remove the field probe feedthrough, jamb nut and probe tip from the nylon bags. Clean each one with ionized nitrogen and place on a wiper on the cart Mount jamb nut and probe tip on the feedthru. Wipe two stainless perforated trays with isopropyl alcohol soaked wipers. Clean them with ionized nitrogen. Organize the hardware in the two trays: field probe hardware tray and HOM load hardware tray. Place the trays on the top shelf of the cart.	[[PrepTech]] <<SRFCVP>> [[PrepDate]] <<TIMESTAMP>> [[PrepComment]] <<COMMENT>>

Step No.	Instructions	Data Input
9	**Press Indium:** Press indium seal on the HOM loads as per the Indium Pressing Procedure. Form the indium seal for the field probe as per the Indium Pressing Procedure. Leave the indium seal in the former and place on the cart with the HOM hardware.	[[IndiumTech]] <<SRFCVP>> [[IndiumPressDate]] <<TIMESTAMP>> [[IndPressComment]] <<COMMENT>>

Step No.	Instructions	Data Input
10	**Covering the cavity:** Clean the handles and upper shelf of a clean room cart with an isopropyl soaked wiper. Clean the cart with ionized nitrogen. Blow off required cavity flange covers and spring clamps with clean ionized nitrogen in front of the particle counter as per the Ionized Nitrogen Cleaning with Particle Counter Procedure. **Attach flange covers with one motion as to not rotate or vibrate flanges once together.** **Never position your body or clothing over an opening.** **Replace and clean new gloves if they are damaged prior to, or during an operation.** **Only one person shall be in close proximity to cavity during this blanking operation.** **Inspect cavity sealing surfaces of cavity flanges as covers are installed.** Starting at the bottom, cover the beam-line flange and clamp in place. Cover each HOM elbow flange and clamp in place. Cover the Field probe flange and clamp in place. Cover the FPC flange and clamp in place. Cover the top beam-line flange and clamp in place.	[[BlankTech]] <<SRFCVP>> [[BlankDate]] <<TIMESTAMP>> [[BlankComment]] <<COMMENT>>

Step No.	Instructions	Data Input
11	**Field Probe Sub-Assembly:** Set field probe to the length specified in the Cavity Field Probe Length Spreadsheet and measure with calipers. Tighten jamb nut to the probe tip using specialized tooling. Clean the assembly as per the Ionized Nitrogen Cleaning with Particle Counter Procedure and place on a wiper on the cleanroom cart. Place the indium for the field probe on a wiper on the cleanroom cart. Clean the hardware in the field probe hardware tray as per the Ionized Nitrogen Cleaning with Particle Counter Procedure and place it on the cart. Clean the following tools as per the Ionized Nitrogen Cleaning with Particle Counter Procedure and place them on the cart: 1/4" drive 7/64" hex key socket 1/4" drive torque wrench (0-50 in. lb. range) 7/64" hex key balldriver Tweezers Transport the cart to the class 10 area. Record the Field Probe length. Record the Field Probe serial #.	[[FPTech]] <<SRFCVP>> [[FPDate]] <<TIMESTAMP>> [[FPComment]] <<COMMENT>> [[FPFT_Length]] <<FLOAT>> [[FPFTSN]] <<FPFTSN>>

Step No.	Instructions	Data Input
12	**Assemble the field probe onto the cavity:** **Refer to drawing # CRM-088-2005-0001 for proper orientation and placement of components.** **Install field probe with one motion as to not rotate or vibrate flanges once together.** **Never position your body or clothing over an opening**. Orient the cavity so that the field probe flange is horizontal, with the flange sealing surface pointing towards the floor. Inspect the field probe seal surface on the cavity. It should be smooth and free of scratches, stains, and residual indium. Contact the supervisor if there are any discrepancies. Install the field probe assembly: Using clean tweezers carefully remove indium from former and place it onto the stainless steel field probe flange. *Make sure you do not scratch the sealing surface or distort the shape of the seal*. Install the field probe with indium and hold in place. While holding the probe, slide the round clamp ring over the feed through. Install the clear hole split flange plates. Install the tapped hole split flange rings and align bolt patterns. Ensure the 'splits' of each set of flanges are not aligned with each other. Install six screws with belleville washers through the clear hole rings and into the threaded plates. Torque to 15 in. lbs. using a star like pattern. Record time.	
13	Ensure the probe is not shorted by checking continuity between the cavity and the center conductor of the probe. If shorted contact supervisor.	[[FPAssyTech]] <<SRFCVP>> [[FPAssyDate]] <<TIMESTAMP>> [[FPAssyComment]] <<COMMENT>>
14	Rotate the cavity 180 degrees. Raise the cavity as high as you can.	

Step No.	Instructions	Data Input
15	**HOM load preparation for assembly to cavity:** Clean the HOM load hardware as per the Ionized Nitrogen Cleaning with Particle Counter Procedure and place on the cleanroom cart. Individually clean the HOM loads as per Ionized Nitrogen Cleaning with Particle Counter Procedure and place on a wiper on the cleanroom cart. Inspect indium after nitrogen cleaning. Clean the following tools as per the Ionized Nitrogen Cleaning with Particle Counter Procedure and place them on the cart: 1/4" drive torque wrench (40-200 in. lb. range) 1/4" drive 7/16" socket 7/16" combination wrench	
16	**Assemble the HOM loads to the cavity:** **Refer to drawing # CRM-088-2005-0001 for proper orientation and placement of components.** **Install HOM loads with one motion as to not rotate or vibrate flanges once together.** **Never position your body or clothing over an opening**. Carefully remove cavity flange cover. Inspect HOM elbow flange seal paths. Insert two opposite screws with appropriate washers into HOM load flange. Properly orient the HOM load and install on the elbow. Make sure flanges are perfectly aligned. Install flat washers and nuts onto the two screws and torque to 30 in. lbs. Repeat for the other HOM load.	[[HOMTech]] <<SRFCVP>> [[HOMDate]] <<TIMESTAMP>> [[HOMComment]] <<COMMENT>>

Step No.	Instructions	Data Input
17	**Torque fasteners:** Install remaining screws and nuts. Using the proper torque pattern, evenly torque all bolts, except corners, incrementally to 30, 40, and then 55 in. lbs. Torque corner bolts to 40 in. lbs. Recheck final torque of all bolts.	[[TorqueTech]] <<SRFCVP>> [[TorqueTech2]] <<SRFCVP>> [[TorqueComment]] <<COMMENT>>
18	**Record HOM Load serial numbers:**	[[HOML_180fromFPC]] <<HOMLSN>> [[HOML_90fromFPC]] <<HOMLSN>>
19	The cavity is now ready for pair assembly.	[[AssyCompleteDate]] <<TIMESTAMP>> [[AssyCompleteComment]] <<COMMENT>>