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| Traveler Title | C20 Cryomodule Disassembly Traveler |
| Traveler Abstract | This Traveler outlines the steps necessary to disassemble a C20 Cryomodule, including removing the endcans, and parting the 4 Cryounits. Work within this Traveler is to be performed by trained and authorized Assembly Technicians ONLY. All Cryomodule materials shall be kept inside the established RADCON barrier until they have been surveyed and released. **\*\* Radiation surveys shall be performed and information recorded at traveler hold points.\*\******\*\* Radiological controls are a critical component of the cryomodule rework disassembly and assembly process. Dose rate, as well as contamination surveys (where indium gaskets or seals are present) shall be performed and analyzed, with information communicated to all involved personnel. Results will be recorded at traveler hold points. RW-II training will be required where contamination is identified\*\**** |
| Traveler ID | ER5C-CMA-CM-DISA-C20 |
| Traveler Revision  | R2 |
| Traveler Author | John Fischer |
| Traveler Date | 01-Oct-2024 |
| NCR Informative Emails | areilly |
| NCR Dispositioners | fischer,jjcamp,weaksmc |
| D3 Emails | fischer,areilly |
| Approval Names | J. Fischer | J. Campbell | J. Fischer | A. Reilly |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | CMA Group Lead | Project Representative |

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| 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.**All materials linked below and throughout this traveler are for reference only and should be verified for latest version at time of use.** |
| [11100-0016 CEBAF Cryomodule Top Assy](https://misportal.jlab.org/jlabDocs/documents/versions/6144/download) | [11131-0081 CEBAF Supply and Return End Can](https://misportal.jlab.org/jlabDocs/documents/versions/109563/download) | [11131-0116 CEBAF Return Beam Pipe](https://misportal.jlab.org/jlabDocs/documents/versions/184734/download) | [11131-0117 CEBAF Supply Beam Pipe](https://misportal.jlab.org/jlabDocs/documents/versions/184735/download) | [11171-0001 CEBAF Bridging Area](https://misportal.jlab.org/jlabDocs/documents/versions/102756/download) |
| [11171-0008 CEBAF Bridging Area Beam Pipe](https://misportal.jlab.org/jlabDocs/documents/versions/5596/download) | [C20-C50 RADCON Briefing Slides Ex.](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-204610/C2050_reworkbrief.pptx) | [RADCON Control Document Ex.](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-143637/C50_Radcon%20RAM%20Control%20Doc%20JF2017.docx) | [C20-C50 Indium Joint Locations](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-205790/C20-C50%20Indium%20Joint%20Locations.pptx) | [WACHs Cutter Noise Survey](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-205782/Noise%20Survey%20%E2%80%93%20Cryomodule%20Assembly%20High%20Bay%2C%20Test%20Lab%20Bldg%2058-Sept%2025%2C%202014%20End%20Can%20Cutting%20Cone%20Placement%20Hearing%20Protection%20Required%202-1.doc) |

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| Revision Note |  |
| R1 | Initial release of this Traveler. |
| R2 | General review and edit of entire Traveler, added discard 8 pin FT |

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| **Part Description** | **Serial No.** |
| CEBAF style Cryomodule is to be refurbished for the C75 project. Verify Radcon has surveyed the component and made recommendations for handling. Decommissioning testing, particulate sampling, leak checking, and any other testing may be performed if necessary. To be determined prior to disassembly by management. **Cryomodule has been released for disassembly.** | [[CMSN]] <<CMSN>>[[TunnelLocation]] <<SN>>[[CMDate]] <<TIMESTAMP>>[[CMComment]] <<COMMENT>>[[RadSurveyMap]] <<FILEUPLOAD>> |
| **Step No** | **Instructions** | **Data Input** |
| 1 | **Lift Cryomodule onto long transfer cart** | [[TIMESTAMP1]] <<TIMESTAMP>>[[TECHNICIAN1]] <<SRFCMP>>[[COMMENT1]] <<COMMENT>> |
| Follow the Lift Plan when performing the CM lift. | [[THALiftCM]] <<CHECKBOX>> |
| Place 4 saddle assemblies onto transfer cart. |  |
| Remove 1/2-13 hardware from the aluminum Cryomodule saddles. |  |
| Lift the Cryomodule | [[LiftCM]] <<CHECKBOX>> |
| While lowering into place, center saddles under each Cryounit. | [[LowerCM]] <<CHECKBOX>> |
| Plumb tophats, rotate Cryomodule if necessary. | [[RotateCM]] <<CHECKBOX>> |
| Run saddle swivel feet up, touching at all locations. 16 places.  | [[SaddleFeetCM]] <<CHECKBOX>> |
| Lock down the Cryomodule carts. | [[LockCartsCM]] <<CHECKBOX>> |
| Remove all KF blanks, ISO flanges, cold cathodes and shrouds, and vacuum vessel isolation valve. Place all parts in labeled bins. |  |
| **\*\*\*\*ALL BEAMLINE MATERIALS AND COMPONENTS ARE TO BE PLACED IN RADCON BIN FOR SURVEY\*\*\*\*** |  |

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| **Step No** | **Instructions** | **Data Input** |
| 2 | **Supply end can removal** | [[TIMESTAMP2]] <<TIMESTAMP>>[[TECHNICIAN2]] <<SRFCMP>>[[COMMENT2]] <<COMMENT>> |
| Install short transfer cart with SEC stand to end of long cart, secure with strap.  | [[TransferCartSEC]] <<CHECKBOX>> |
| Align and attach end can stand to end can  | [[AttachEndCanStandSEC]] <<CHECKBOX>> |
| Position and lock down Cryomodule and end can stand. | [[LockDownECS]] <<CHECKBOX>> |
| Install the Wach's cutter and align | [[WachCutterAlignSEC]] <<CHECKBOX>> |
| Cut weld at bridging ring. \*\*This action may happen on off hours to limit noise exposure to others\*\* | [[RingCut]] <<CHECKBOX>> |
| Remove the Wach's cutter, install at the next bridging ring weld to be cut. | [[RepositionWachs]] <<CHECKBOX>> |
| Using crane, sling the SEC bridging ring  |  |
| Unbolt the bridging ring at end can endplate  | [[UnboltBridgingRingSEC]] <<CHECKBOX>> |
| Pull ring back, exposing outer Mu metal (It may be necessary to grind remaining weld to achieve this) | [[RingBack]] <<CHECKBOX>> |
| Tie bridging ring off to Cryomodule  | [[TieBridgingRingSEC]] <<CHECKBOX>> |
| Remove outer Mu metal, 50k MLI, 50k shield , 2k MLI, and inner MU metal, exposing beampipe and shield flex line, place parts into bins.  | [[RemoveBridgingMaterialsSEC]] <<CHECKBOX>> |
| **CALL RADCON TO SURVEY AREA.** | [[RADCONSurveyed]] <<CHECKBOX>> |
| Support and protect the beampipe bellows,unbolt the beampipe and 50k intercept from the Cryounit, blank off the gatevalve. **\*\*The intercept may contain indium that will need to be measured for contamination prior to removal by RADCON\*\*** | [[TIMESTAMPRAD]] <<TIMESTAMP>>[[RADCONTech]] <<SRFCMP>>[[COMMENT2g]] <<COMMENT>> |
| Remove the beampipe dogs from the endplate, carefully remove the pumpdrop and beampipe. **Place in Radcon bin.** | [[RemoveBeampipe]] <<COMMENT>> |
| Remove and discard the liquid level 8 pin cryogenic feedthru. Follow RADCON protocols. | [[Remove8PinFTSEC]] <<COMMENT>> |
| Cut 4" and 3/4" process lines between SEC and Cryounit,square.  | [[CutProcessLines]] <<CHECKBOX>> |
| Transfer SEC to rework area.  | [[TransferSEC]] <<CHECKBOX>> |
| Using the OHC remove the bridging ring, Mu metal, and gate valve from Cryounit end. **Place cold gate valve into Radcon bin.**  | [[RemovePartsEC]] <<CHECKBOX>> |
| Supply End Can | [[SECSN]] <<SECSN>>  | [[SECSN\_RAM]] <<CHECKBOX>>  |
| Pumpdrop SEC | [[SUBPSN]] <<SUBPSN>> | [[SUBPSN\_RAM]] <<CHECKBOX>> |
| Warm gate valve SEC | [[GTVWSN\_SEC]] <<GTVWSN>> | [[GTVWSN\_SEC\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN1]] <<GTVCSN>> | [[GTVCSN1\_RAM]] <<CHECKBOX>> |

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| **Step No** | **Instructions** | **Data Input** |
| 3 | **Bridging ring removal** | [[TIMESTAMP3]] <<TIMESTAMP>>[[TECHNICIAN3]] <<SRFCMP>>[[COMMENT3]] <<COMMENT>> |
|  | Using the Wach's cutter, remove weld from both sides of the bridging ring. | [[WachsComplete]] <<CHECKBOX>> |
| Remove the Wach's cutter, install at the next bridging ring weld. | [[MoveWachs]] <<CHECKBOX>> |
| Using the OHC, pull the ring back, exposing the outer Mu metal (It may be necessary to grind remaining weld to achieve this) | [[RingBack2]] <<CHECKBOX>> |
| Remove outer Mu metal, 50k MLI, 50k shield , 2k MLI, and inner MU metal. Expose the beampipe, shield flex line, and 2k crossover, place parts into bins.  | [[RemoveBridgingMaterials]] <<CHECKBOX>> |
| **CALL RADCON TO SURVEY AREA.** | [[RADCONSurveyed2]] <<CHECKBOX>> |
| Support and protect beampipe bellows,unbolt beampipe, and cold gate valves. **Place in Radcon bin, call for survey.** | [[RemoveBBP]] <<CHECKBOX>> |
| Cut 4" and 3/4" process lines between Cryounits  | [[CutProcessLineBRBP]] <<CHECKBOX>> |
| Position Cryounit onto short transfer cart, lock down, take to CU disassembly area. | [[PositionCartBRBP]] <<CHECKBOX>> |
| Repeat process 3 times, opening all three bridging areas. |  |
| Bridging Beampipe | [[BRBPSN1]] <<BRBPSN>> | [[BRBPSN1\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN2]] <<GTVCSN>> | [[GTVCSN2\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN3]] <<GTVCSN>> | [[GTVCSN3\_RAM]] <<CHECKBOX>> |
| Bridging Beampipe | [[BRBPSN2]] <<BRBPSN>> | [[BRBPSN2\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN4]] <<GTVCSN>> | [[GTVCSN4\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN5]] <<GTVCSN>> | [[GTVCSN5\_RAM]] <<CHECKBOX>> |
| Bridging Beampipe | [[BRBPSN3]] <<BRBPSN>> | [[BRBPSN3\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN6]] <<GTVCSN>> | [[GTVCSN6\_RAM]] <<CHECKBOX>> |
| Cold gate valve | [[GTVCSN7]] <<GTVCSN>> | [[GTVCSN7\_RAM]] <<CHECKBOX>> |

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| **Step No** | **Instructions** | **Data Input** |
| **4** | **Return end can removal** | [[TIMESTAMP4]] <<TIMESTAMP>>[[TECHNICIAN4]] <<SRFCMP>>[[COMMENT4]] <<COMMENT>> |
| Install the REC stand onto the long cart.  | [[RECS]] <<CHECKBOX>> |
| Align and attach the end can stand to end can  | [[AlignStandREC]] <<CHECKBOX>> |
| Position and lockdown the Cryomodule and end can stand. | [[LockECS]] <<CHECKBOX>> |
| Install the Wach's cutter and align.  | [[WachCutterAlignREC]] <<CHECKBOX>> |
| Cut the weld at the bridging ring.  | [[WachsComplete2]] <<CHECKBOX>> |
| Remove the Wach's cutter, install at the next bridging ring weld. | [[MoveWachs2]] <<CHECKBOX>> |
| Using the OHC, sling bridging ring  |  |
| Unbolt the bridging ring at the end can endplate  | [[UnboltBridgingRingREC]] <<CHECKBOX>> |
| Pull the ring back, exposing the outer Mu metal (It may be necessary to grind remaining weld to achieve this) | [[MoveRing]] <<CHECKBOX>> |
| Tie the bridging ring off to the Cryomodule  | [[TieBridgingRingREC]] <<CHECKBOX>> |
| Remove the outer Mu metal, 50k MLI, 50k shield , 2k MLI, and inner MU metal, exposing the beampipe and shield flex line, place parts into bins.  | [[RemoveBridgingMaterialsREC]] <<CHECKBOX>> |
| **CALL RADCON TO SURVEY AREA.** | [[RADCONSurveyed3]] <<CHECKBOX>> |
| Support and protect the beampipe bellows,unbolt the beampipe and 50k intercept from the Cryounit, blank off the gatevalve. |  |
| Remove the beampipe dogs from the endplate, carefully remove the beampipe. **Place in Radcon bin.** | [[RemoveRTBP]] <<CHECKBOX>> |
| Remove and discard the liquid level 8 pin cryogenic feedthru. Follow RADCON protocols. | [[Remove8PinFTREC]] <<COMMENT>> |
| Cut 4" and 3/4" lines between REC and Cryounitsquare.  | [[CutProcessPiping]] <<CHECKBOX>> |
| Remove the bridging ring, Mu metal, and gate valve from the Cryounit end. **Place gate valve into Radcon bin, call for survey.**  | [[RemovePartsREC]] <<CHECKBOX>> |
| Transfer the REC and Cryounit to rework area | [[TransferREC]] <<CHECKBOX>> |
| Return Beampipe REC | [[RTBPSN]] <<RTBPSN>> | [[RTBPSN\_RAM]] <<CHECKBOX>> |
| Warm gate valve REC | [[GTVWSN\_REC]] <<GTVWSN>> | [[GTVWSN\_REC\_RAM]] <<CHECKBOX>> |
| Cold gate valve 8 | [[GTVCSN8]] <<GTVCSN>> | [[GTVCSN8\_RAM]] <<CHECKBOX>> |
| Return End Can | [[RECSN]] <<RECSN>> | [[RECSN\_RAM]] <<CHECKBOX>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 5 | Verify the above steps are completed. Use the comment box to note variances.Upload the inventory tracking forms.Supervisor to clear holdpoint and close once traveler is complete. | [[TECHNICIAN5]] <<SRF>>[[TIMESTAMP5]] <<TIMESTAMP>>[[COMMENT5]] <<COMMENT>>[[INVENTORYFORMS]] <<FILEUPLOAD>>[[SUPERVISORHOLDPOINT]] {{fischer,jjcamp,jared}} <<HOLDPOINT>>[[CMASUPERVISOR]] <<SRFCMP>> |