SNS OPM ATTACHMENT - 2.H-13.c
Approved Radiation Safety Hold Points

Before using a printed copy, check the *last modified date and revision number* against the OFFICIAL COPY on the SNS-OPM website.
Signed archival copies are maintained by the SNS Document Control Center.

SNS OPM Procedures in which this Attachment is used.		
2.H-13		

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____ 03.21.2016
RAD Division Director — Date

Approved: _____ 03.21.2016
SNS Operations Manager — Date

Approved: _____ 3/16/2016
SNS Radiation Safety Officer — Date

Approved: _____ 3-16-16
RAD Accelerator Operations Manager — Date

Approved: _____ 3/21/16
RAD Mechanical Systems and Operations Group Leader — Date

Approved: _____ 3-16-2016
ISD SNS Instrument Operations Manager — Date

Contacts: Don Gregory (SNS Radiation Safety Officer)
SNS-OPM Editor

SNS-OPM 2.H-13.c
Approved Radiation Safety Hold Points

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
PPS Control Keys for critical Beam Production or Beam Transport Devices – i.e. the (front end key), HEBT Dipole, Ring Extraction Septum and RTBT DH-13	Place PPS control key for the critical device in the dedicated yellow Lockbox in CCR	On Yellow group Lockbox in CCR	Only available if PPS is certified to provide the proper protections WITH THE PPS key locked up.
Ion Source 65 KV (test stand)	220 VAC backup breaker for 65 kV power supply	Backup breaker FER 103, CB 4	
Ion Source 65 KV PS (Front End)	480 VAC 3 ϕ disconnect switch (PPS Controlled) mounted adjacent to the normal entry way to the front end area **or** FE-1DP1-3 (Circuit Breaker 3) located on the south wall facing the Big Blue Box **or** Disconnected RF Antenna Leads within the Ion Source access Cage	On the disconnect handle through the provided hole when in the off position **or** Circuit Breaker 3 FE-1DP1 **or** On hasp on door to Ion source access cage to RF Antenna	None **or** None **or** Ion Source Group assistance needed for disconnection
Grounded 2MHz System (Front End)	208V PPS Controlled receptacle to the grounded 2MHz amplifier **or** 2MHz RF Transformer transfer line flange	On the receptacle end of the cable located at the rear of the grounded 2MHz amplifier **or** Located on the North Side of the Big Blue Box	This RS Hold needs to be on when operating the grounded 2MHz amplifier using the PPS Controlled 208V disconnect switch This RS Hold needs to be on prior to the removal of the 208V PPS Controlled receptacle to the grounded 2MHz amplifier
Grounded 2MHz System (Front End)	208V disconnect switch labeled “PPS Controlled 2MHz grounded” **or** FE-1DP1-1 (Circuit Breaker 3) located on the south wall facing the Big Blue Box	On the disconnect handle through the provided hole when in the off position **or** Circuit Breaker 1 FE-1DP1	None **or** This location takes care of both the 2 & 13 Mhz systems
Grounded 2 MHz and 13MHz System (Front End)	480V VAC 3 ϕ disconnect switch labeled “Plasma RF” **or** FE-1DP1-1 (Circuit Breaker 1) located on the south wall facing the Big Blue Box	On the disconnect handle through the provided hole when in the off position **or** Circuit Breaker 1 FE-1DP1	This location takes care of both the 2 & 13 Mhz systems **or** This location takes care of both the 2 & 13 Mhz systems

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
LEBT Electrode number 1	At LEBT electrode power connection **or** backup breaker for 40 kV power supply	LEBT electrode power connection on beamline **or** backup breaker at FER 04	For Electrical Safety, LOTO backup breaker before disconnecting any power cables.
LEBT Electrode number 2	At LEBT electrode power connection **or** backup breaker for 40 kV power supply	LEBT electrode power connection on beamline **or** backup breaker at FER 04	For Electrical Safety, LOTO backup breaker before disconnecting any power cables.
MEBT Rebuncher RF Cavities (4)	At each of four MEBT Rebuncher RF Cavities, at the RF connection point **or** (in back of) each MEBT RF cabinet (1-5) on the 208V 3PH cable **or** At each FER wall breaker in wall breaker panel FE-1PP15	RF connector on MEBT Rebuncher RF Cavity to beamline **or** On the yellow LOTO clam shell enclosing the 208V 3 PH cable plug mounted on the back of each MEBT RF cabinet (1-5) **or** FER wall/panel breaker in breaker panel FE-1PP15	For Electrical Safety, LOTO backup breaker before disconnecting any RF power cables. Application of the RS Hold tag on the yellow LOTO clam shell requires assistance from members of the RF Systems group
MEBT Beam Stop	At the control cable for the MEBT Beam Stop	On the yellow LOTO clam shell enclosing the control cable for the MEBT Beam Stop	Confirm beam stop is inserted before applying RS Hold. **Only valid when in Front End Only Mode** (N2 interlock will trip beam off only in this PPS mode)
MPS DG-535 Pulse Generator	The lock box containing the MPS DG-535 Pulse Generator	Apply RS Hold tag on the padlock hasp on the box containing the MPS DG-535 pulse generator	The MPS DG-535 pulse generator is used for limiting beam power (by rep rate and width) and is located in the Front End Building in the MPS Equipment Cabinet FE-MPS:Cab02
RFQ	Shorting plate on RF waveguide after circulator **or** On HVCM output cable to Klystron **or** HVCM 13 kV switchgear	Through bolt hole in flange for RF shorting plate **or** On a plug box cover on the HVCM voltage output cable to the Klystron or On lockbox mounted on the front of the dog house enclosure for the HVCM	For Electrical Safety, LOTO backup breaker before disconnecting any power cables – see SNS JHA/SOP for the HVCM. One should see 4 keys inside the lockbox. 13kV remote control key, kirk key for 13kV switchgear, LOTO key for the 13kV switchgear, and key for the lock on the CO2 valve.

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
DTL 1 and 2 waveguides with shorting plates installed for Front End Only Mode	DTL 1 and 2 waveguides with shorting plates installed located in the front end mezzanine (used for Front End Only Mode)	Through the bolt hole of the waveguide flange and shorting plate of DTL 1 and/or 2 waveguides.	These RS Hold points can be used to prevent establishing Beam Permit for the Linac with shorting plates installed. RS Hold on either point is sufficient.
DTL / CCL / SCL Tank / Module / Cryomodule	Cover on RF Waveguide at Tank / Module / Cryomodule **or** Shorting plate on RF waveguide after circulator **or** On HVCM voltage output cable to Klystron **or** HVCM 13.8 kV switchgear **or** 13.8 kV vacuum circuit breaker in Switch House (Bldg 8912)	Through bolt hole in flange for RF waveguide cover **or** Through bolt hole in flange for RF shorting plate **or** On a plug box cover on the HVCM voltage output cable to the Klystron **or** On lockbox mounted on the front of the dog house enclosure for the HVCM **or** 13.8 kV vacuum circuit breaker in Switch House (Bldg 8912)	For Electrical Safety, LOTO backup breaker before disconnecting any power cables – see SNS JHA/SOP for the HVCM. One should see 4 keys inside the lockbox. 13kV remote control key, kirk key for 13kV switchgear, LOTO key for the 13kV switchgear and key for the lock on the CO2 valve. Application of the RS Hold tag on the breaker requires assistance from members of the Electrical Systems group
HEBT DH11, DH12 - DH18	At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	To prevent Beam from entering the Ring, RS Holds need to be placed at the upstairs power supplies and at the downstairs magnets locations to prevent re-configuration of cables.
Linac Dump Shielding	Linac Dump Shielding (Top & Side Plates)	Apply RS-Holds to hasps securing plates around beam pipe	RS-Hold locks physically secure shielding to minimize backstreaming radiation from linac dump
Ring Gamma blocker	Gamma blocker solenoid valve housing in Ring Service building	Solenoid valve housing air supply shut-off valve	Locked in closed position to prevent delivery of air to gamma blockers actuators to ensure non-exposure of personnel to radiological hazard
Ring Extraction Septum	At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	To prevent Beam from extracting into the RTBT, RS Holds need to be placed at the upstairs power supplies and at the downstairs magnets locations to prevent re-configuration of cables.

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
RTBT DH13	Place the Tg key in a dedicated Lockbox in CCR **or** At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	On Lockbox in CCR **or** At Power Supply breaker **AND** At Power Supply cabinet door(s) to cable leads **AND** At magnet terminals	To prevent Beam from entering the Target, RS Holds need to be placed at the upstairs power supplies and at the downstairs magnets locations to prevent re-configuration of cables.
RTBT/Target Gamma Blocker	Gamma blocker solenoid valve housing in RTBT tunnel at bottom of escape hatch ladder	Solenoid valve housing air supply shut-off valve	Locked in closed position to prevent delivery of air to gamma blockers actuators to ensure non-exposure of personnel to radiological hazard
Target Shutters	Retaining pin on Closed shutter	In Shutter Drive Equipment room after shutter is closed and locked in place with retaining pin	To be locked in the closed position while instrument shielding ON CHOPPER SHELF is removed or not under configuration management. May also be used when shielding further downstream is released.
High Bay T-section radiation shielding Lintels	At each radiation shielding Key Block (lintel) above the SDER	Place chain around one lifting fixture per block and apply RS Hold tag and lock.	To prevent access to critical steel radiation shielding underneath the T-Sections
Target shutter replacement concrete plug	At each radiation shine shield Key lintel above the appropriate shutter that has been replaced with a concrete plug	Place chain around one lifting fixture per block and apply RS Hold tag and lock.	To prevent access to concrete plugs, the overlaying shine shield is locked in place.
Target Bay Personnel Door	On the bar on the Target Bay Personnel Door	Place Chain around the bar that goes across the door assuring that the Target Bay Personnel Door is locked in the close position	To prevent inadvertent opening the Target Bay Personnel Door when the Target Bay Access Control (TBAC) is inoperable or bypassed
Intra-Bay Doors **When TBAC is not functional**	On the Electrical Breaker that supplies power for opening the Intra-Bay doors	Before entry into the Transfer Cell, one must visually verify that the Intra-Bay doors are closed **AND** An RS Hold has been applied to the Electrical Breaker that supplies power for opening the Intra-Bay doors	To insure that the Intra-Bay doors cannot be opened while personnel are accessing the Transfer Cell

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
Target Transfer Cart	Power Breaker For the Hydraulic Cart **AND** Power Breaker on Panel for Service Bay 7.5 Ton Crane Bridge	At the panel breaker for the Hydraulic Cart **AND** At the Power Breaker for the Service Bay 7.5 Ton Crane Bridge	To prevent extracting the Target Transfer Cart, RS Hold tags must be placed on both the Hydraulic Cart Breaker and the 7.5 Ton Crane Bridge Breaker
RTBT Shield Covers in the Target High Bay	At two key blocks forming the High Bay floor in the lower section outside the SDER entrance	Place chain around one lifting fixture per block and apply RS Hold tag and lock.	Prevents removal of steel blocks in the space between the High Bay and RTBT tunnel
Delay Tank Covers in the Target High Bay	Blocks covering the downstream section of the primary delay tank	Place chain around one lifting fixture per block and apply RS Hold tag and lock.	Prevents personnel access to the decay tank recess
Key to locks and special tools securing beamline shielding	Lock-box for each operational instrument located in the CCR	Apply RS Hold lock and tag to lock-box	Prevents removal of configuration controlled shielding on a beamline without compensatory action
Neutron Beam lines	UKey for the Instrument placed in a lock-box in the CCR	On group Lockbox in CCR	To prevent beam transport to specified neutron beamline areas as defined by the reasons on the RS Hold Tag
Spare PPS keys for the Linac, HEBT, Ring, RTBT, Ring Injection Dump, and Target Areas.	The lock box contains the keys, which will unlock the lock boxes mounted on the back of the CCR PPS racks. (Linac, HEBT, Ring, RTBT, and Target)	Apply RS Hold tag and Lock to the lock box in CCR	To secure the spare pps keys required for recertification.
Central Control Room (CCR) Key Lock Box	The CCR Lock Box may contain keys such as; FE key; Linac, HEBT, Ring, RTBT or Target Exchange keys; HEBT or RTBT DH13 Critical Device keys; Extraction Septum key; Target Key Exchange; Key to LOTO Lock placed on the Electrical Circuit Breakers that supply power for opening Intra-Bay Doors; or any other key that prevent beam transport	Apply RS Hold tag and Lock to the lock box	To prevent beam transport to specified areas as defined by the reasons on the RS Hold Tag

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
RFTF Waveguide	Blank-off flange on waveguide inside the RFTF cave	Place lock hasp through one of the bolt holes in the waveguide and blank flange	Prevents delivery of RF to resonant cavities in the RFTF cave
BTF Ion Source 65 KV PS	600 VAC 3 ϕ disconnect switch mounted adjacent to the normal entry way to the BTF area **or** RF-3PP7 (Ganged Circuit Breakers 20, 22, 24) located on the south west wall **or** Disconnected RF Antenna Leads within the BTF Ion Source access Cage	On the disconnect handle through the provided hole when in the off position **or** RF-3PP7 - Ganged Circuit Breakers 20, 22, 24 **or** On hasp on door to BTF Ion source access cage to RF Antenna	None None Ion Source Group assistance needed for disconnection
BTF 2MHz System	600V VAC 3 ϕ disconnect switch labeled “2 MHz power supply Tomco 1 and 2” mounted adjacent to the normal entry way to the BTF area **or** Both Tomco unit 600V VAC 3 ϕ disconnect switches labeled “Tomco unit Cabinet #1 Rack 1 and Tomco unit Cabinet #2 Rack 2” located on the south west wall **or** RF-3DP1 (Circuit Breaker 9) located on the south west wall	On the disconnect handle through the provided hole when in the off position **or** On the disconnect handle through the provided hole when in the off position **or** RF-3DP1 (Circuit Breaker 9)	None None None
BTF 13MHz System	600V VAC 3 ϕ disconnect switch labeled “On Deck Switched Power” mounted adjacent to the normal entry way to the BTF area **or** RF-3PP7 (Ganged Circuit Breakers 13, 15, 17) located on the south west wall **or** 208V power cord on the back of the 13 MHz Comdel RF generator chassis. The top chassis inside the “Ions Source Small Blue Box”	On the disconnect handle through the provided hole when in the off position **or** RF-3PP7 - Ganged Circuit Breakers 13, 15, 17 **or** On a clamshell over the male plug end of the 208V power cord going to the 13 MHz Comdel RF generator chassis inside the “Ions Source Small Blue Box”	None None None

Device or Beam Area	Radiation Safety Hold Point	RS Hold Lock and Tag Placement	Note
BTF 13 MHz	208V power cord on the back of the 13 MHz Comdel RF generator chassis connected to the incoming power cord inside the "Ions Source Small Blue Box"	On a clamshell over the connection of the male plug end of the 208V power cord going to the 13 MHz Comdel RF generator chassis and the female plug end providing PPS controlled 208V inside the "Ions Source Small Blue Box"	This RS Hold needs to be on when operating the 13MHz system using the PPS Controlled 208V for configuration control.
BTF RFQ	Shorting plate on RF waveguide after circulator **or** On HVCM output cable to Klystron **or** HVCM 13 kV switchgear	Through bolt hole in flange for RF shorting plate **or** On a plug box cover on the HVCM voltage output cable to the Klystron **or** On lockbox mounted on the front of the dog house enclosure for the HVCM	None None None
BTF DH-7	At magnet terminals	At magnet terminals	To maintain configuration control and prevent beam transport to areas not authorized for beam.