

**Princeton Plasma Physics Laboratory  
D-Site Procedure**

Procedure Title:

**Massive Gas Injection Cabling Installation**

Number:

**D-NSTX-IP-3824**

Revision:

**1**

Effective Date: 5-16-16

Expiration Date: 5-16-19

*(3 yrs. unless otherwise stipulated)*

**Procedure Approvals**

Author: G. Grainger

x3334

Date 5-31-16

ATI: Frank Hoffman

x3914

Date 5-31-16

RLM: AL von Halle

x3639

Date 5-31-16

Responsible Division: **Electrical Construction**

**Procedure Requirements**

designated by RLM

LABWIDE:

✓	Work Planning Form # <b>2113</b> (ENG-032)	✓	Lockout/Tagout (ESH-016)
	Confined Space Permit (5008, Sec 8, Chap. 5)		Lift Procedure (ENG-021)
	Master Equip. List Mod (MC-002/003)		ES&H Review (NEPA, IH, etc.)
	RWP (HP-OP-20)		Independent Review
✓	ATI Walkdown	✓	Pre-Job Brief
✓	Post-job Brief	✓	Hazard Analysis
	Run Copy Required (performance of procedure must be documented and archived per ENG-030 page 10)		Special archiving requested for completed Run Copies: _____

D-SITE SPECIFIC:

✓	D-Site Work Permit (OP-AD-09)		Door Permit (OP-G-93)
	Work on Tritium Contaminated Sys. (OP-AD-77)		Activity Certification Committee Review
✓	Pre-Job Brief (ENG-030)		T-Mod (ENG-036)

<b>REVIEWERS</b> (designated by RLM)	
Accountable Technical Individual: <b>F. Hoffman Rev 1</b>	
Test Director	
Independent Reviewer: <b>Richard Van Kirk Rev 1</b>	
D-Site Shift Supervisor	
NSTX Construction Manager: <b>E. Perry</b>	
TFTR Caretaking	
Vacuum	
Computer	
Tritium	
Quality Assurance/Quality Control: <b>Quality Control Representative</b>	
AC Power	
Maintenance and Operations Division	
Energy Conversion System/Motor Control Division	
Electrical Safety: <b>Glenn Anderson</b>	
Environmental Restoration & Waste Management Division	
Work Control Center: <b>D. McBride</b>	
Neutral Beam (Heating Systems Branch of Electrical Engineering)	
Radio frequency (Heating Systems Branch of Electrical Engineering)	
Diagnostics: <b>F. Hoffman</b>	
Grounding Engineer	
Coil Engineer	
Lead machine Tech: <b>J. Winston</b>	

<b>TRAINING</b> (designated by RLM)			
No training required _____		Instructor : F. Jones	
Personnel (group, job title or individual name)	Read Only	Instruction	Hands On
Technicians and/or subcontractors performing installation		Pre-job Brief	X
ENG-041 Qualified			X
Training Rep. Frank Jones			
RLM : AL von Halle			

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## 1.0 PURPOSE

- 1.1 Install Massive Gas Injection System. The system includes (3) high voltage cables for solenoid valves: (1) from rack CTC-EE-451 to MGI #1 BAY K/L TOP; (2) from rack CTC-EE-401 to MGI#2 BAY F/G LOWER; (3) MGI #3 BAY I MIDPLANE and associated fiber optic, control and 120VAC power wiring.
- 1.2 To install electrical power, controls & fiber optic cables for racks (CTC-EE-401 & CTC-EE-451) in the MGI system.

## 2.0 BACKGROUND INFORMATION

- 2.1 The installation of high voltage conduit/cables for MGI-1, MGI-2 and MGI-3 are installed. Diagnostic personnel shall install preassembled electronic component boxes of electronic equipment, web-power switches, media converters and power supplies mounted in their respective racks under the supervision of the ATI and/or attending Physicist.
- 2.2 Plasma Research Staff (John Schmitt or designee) will supervise final fiber optic and high voltage connections at racks (CTC-EE-451 & CTC-EE-401 and MGI-1, MGI#-2 and MGI-3 valves.

## 3.0 SCOPE

This procedure describes the required steps necessary to accomplish the following tasks located in the NSTXU Test Cell:

- a. Lockout Tagout LP-471 circuit 18;
- b. Installation of (3) conduit/cable (HV) for MGI#1 SV-140, MG#2 SV-144 and MGI#3 SV-148 valves and electronic components mounted in racks (CTC-EE-451 & CTC-EE-401) . Additional mounting of associated power supplies, control wiring and Fiber optic cables to racks;
- c. Installation for Racks (CTC-EE-401& -451) front doors & covers (Lexan).
- d. *Installation of E-stop, loopset and TVPS-Permissive cables for MGI-1, 2 & 3 injectors systems.*
- e. Megger testing as noted;
- f. Test control and data acquisition;
- g. Cost Center: 1101-\*\*\*\*-MGI1.

## 4.0 GENERAL REQUIREMENTS

The following work/conditions are required per this installation procedure:

- 4.1 The latest edition of the National Electrical Code (NFPA/NEC 70-2011); National Fire Protection Association, with current National Recognized Testing Laboratory (NRTL) listing and labeling, Electrical Safety Standard for the Workplace (NFPA 70E-2012), as

well as and any other issued Specifications/Documents associated with this procedure ***shall be complied with.***

- 4.2 All work shall conform to PPPL lab-wide directive ES&HD 5008 and the PPPL Engineering Department Standard Electrical Systems Safe Work Practices ES-ELEC-005.
- 4.3 All Electrical workers performing the tasks of this procedure must meet the requirements of PPPL ENG-041 (Electrician Qualification). ATI must verify.
- 4.4 A Pre-Job Briefing of all work to be performed prior to start of procedure task(s) is required.
- 4.5 A completed **Job Hazard Analysis** form (JHA's) **must** be posted in each work area, and updated as work conditions change.
- 4.6 Lead Electrician performing work **must initial** each step in procedure when completed.
- 4.7 Personnel with whom the Lead Electrician will work with are:
- PPPL Electrical Construction Manager Frank Jones (x3099)
  - PPPL ATI (front cover)
  - PPPL Q.C. Representative

## 5.0 **DOCUMENTS**

The following Documents, Specifications and Drawings form an integral part of this procedure.

### 5.1 **Documents, Policies and Procedures**

OP-AD-09	D-Site work Permit
OP-AD-39	Conduct of Operations
ESH-004	Job Hazard Analysis
ESH-016	Control of Hazardous/Energy (lockout /Tagout )
ES-ELEC-005	Electrical Systems Safe Work Practices

### 5.2 **Drawing List (See NOTE)**

DRAWING NUMBER	REV	TITLE
<i>B-EA3531 SH-1</i>	<i>1</i>	<i>MASSIVE GAS INJECTION SYSTEM MGI #1 BAY K/L TOP CWD</i>
<i>B-EA3532 SH-1</i>	<i>1</i>	<i>MASSIVE GAS INJECTION SYSTEM MGI #2 BAY F/G LOWER CWD</i>

<i>B-EA3533 SH-1</i>	<i>1</i>	<i>MASSIVE GAS INJECTION SYSTEM MGI #3 BAY I MIDPLANE CWD</i>
<i>B-EA3500 SH-59</i>	<i>1</i>	<i>GAS INJECTION SYSTEM MGI INTERLOCK CWD</i>
B-EA3526 SH-1	0	MASSIVE GAS INJECTION SYSTEM POWER SUPPLY CAPACITOR BOX # 1
B-EA3526 SH-2	0	MASSIVE GAS INJECTION SYSTEM POWER SUPPLY CAPACITOR BOX # 1
B-EA3526 SH-3	0	MASSIVE GAS INJECTION SYSTEM POWER SUPPLY BOX # 2/3
B-EA3526 SH-4	0	MASSIVE GAS INJECTION SYSTEM POWER SUPPLY CAPACITOR BOX # 2
B-EA3526 SH-5	0	MASSIVE GAS INJECTION SYSTEM POWER SUPPLY CAPACITOR BOX # 3
B-EA3527 SH-1	0	MASSIVE GAS INJECTION SYSTEM NI CRIO
B-EA3527 SH.2	0	MASSIVE GAS INJECTION SYSTEM NI CRIO
B-EA3527 SH-3	0	MASSIVE GAS INJECTION SYSTEM NI CRIO
B-EA1500 SH-313	3	MASSIVE GAS INJECTION SYSTEM TORUS PRESSURE SYSTEM CTC-EE-441 & CTC-EE-451
E-9D11353	5	OPERATION AND DIAGNOSTIC SYSTEM NEUTRON DETECTOR ARRANGEMENT AND OTHER DIAGNOSTIC INSTRUMENTION
6000-B-52199	7	LP-471
E-EA3537 SH-1	0	MGI Rack Door Details (CTC-EE-401, CTC-EE-451)
E-EA3538 SH-1	0	MGI Rack 30" Door Details CTC-EE-451
E-EA3539 SH-1	0	Rack Covers for CTC-EE-401 & CTC-EE-451
B-4BA202	0	Power Supply & Distribution CWD CTC-EE-401
B-4A2002 SH-464A	0	Single Filter Assembly
E-4BA017	15	Single Line diagram (Ref.)
6000-B-52202	22	LP-474 (Ref.)

**NOTE:** These drawings are included for reference purpose only and may not accurately represent the field condition for the equipment. If there is any discrepancy between the drawing, procedure, and/or field conditions, **STOP** and notify the ATI (front cover) for clarification.

## 6.0 BILL OF MATERIALS

6.1 See Bill of Materials below. All miscellaneous items must be supplied by the PPPL electricians and/or PPPL Stockroom. Material / manufacturer substitutions are acceptable, as approved by the ATI.

QTY	VENDOR	PART NUMBER	PART DESCRIPTION
A/R	PPPL Stock	100124	Conduit, 1 1/4", PVC, 6063T1 Alloy
A/R	Electric Flex	CL-12	Corrlok, 3/4", Black or equivalent
3	Commercial		Conduit Accessory, PVC, LB, 1-1/4"
1@45'	LYNN/BERTEK	ZX04040424	F/O cable,round,OFNP,50/125um GIGAlite-10
1@50'	LYNN/BERTEK	ZX04040424	F/O cable,round,OFNP,50/125um GIGAlite-10
1@55'	LYNN/BERTEK	ZX04040424	F/O cable,round,OFNP,50/125um GIGAlite-10
3	PPPL STOCK		Plugmold Strip,15A, 125V AC, 10- 6 rcpt's
125'	Houston Wire & Cable Company	HW15301203	3/C + OS, #12 AWG, Shld, 600V, Type TC, THHN/THWN, 90°, PVC Jacket, 0.390 OD
2	PPPL	<i>E-EA3537, EA3538</i>	<i>MGI Rack Door Details</i>
2	PPPL	<i>E-EA3539</i>	Lexan Door Covers
<i>AR</i>	<i>BELDEN-#9513</i>	<i>D67-C8</i>	<i>3TWP+OS 22 AWG CU.300V,20 AWG Shielded, PLTC</i>
<i>4</i>	<i>HONEYWELL</i>	<i>DT2RV22-A7</i>	<i>Micro Switch, DPDT, 10A</i>

- Optical fiber cable in pre-terminated lengths supplied by J.Schmitt.
- Plenum rated USB2 cable supplied by J.Schmitt.
- *Internal wiring supplied by Engineering (F. Hoffman)*

## 7.0 PRECAUTIONS

- 7.1 Individuals are not permitted to lift more than 50 lbs. at any one time. If an object weighs in excess of 50 lbs., then it shall be lifted by more than one individual, or with the aid of mechanical system(s).
- 7.2 An approved method of fall protection shall be established for individuals working at elevated positions.
- 7.3 Use appropriate PPE (per JHA) and or per guidance from Industrial Hygiene.
- 7.4 Before removal Health Physics shall survey all materials that were in the test cell during the last run of NSTX or any material or tools left in the test cell overnight.

## 8.0 PREREQUISITES

The Lead Electrician for this procedure is: \_\_\_\_\_.  
The following shall be completed and signed by the Lead Electrician.

- 8.1 From the Shift Supervisor, obtain an approved D-Site Work Permit prior to any work commencing.)

\_\_\_\_\_  
ATI or Lead Electrician

\_\_\_\_\_  
Date

8.2 Work Control Center (WCC) has logged in this procedure and has approved the Engineering Work Package and has been given to the Lead Electrician performing the work. Under no circumstances should the work proceed without the approved “blue or yellow folder” from the WCC.

\_\_\_\_\_  
ATI or Lead Electrician Date

8.3 Notify Quality Control, and Electrical Construction Manager to attend pre-job Brief. The only personnel allowed to work under this procedure are those that attend this briefing.

\_\_\_\_\_  
ATI or Lead Electrician Date

8.4 The workers and ATI have reviewed the Job Hazard Analysis for this job. A completed JHA form must be posted at work area, and updated as conditions change.

\_\_\_\_\_  
ATI or Lead Electrician Date

9.0 **PROCEDURE**

**NOTE: The Lead Electrician shall note completion of all following tasks by initialing beside each step or paragraph.**

9.1 Site preparation:

a. Notify Electrical Construction Manager prior to start of work.

\_\_\_\_\_  
Lead Electrician Date

**THE IMPLEMENTATION OF THIS PROCEDURE REQUIRES THE TEMPORARY SHUTDOWN OF PANEL LP- 471. SHUTDOWN OF THIS PANEL AFFECTS THE VACUUM SYSTEMS. NOTIFICATION MUST BE GIVEN 1 WEEK IN ADVANCE TO Mark Cropper & Dang Cai, Joe Winston.**

9.2 Using the appropriate PPE listed in the Hazard Analysis Table A, de-energize electrical panel circuits in the NSTX TEST CELL as listed below:

LP-471 WILL BE SHUTDOWN ON \_\_\_\_\_ AT \_\_\_\_\_

\_\_\_\_\_ a. On the west wall of Test Cell, locate lighting panel LP-471 and open main breaker to shed loads.

- \_\_\_\_\_ **b.** On west wall of NSTX TEST CELL, locate disconnect switch PCB-45 and open switch blade. Lockout and Tagout disconnect switch PCB-45. Record tag number here;

PCB-45 tag number: \_\_\_\_\_

- \_\_\_\_\_ **c.** Remove cover from LP-471 and verify that LP-471 main breaker (line & load side) is positively de-energized – zero voltage with a category IV meter.

**Hazard Analysis Table A**

Procedure Step #	Task	Hazard Cat.	Identify limits and precautionary steps	Protective apparel/Protective equipment
9.2a 9.2b 9.7.e	Open LP-471 Main Breaker Open PCB-45  Close LP-471 Main Breaker	0	<b>50-250V - BES Trained, 251-480V – EPO/EUT</b> Arms Extended, Off-Center, Covers Closed	<b>Shirt, Long Sleeve Pant, Long (Non-melting natural fiber, as in cotton or wool)</b>  Safety Glasses or Goggles Hearing Protection Heavy Duty Leather Gloves
9.2b 9.2.c 9.7.c 9.7d	Lockout/Tagout PCB-45. Remove Panel Cover LP-471 and Perform a Zero Check.  Replace Panel Cover LP-471.  Remove Lock & Tag of PBC-45. Close Switch.	1	<b>50-250 VOLTS BES Trained</b> Avoid contact Prohibited work zone requires:3’-6” Category III or IV Meter Verification of meter Arc Flash Distance 48”	1. HRC 1 AR Shirt, Long Sleeve 2. HRC 1 AR Pants, Long 3. HRC 1 AR Coverall Instead of 1 & 2 4. Hard Hat. 5. Arc Rated 4 Wrap Around Face Shield. 6. Safety glasses or goggles 7. Leather Work shoes (AN) 8. Hearing Protection.

**9.3 Cable Installation**

- \_\_\_\_\_ **a.** Install cable routes in accordance with drawing E-9D11353 & **Cable Installation Schedule 1** depicted below:

**CABLE INSTALLATION SCHEDULE**

CABLE	DESC	FROM	TO	ROUTING	DRAWING
<b>LP-471 TO RACK CTC-EE-451</b>					
62199S	POWER CABLE 3/C+OS #12	Ckt-18	RACK CTC-EE-451	LP-471, L402, L404:5715;	B-EA1500 SH-313

CABLE	DESC	FROM	TO	ROUTING	DRAWING
RACK CTC-EE-451 TO RACK CTC-EE-418					
EA3531A EA3531B EA3531C	1-F/O	CTC-EE-451	CTC-EE-418	L477, N404,N411 :5887,5714	B-EA3531, E-9D11353
CTC-EE-401 TO CTC-EE-418					
EA3532A EA3532B EA3532C	1-F/O	CTC-EE-401	CTC-EE-418	N438; N411: 5847, 5939, 5941; PVC NIPPLE	B-EA3532, E-9D11353
EA3533B EA3533C	1-F/O	CTC-EE-401	CTC-EE-418	N438; N411: 5847, 5939, 5941; PVC NIPPLE	B-EA3533, E-9D11353
<i>RACK CTC-EE-401 TO CTC-EE-442 PER REV 1</i>					
<i>EA3059A EA3059B</i>	<i>D67-C8</i>	<i>CTC-EE-401</i>	<i>CTC-EE-442</i>	<i>N404:5722,5724; N473:5902,5903, 5904,5905,5906, 5907,5909; PEN 1593;N400: 5930,5980</i>	<i>B-EA3532, B-EA3500 SH-59, E-9D11437</i>
<i>RACK CTC-EE-451 TO CTC-EE-442 PER REV 1</i>					
<i>EA3059C</i>	<i>D67-C8</i>	<i>CTC-EE-451</i>	<i>CTC-EE-442</i>	<i>N435;N477;N404: 5887,5856,5988; N473:5902,5903, 5904,5905,5906, 5907,5909; PEN 1593;N400: 5930,5980</i>	<i>B-EA3531 B-EA3500 SH-59, E-9D11437</i>
<i>RACK CTC-EE-451 TO CTC-EE-401 PER REV 1</i>					
<i>EA3059D</i>	<i>D67-C8</i>	<i>CTC-EE-451</i>	<i>CTC-EE-401</i>	<i>N435;N477;N404: 5887,5856,5988, 5724,5722</i>	<i>B-EA3531, B-EA3532, E-9D11437</i>

- b. Label all cables at both ends in accordance with drawings listed in the “drawing column” of the above Cable Installation Schedule 1.

- \_\_\_\_\_ c. Terminate all cables including cable shields in accordance with drawings listed in the “drawing column” of the above Cable Installation Schedule 1.

#### 9.4 Installations continued

- \_\_\_\_\_ a. Electricians to install line filter LF1-2 and 15A plug mold into rack CTC-EE-451 in accordance with drawing. B-EA1500 SH-313.
- \_\_\_\_\_ b. Electricians to install cable 62199S from LF1-2 of rack CTC-EE-451 to LP-471 ckt-18 via cable tray route (L477, L404 & L402) in accordance with drawings. B-EA1500 SH.313, 6000B-52199-PL & 9D11353. Panel LP-471 is located on west wall elevation 106’-3” and Rack CTC-EE-451 AT Elevation 118-6” in Test Cell per drawing. E9D11353.
- \_\_\_\_\_ c. Install Lexan doors and covers onto racks CTC-EE-401 and CTC-EE-451 while they are de-energized in accordance with drawings E-EA3537, E-EA3538 and E-EA3539.
- \_\_\_\_\_ d. Install Honeywell micro switches (referenced in Bill of Material) S1 (MGI-1) and S2 (MGI-4) onto front and rear Lexan doors of rack CTC-EE-451 in accordance with drawing B-EA3531.
- \_\_\_\_\_ e. Install Honeywell micro switches (referenced in Bill of Material) S1 (MGI-2) and S2 (MGI-3) onto front and rear Lexan doors of rack CTC-EE-451 in accordance with drawing B-EA3532.

**NOTE: All plugin devices are to be installed prior to energizing racks.**

**9.5** The three (3) PVC 1 1/4” conduits EA3531H-1, EA3532H-1, EA3533H-1 for MGI-1 valve, Bay K/L Top valve, MGI-2 valve Bay F/G Lower and MGI#3 valve Bay I midplane respectively have been installed for the high voltage cables from racks CTC-EE-451 and CTC-EE-401) to each vessel injector location.

- \_\_\_\_\_ a. Electricians to pull cable EA3531H thru conduit EA3531H-1, cable EA3532H thru conduit EA3532H-1 and cable EA3533H thru conduit EA3533H-1. Terminate on vessel locations and at racks CTC-EE-451 and CTC-EE-401 in accordance with drawings B-EA3531, B-EA3532, B-EA3533 and E9D11353. Verify labels with Electricians.

**Note: Cables have been successfully Hi-Pot tested to 4 k VDC.**

**9.6** Installation and hook-up of MGI-1 rack CTC-EE-451 components.

- \_\_\_\_\_ a. Diagnostics to perform the following in accordance with drawing B-EA3531:
- Install a web-power switch Minuteman 8 MM8-1.

- Install power supplies PS1, PS2 and PS3.
- Install media converters MC#1 and MC#2.
- Install electronic boxes containing MGI-1 Cap Box 1.
- Install MGI-1 power supply box 1.
- Install National Instruments NI compact DAQ chassis (cR10-9065) with modules NI-9205, NI-9263, NI-9401 and NI-9472.
- Install VI Control-1 System modules.

\_\_\_\_\_ b. Diagnostics to perform the following in accordance with drawing B-EA3531:

- Interconnect and terminate MGI-1 Cap Box 1 to National Instruments NI compact DAQ chassis (cR10-9065) modules 9205, 9401 and 9472.
- Interconnect and terminate MGI-1 Cap Box 1 to power supply MGI-1 box 1.
- Interconnect and terminate power supply MGI-1 Box 1 to National Instruments NI compact DAQ chassis (cR10-9065) modules 9205, 9263 and 9472.
- Interconnect and terminate VI Control-1 System module to National Instruments NI compact DAQ chassis (cR10-9065) modules 9401 and 9472.
- Interconnect and terminate National Instruments NI compact DAQ chassis (cR10-9065) to associated module 9472.
- Interconnect door open switches S1 (MGI-1/4) and S2 (MGI-1/4).
- Interconnect NO E-STOP MGI-1, LOOP SET/HIS MGI-1 and TVPS MGI-1 PERM wiring from MGI-1 Cap Box 1 to Din rail.
- Label all interconnect wires as noted.

\_\_\_\_\_ c. Diagnostics to perform the following in accordance with drawing B-EA3531:

- Connect web-power switch MM8-1, power supply PS3 and MGI-1 power supply box to rack CTC-EE-451 power strip.
- Connect power supply PS1 and PS2 to web-power switch MM8-1.
- Connect media converter MC#1 to power supply PS3.
- Connect media converter MC#2 to power supply PS2 and associated Ethernet cable to NI compact DAQ chassis (cR10-9065).
- Connect power supply PS1 to NI compact DAQ chassis (cR10-9065).
- Connect fiber optic cable from media converter MC#1 to Lan port on web-power switch MM8-1.

## 9.7 Removal of locks and tags.

\_\_\_\_\_ a. Verify that the system is grounded per *National Electrical Code* (NFPA/NEC 70-2011).

- \_\_\_\_\_ b. Obtain approval of Electrical Safety at X3740 and QC representative at X2824 prior to energizing and testing entire electrical system.

\_\_\_\_\_  
Electrical Safety

\_\_\_\_\_  
Date

\_\_\_\_\_  
QC Representative

\_\_\_\_\_  
Date

- \_\_\_\_\_ c. Install panel cover to LP-471 in accordance with Hazard Analysis table A.
- \_\_\_\_\_ d. Remove lock and tag from PCB-45 and close switch blade in accordance with Attachment A - Hazard Analysis Table A.
- \_\_\_\_\_ e. Restore power to LP-471 by closing main breaker in accordance with Hazard Analysis Table A.

### 9.8 Installation and hook-up of MGI-2 rack CTC-EE-401 components.

- \_\_\_\_\_ a. Diagnostics to perform the following in accordance with drawing B-EA3532 and B-EA3533:
- Install a web-power switch Minuteman 8 MM8-1.
  - Install power supplies PS1, PS2, PS3, PS4 and PS5.
  - Install media converters MC#1, MC#2 and MC#3.
  - Install electronic box containing MGI-2 Cap Box 2.
  - Install electronic box containing MGI-3 Cap Box 3.
  - Install MGI-2 and MGI-3 power supply box 1.
  - Install National Instruments NI compact DAQ chassis cR10-9065-1 and cR10-9065-2 with modules NI-9205, NI-9263, NI-9401 and NI-9472.
  - Install VI Control-1 and VI Control-2 System modules.
- \_\_\_\_\_ b. Diagnostics to perform the following in accordance with drawing B-EA3532 and B-EA3533:
- Interconnect and terminate MGI-2 Cap Box 2 to National Instruments NI compact DAQ chassis cR10-9065-1 modules 9205, 9401 and 9472.
  - Interconnect and terminate MGI-2 Cap Box 2 to power supply MGI-2 box.
  - Interconnect and terminate power supply MGI-2 box to National Instruments NI compact DAQ chassis cR10-9065-1 modules 9205, 9263 and 9472.
  - Interconnect and terminate VI Control-1 System module to National Instruments NI compact DAQ chassis cR10-9065-1 modules 9401 and 9472.

- Interconnect and terminate National Instruments NI compact DAQ chassis cR10-9065-1 to associated module 9472.
- Interconnect and terminate MGI-3 Cap Box 3 to National Instruments NI compact DAQ chassis cR10-9065-2 modules 9205, 9401 and 9472.
- Interconnect and terminate MGI-3 Cap Box 3 to power supply MGI-3 box.
- Interconnect and terminate power supply MGI-3 box to National Instruments NI compact DAQ chassis cR10-9065-2 modules 9205, 9263 and 9472.
- Interconnect and terminate VI Control-2 System module to National Instruments NI compact DAQ chassis cR10-9065-2 modules 9401 and 9472.
- Interconnect and terminate National Instruments NI compact DAQ chassis cR10-9065-2 to associated module 9472.
- Interconnect door open switches S1 (MGI-2/3) and S2 (MGI-2/3).
- Interconnect NO E-STOP MGI-2, LOOP SET/HIS MGI-2 and TVPS MGI-2 PERM wiring from MGI-2 Cap Box 2 to Din rail.
- Interconnect NO E-STOP MGI-3, LOOP SET/HIS MGI-3 and TVPS MGI-3 PERM wiring from MGI-3 Cap Box 3 to Din rail.
- Label all interconnect wires as noted.

\_\_\_\_\_ c. Diagnostics to perform the following in accordance with drawing B-EA3532:

- Connect web-power switch MM8-1, power supply PS3 and MGI-2 power supply box to rack CTC-EE-401 power strip.
- Connect power supply PS1 and PS2 to web-power switch MM8-1.
- Connect media converter MC#1 to power supply PS3.
- Connect media converter MC#2 to power supply PS2 and associated Ethernet cable to NI compact DAQ chassis cR10-9065-1.
- Connect power supply PS1 to NI compact DAQ chassis cR10-9065-1.
- Connect fiber optic cable from media converter MC#1 to Lan port on web-power switch MM8-1.

\_\_\_\_\_ d. Diagnostics to perform the following in accordance with drawing B-EA3533:

- Connect MGI-3 power supply box to rack CTC-EE-401 power strip.
- Connect power supply PS4 and PS5 to web-power switch MM8-1.
- Connect media converter MC#3 to power supply PS5 and associated Ethernet cable to NI compact DAQ chassis cR10-9065-2.
- Connect power supply PS4 to NI compact DAQ chassis cR10-9065-1.

10.0 LABELS

- \_\_\_\_\_ a. Label all equipment, conduit, Tee's, boxes, wires and cables with legible labels (preferably computer or printer generated) where appropriate, and as noted throughout this procedure along with referenced drawings.

11.0 SCHEDULE

NSTX-U Open period. Actual date shall be determined by Work Control Center and availability of PPPL Electrician

12.0 COMPLETION SIGN-OFF

Notes:

- \_\_\_\_\_ 1. Lead Electrician is responsible for coordination of final sign-off and Q.C. Inspection.
- \_\_\_\_\_ 2. Lead Electrician shall close this package and complete the Post-Job Brief.

This procedure and post job brief has been completed and verified by the signatures below.

Procedure Completed On: \_\_\_\_\_  
Date

Procedure Completed By:

_____	_____
Initials	Print Name
_____	_____
Initials	Print Name
_____	_____
Initials	Print Name

Reviewed By:

Lead Electrician	_____	_____
	Signature	Date
ATI	_____	_____
	Signature	Date
Quality Control	_____	_____
	Signature	Date

Return this completed procedure to the Work Control Center

Electrician's Comments:

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**Note:** The run copy of this procedure shall be returned to the Operations Center upon completion.