If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

11.4.3.c STAR Power Supply Polarity Change Check Off List

C-A-OPM Procedures in which this Attachment is used.		
11.4.3		

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

P. Rosas

STAR Power Supply Polarity Change Check Off List

1. Request from the **STAR Experimenter Power Supply Operator** the Polarity of which all the power supplies shall be place:

    - Polarity From_____ to _____ [ ]

2. Visually inspect and record using the RSView Page for the present Polarity of the power supplies
    - Main Magnet Polarity: _____ [ ]
    - Pole Tip Trim East Polarity: _____ [ ]
    - Pole Tip Trim West Polarity:_____ [ ]
    - Space Trim East Polarity: _____ [ ]
    - Space Trim West Polarity: _____ [ ]

Authorized By: _____, Time: _____, Date: _____.

3. The STAR Main Magnet Power Supplies Power Supplies shall be shut down and locked out in accordance with the "**STAR Power Supply SHUT-DOWN Check Off List**". [ ]

Caution:
Do Not Proceed Until Step 3 is Completed

WARNING:
Current can flow after the power supply is turned off due to the stored energy in the magnet. In addition to the energy stored in the magnet the power supply contains filter capacitors which decay with a 1-minute time constant. Entrance into the power supply enclosure shall be delayed for approximately 5 minutes after de-energizing the power supply.

4. LOTO the STAR PS using the Lock Out Box located inside the STAR PS room [ ]

5. Both members of the CAS Watch shall be wearing the proper Personal Protective Equipment (PPE). The PPE require for the Polarity Change shall be category 2.

    - 100% Natural Fiber Short Sleeve T-Shirt [ ]
    - 100% Natural Fiber underwear [ ]
    - Fire Retardant Long Sleeve Shirt (Sleeves rolled down and buttoned, shirt buttoned and tucked in pants) [ ]
    - Fire Retardant Pants [ ]
    - Hard Hat [ ]
    - Arc-Rated Face Shield [ ]
    - Safety Glasses with Side Covers [ ]

- All Leather Gloves [ ]
- Leather work Shoes [ ]
- Hearing Protection [ ]

6. The polarity reversal for the Main Magnet Power Supply is accomplished by unbolting the reversing bus bars and moving each bus (2 each) to the opposite positions. As a precaution, wait five (5) minutes after power supplies have been turn off before unlocking the rear doors. Should there be any difficulties, **STOP** and contact the system expert

    - Observe the front door polarity indicator light for current polarity position: _____ [ ]
    - Visually verify the power supply output voltage meters are at zero volts [ ]
    - Remove the Kirk Lock key **1B** from the transfer lock **'B'** tree and insert it to the **1D** transfer lock tree, turn and release the **1D** keys. [ ]
    - Unlock the three rear doors with the **1D** keys [ ]
    - Unbolt the three rear doors [ ]
    - Visually inspect the capacitors bleeder resistors for any damage [ ]
    - Verify the T3 Fluke Voltmeter on a known circuit [ ]
    - Verify capacitor bank voltage is at zero potential, using the T3 Fluke Voltmeter across each of the capacitor bank voltage panel. (Warning the maximum DC output voltage of the PS can be 1000Volts DC) [ ]
    - Verify the T3 Fluke Voltmeter on a known circuit [ ]
    - Note the hand placement warning sign on the grounding stick [ ]
    - Place a resistor ground stick on the positive bus [ ]
    - Place a ground stick on the negative bus [ ]
    - Clamp a ground strap to the positive bus [ ]
    - Clamp a ground strap to the negative bus [ ]
    - Unbolt the reversing bus bars, 2 each [ ]
    - Clean and inspect bus connections [ ]
    - Apply a light coating of silicone grease to all bus contact surfaces [ ]
    - Mount the bus bars in the new polarity position and torque the bolts to the proper torque. (25Lbs/Ft Dry or 30 Lbs/Ft Lubricated) [ ]
    - Observe the front door polarity indicator light for new polarity position: _____ [ ]
    - Remove the ground strap from the positive bus [ ]
    - Remove the ground strap from the negative bus [ ]
    - Remove the resistor ground stick from the positive bus [ ]
    - Remove the ground stick from the negative bus [ ]
    - Make a visual inspection of the compartment for any foreign material or loose connection [ ]
    - Bolt the three rear doors [ ]
    - Lock the three rear doors [ ]
    - Move the **1D** keys to power supply Transfer Lock '**D**'. [ ]

7. The polarity reversal for the Pole Tip Trim East Power Supply is accomplished by unbolting the reversing bus bars and moving each bus (2 each) to the opposite positions. As a precaution wait five (5) minutes after power supplies have been turn off before unlocking the rear doors. Should there be any difficulties, **STOP** and contact the system expert

    - Observe the front door polarity indicator light for current polarity position: _____ [ ]
    - Visually verify the power supply output voltage meters are at zero volts [ ]
    - Remove the Kirk lock key **2C** from the transfer lock **'B'** tree and insert it to the **2C** transfer lock tree, turn and release the **2C** keys. [ ]
    - Unlock the two rear doors with the **2C** keys [ ]
    - Unbolt the two the rear doors [ ]
    - Visually inspect the capacitors bleeder resistors for any damage [ ]
    - Verify the 3T Fluke Voltmeter on a known circuit [ ]
    - Verify capacitor bank voltage at zero potential, using the 3T Fluke Voltmeter across each of the capacitor bank voltage panel. (Warning the maximum DC output voltage of the PS can be 162Volts DC) [ ]
    - Verify the 3T Fluke Voltmeter on a known circuit [ ]
    - Note the hand placement warning sign on the ground stick [ ]
    - Place a resistor ground stick on the positive bus [ ]
    - Place a ground stick on the negative bus [ ]
    - Clamp a ground strap to the positive bus [ ]
    - Clamp a ground strap to the negative bus [ ]
    - Unbolt the reversing bus bars, 2 each [ ]
    - Clean and inspect bus connections [ ]
    - Apply a light coating of silicone grease to all bus contact surfaces [ ]
    - Mount the bus bars in the new polarity position and torque the bolts to the proper torque. (25 Lbs/Ft Dry or 30 Lbs/Ft Lubricated) [ ]
    - Observe the front door polarity indicator light for new polarity position: _____ [ ]
    - Remove the ground strap from the positive bus [ ]
    - Remove the ground strap from the negative bus [ ]
    - Remove the resistor ground stick from the positive bus [ ]
    - Remove the ground stick from the negative bus [ ]
    - Make a visual inspection of the compartment for any foreign material or loose connection [ ]
    - Bolt the two rear doors [ ]
    - Lock the two rear doors [ ]
    - Move **2C** keys to Power Supply Transfer Lock '**C**' [ ]

8. The polarity reversal for the Pole Tip Trim West Power Supply is accomplished by unbolting the reversing bus bars and moving each bus (2 each) to the opposite positions. As a precaution wait five (5) minutes after power supplies have been turn off before unlocking the rear doors. Should there be any difficulties, **STOP** and contact the system expert

- Observe the front door polarity indicator light for current polarity position: _____ [ ]
- Visually verify the power supply output voltage meters are at zero volts [ ]
- Remove the Kirk lock key **3E** from the transfer lock **'B'** tree and insert it to the **3E** transfer lock tree, turn and release the **3E** keys. [ ]
- Unlock the two rear doors with the **3E** keys [ ]
- Unbolt the two the rear doors [ ]
- Visually inspect the capacitors bleeder resistors for any damage [ ]
- Verify the T3 Fluke Voltmeter on a known circuit [ ]
- Verify capacitor bank voltage at zero potential, using the T3 Fluke Voltmeter across each of the capacitor bank voltage panel. (Warning the maximum DC output voltage of the PS can be 162Volts DC) [ ]
- Verify the T3 Fluke Voltmeter on a known circuit [ ]
- Note the hand placement warning sign on the ground stick [ ]
- Place a resistor ground stick on the positive bus [ ]
- Place a ground stick on the negative bus [ ]
- Clamp a ground strap to the positive bus [ ]
- Clamp a ground strap to the negative bus [ ]
- Unbolt the reversing bus bars, 2 each [ ]
- Clean and inspect bus connections [ ]
- Apply a light coating of silicone grease to all bus contact surfaces [ ]
- Mount the bus bars in the new polarity position and torque the bolts to the proper torque. (25 Lbs/Ft Dry or 30 Lbs/Ft Lubricated) [ ]
- Observe the front door polarity indicator light for new polarity position: _____ [ ]
- Remove the ground strap from the positive bus [ ]
- Remove the ground strap from the negative bus [ ]
- Remove the resistor ground stick from the positive bus [ ]
- Remove the ground stick from the negative bus [ ]
- Make a visual inspection of the compartment for any foreign material or loose connection [ ]
- Bolt the two rear doors [ ]
- Lock the two rear doors [ ]
- Move **3E** keys to Power Supply Transfer Lock '**E**' [ ]

9. The Polarity reversal for the Space Trim East Power Supply is accomplished by moving the manual reversing switch to the opposite position. The switch is located in the rear of the power supply. Wait five (5) minutes after the power supplies are turn off then unlock the front door. Should there be any difficulties, **STOP** and contact the system expert

    - Remove the Kirk lock key **5B** from the transfer lock **'B'** tree and insert it to the **5D** transfer lock tree, turn and release the **5D** keys. [ ]
    - Unlock the front door using the **5B** key [ ]
    - Visually inspect the capacitors bleeder resistors for any damage [ ]
    - Verify the T3 Fluke Voltmeter on a known circuit [ ]

- Verify capacitor bank voltage at zero potential, using the T3 Fluke Voltmeter across each of the capacitor bank voltage panel. (Warning the maximum DC output voltage of the PS can be 50 Volts DC) [ ]
- Verify the T3 Fluke Voltmeter on a known circuit [ ]
- Note the warning sign on the handle of the grounding stick [ ]
- Place a resistor ground stick on the positive bus [ ]
- Place a ground stick on the negative bus [ ]
- Move the Reversing Switch to the new position [ ]
- Remove the resistor ground stick from the positive bus [ ]
- Remove the ground stick from the negative bus [ ]
- Lock PS door and move the **5B** key to the '**B**' Transfer lock [ ]

10. The Polarity reversal for the Space Trim West Power Supply is accomplished by moving the manual reversing switch to the opposite position. The switch is located in the rear of the power supply. Wait five (5) minutes after the power supplies are turn off then unlock the front door. Should there be any difficulties, **STOP** and contact the system expert

    - Remove the Kirk lock key **4B** from the transfer lock **'B'** tree and insert it to the **4D** transfer lock tree, turn and release the **4D** keys. [ ]
    - Unlock the front door using the **4B** key [ ]
    - Visually inspect the capacitors bleeder resistors for any damage [ ]
    - Verify the T3 Fluke Voltmeter on a known circuit [ ]
    - Verify capacitor bank voltage at zero potential, using the T3 Fluke Voltmeter across each of the capacitor bank voltage panel. (Warning the maximum DC output voltage of the PS can be 50 Volts DC) [ ]
    - Verify the T3 Fluke Voltmeter on a known circuit [ ]
    - Note the warning sign on the handle of the grounding stick [ ]
    - Place a resistor ground stick on the positive bus [ ]
    - Place a ground stick on the negative bus [ ]
    - Move the Reversing Switch to the new position [ ]
    - Remove the resistor ground stick from the positive bus [ ]
    - Remove the ground stick from the negative bus [ ]
    - Lock PS door and move the **4B** key to the '**B**' Transfer lock [ ]

11. Record completion of the Polarity Change in the Power Supply logbook [ ]

NOTES:

Completed By: _____	Date: _____