

1. Work requester fills out this section.  Standing Work Permit

Requester: Don Lynch	Date: 6/30/2009	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date: 7/6/2009	Est. End Date: 12/1/2009
Brief Description of Work: MuTr Chip Capacitor removal Troubleshooting & MuTrigger FEE Troubleshooting			
Building: 1008	Room: IR	Equipment: MuTr North	Service Provider: PHENIX techs, MuTrigger & MuTr experts

WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

<b>ES&amp;H ANALYSIS</b>					
<b>Radiation Concerns</b>	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation
Radiation Generating Devices:	<input type="checkbox"/> Radiography	<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges	<input type="checkbox"/> X-ray Equipment	
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			<input type="checkbox"/> Fissionable materials involved, notify Laboratory Criticality Officer		
<b>Safety Concerns</b>	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Transport of Haz/Rad Material		
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input checked="" type="checkbox"/> Confined Space*	<input type="checkbox"/> Explosives	<input type="checkbox"/> Lead*	<input type="checkbox"/> Penetrating Fire Walls	
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Flammable	<input type="checkbox"/> Magnetic Field*	<input type="checkbox"/> Pressurized Systems	
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Rigging/Critical Lift	
<input type="checkbox"/> Biohazard*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Noise*	<input type="checkbox"/> Toxic Materials*	
<input type="checkbox"/> Chemicals*	<input type="checkbox"/> Elevated Work*	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Non-ionizing Radiation*	<input type="checkbox"/> Vacuum	
	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Oxygen Deficiency*	<input checked="" type="checkbox"/> Other	
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
<b>Environmental Concerns</b>			<input checked="" type="checkbox"/> None	<input type="checkbox"/> Work impacts Environmental Permit No.	
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input type="checkbox"/> Land Use		<input type="checkbox"/> Soil Activation/contamination	<input type="checkbox"/> Waste-Mixed	
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Liquid Discharges		<input type="checkbox"/> Waste-Clean	<input type="checkbox"/> Waste-Radioactive	
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Oil/PCB Management		<input type="checkbox"/> Waste-Hazardous	<input type="checkbox"/> Waste-Regulated Medical	
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Spill potential		<input type="checkbox"/> Waste-Industrial	<input type="checkbox"/> Underground Duct/Piping	
Waste disposition by:					
<b>Pollution Prevention (P2)/Waste Minimization Opportunity:</b>			<input checked="" type="checkbox"/> None	<input type="checkbox"/> Yes	
<b>FACILITY CONCERNS</b>			<input checked="" type="checkbox"/> None		
<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm		<input type="checkbox"/> Vibrations	
	<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Control	<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions		
<b>WORK CONTROLS</b>					
<b>Work Practices</b>					
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input checked="" type="checkbox"/> Lockout/Tagout	<input type="checkbox"/> Spill Containment	<input type="checkbox"/> Security (see Instruction Sheet)	
<input checked="" type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	<input type="checkbox"/> Time Limitation	<input type="checkbox"/> Other	
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")		
<b>Protective Equipment</b>					
<input type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Gloves	<input type="checkbox"/> Lab Coat	<input checked="" type="checkbox"/> Safety Glasses	
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	<input type="checkbox"/> Respirator	<input type="checkbox"/> Safety Harness	
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers	<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> Other
<b>Permits Required</b> (Permits must be valid when job is scheduled.)					
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding		<input type="checkbox"/> Impair Fire Protection Systems		
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling		<input type="checkbox"/> Rad Work Permit-RWP No		
<input checked="" type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot		<input type="checkbox"/> Other		
<b>Dosimetry/Monitoring</b>					
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD		
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization		
<input type="checkbox"/> Ground Water	<input type="checkbox"/> O <sub>2</sub> /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input checked="" type="checkbox"/> Other Check O2 level prior to entry		
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump			
<b>Training Requirements</b> (List below specific training requirements)					
Confined Space, CA –Collider User, PHENIX Awareness					
<b>Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:</b>			<b>If using the permit when all hazard ratings are low, only the following need to sign: ( Although allowed, there is no need to use back of form)</b>		
<b>ES&amp;H Risk Level:</b>	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High	WCC:	Date:
<b>Complexity Level:</b>	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	Service Provider:	Date:
<b>Work Coordination:</b>	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	Authorization to start	Date:
(Departmental Sup/WCC/Designee)					

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

<b>Work Plan</b> (procedures, timing, equipment, and personnel availability need to be addressed): See Attached backup Documentation				
Special Working Conditions Required: None				
Operational Limits Imposed: Modification work limited to lower octants easily reachable when standing on lower magnet superstructure.				
Post Work Testing Required: No				
Job Safety Analysis Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Walkdown Required: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Reviewed by:</b> Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.				
Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other C. Pearson				
Work Control Coordinator	Don Lynch		20146	4/18/07
Service Provider				
	Review Done: <input type="checkbox"/> in series <input type="checkbox"/> team			

**4. Job site personnel fill out this section.**

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

**5. Departmental Job Supervisor, Work Control Coordinator/Designee**

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

**6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required.**  Yes  No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

**7. Worker provides feedback.**

Worker Feedback (use attached sheets as necessary)
a) WCM/WCC: Is any feedback required? <input type="checkbox"/> Yes <input type="checkbox"/> No
b) Workers: Are there better methods or safer ways to perform this job in the future? <input type="checkbox"/> Yes <input type="checkbox"/> No

**8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)**

Name:	Signature:	Life#:	Date:
Comments:			

## **MuTr Chip Capacitor removal & MuTrigger FEE Troubleshooting**

### **INTRODUCTION**

The PHENIX MuTr experts have been undertaking a continuing process to safely remove high-voltage surface mount chip capacitors, from anode wire circuit cards - that are a part of the station 1, 2 and 3 tracking chambers - mounted to the back wall of the north and south muon magnets.

The process involves the use of a modified 30 watt soldering iron that has a custom tip attached (see attached photos). The soldering iron tip slips over the HV-cap, once heat is applied the capacitor becomes loose and can be easily removed. The process was completed last year, but some minor electronics issues remain. The MuTr experts indicate that they expect the troubleshooting to be confined to the readily accessible lower 3 octants of the MMN, thus.

In addition, the MuTrigger FEE group completed installation of the MMN station 2 and 3 FEE's last year but have encountered some minor electronic anomalies/noise and will be troubleshooting the same area. As with the MuTr work, this work does not require any additional scaffolding or work structure than the permanent superstructure within the MMN.

### **MMN Access for MuTr and MuTrigger Troubleshooting Procedure**

The following operations will take place during 2009 summer shutdown.

1. Prior to any IR entry, all PHENIX magnets will be ramped down (if applicable and locked out. ***PHENIX WCC will apply lock to PHENIX lock box. MMN Power supply will be LOTO'd by C-A***
2. Prior to entry into the MMN C-A safety shall be contacted, prior to his arrival to sample the internal MMN atmosphere, the sliding access hatch shall be opened by PHENIX technicians to permit sampling and an O<sub>2</sub> content of the MMN internal atmosphere shall be sampled and recorded on the attached sheet
3. The C-A confined space safety expert shall determine from the tests whether it is safe to enter the MMN for the purposes stated herein. ***In no event shall anyone enter the MMN prior to approval of the C-A confined space monitoring expert.***
4. After clearance to enter has been, properly trained PHENIX technicians, MuTr experts and/or properly MuTrigger experts shall sign the entry log sheet (attached) and may then enter and perform the troubleshooting as necessary as determined by the MuTr and MuTrigger experts.
5. Access to the MMN shall be through the hatch door by means of a suitable step ladder in accordance with BNL ladder safety regulations.

6. During the task HV to the MuTr detector panels may be turned on and off for troubleshooting purposes. All electronics work shall be in strict accordance with PHENIX Awareness training guidelines for allowable electrical work.
7. After completion of the tasks all equipment brought into the MMN shall be removed, the access hatch shall be closed and bolted shut.

## CONFINED SPACE ENTRY CERTIFICATION

Location Building 1008, IR, Muon Magnet North (MMN)		Date
Department PO	Division PHENIX	
Building 1008	Area/Location/Room: IR, MMN	
Supervisor/Designee Don Lynch/Carter Biggs		Life # 20146/15639

### PRE-ENTRY QUESTIONS

*For each item, check "yes" or "no": If no, consult Supervisor*

	YES	NO
Is entry essential to perform work?	<input type="checkbox"/>	<input type="checkbox"/>
Have all personnel been trained in confined space entry?	<input type="checkbox"/>	<input type="checkbox"/>
Are conditions safe to remove utility-hole cover?	<input type="checkbox"/>	<input type="checkbox"/>
Has opening been guarded?	<input type="checkbox"/>	<input type="checkbox"/>
Is monitoring equipment calibrated?	<input type="checkbox"/>	<input type="checkbox"/>
Has monitoring been performed and recorded below?	<input type="checkbox"/>	<input type="checkbox"/>
Is GFCI used, if outside or in wet conditions?	<input type="checkbox"/>	<input type="checkbox"/>
Is ventilation blown into bottom of space? (If required)	<input type="checkbox"/>	<input type="checkbox"/>
Are personnel instructed to evacuate upon hazard detection?	<input type="checkbox"/>	<input type="checkbox"/>
Have all workers reviewed these entry requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Radiation: If present, RWP may be required – review work with ESH Coordinator and RCD personnel. Evaluate hazards and controls.	<input type="checkbox"/> <b>Reviewed</b>	<input type="checkbox"/>

### SPACE CLASSIFICATION QUESTIONS

For each item, check box only if "yes"	Class 2A	Class 2B	Class 2C
Engulfment Hazard Present			<input type="checkbox"/>
Entrapment Hazard Present			<input type="checkbox"/>
Electrical Systems:			
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized, but Guarded or not Working Hot	<input type="checkbox"/>		
Mechanical Systems:	n/a		
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Other Energized Systems: (e.g., steam, sewage)	n/a		
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Chemical Hazards inherent in space, based upon monitoring, but controllable by Ventilating - <b>Monitor for O<sub>2</sub> prior to entry</b>	<input type="checkbox"/>		
Chemical Hazards inherent in space, based upon monitoring, but not controllable by ventilating	n/a		<input type="checkbox"/>
Chemical Sources, introduced into space? (e.g., welding fumes, solvents)	n/a		<input type="checkbox"/>
High Temperature/Pressure Hazard? (other than steam utility-holes)	n/a		<input type="checkbox"/>

- If ANY box in column 2C is checked, a Confined Space Permit **IS** required.
- If any box in column 2B is checked, and none in column 2C, a Confined Space Permit **IS NOT** required **BUT** continuous monitoring and ventilating **ARE** required.
- If only boxes in column 2A are checked, no additional requirements apply.

### Classification evaluation

<b>CLASSIFICATION</b>	<p><b>CLASS: 2A</b></p> <p>I have completed the front and back of this Confined Space Entry Certification form and classified this space. If the confined space is classified as a 2C, I will obtain a Confined Space entry permit. If the space is Class 2B, continuous monitoring and ventilation is required and will be documented on this form.</p>	
	Supervisor/Designee:	Life #
		Date:

# BNL CONFINED SPACE ENTRY CERTIFICATION

Meter:	Serial #	Calibration Date:
Day of Use Sensor Check <input type="checkbox"/> Yes <input type="checkbox"/> No		
Tested By:	BNL#:	

## MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O2)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H2S ppm)	Other:
<b>Pre-Entry Certification test</b>					
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	<25 ppm	<10 ppm	

### Supplemental sampling record

## CLASS 2B CONFINED SPACE ENTRY CERTIFICATION

For Class2B spaces, continuous monitoring is required.

## MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O2)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H2S ppm)	Other:
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	25 ppm	10 ppm	

Class 2B: Describe Method of Ventilation:

