

**1. Work requester fills out this section.**

Standing Work Permit

|   |                  |                                     |  |
|---|------------------|-------------------------------------|--|
| Requester: Don Lynch  | Date: 11/07/2011 | 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: 11/4/2011               | Est. End Date: 12/31/2011                            |
| Brief Description of Work: Repair/ remove detector chamber wire(s) in Drift Chamber on PHENIX East & West Carriages |                  |                                     |  |
| Building: 1008  | Room: IR & AH    | Equipment: DC East & West detectors | Service Provider: PHENIX collaborators & Technicians |

**. 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 type="checkbox"/> None                                    | <input type="checkbox"/> Ergonomics  | <input type="checkbox"/> Transport of Haz/Rad Material   |
| <input type="checkbox"/> Adding/Removing Walls or Roofs   | <input type="checkbox"/> Confined Space*                         | <input type="checkbox"/> Explosives  | <input type="checkbox"/> Lead*   |
|   | <input type="checkbox"/> Corrosive                               | <input type="checkbox"/> Flammable   | <input type="checkbox"/> Magnetic Field*   |
| <input type="checkbox"/> Asbestos*  | <input type="checkbox"/> Cryogenic                               | <input type="checkbox"/> Fumes/Mist/Dust*  | <input type="checkbox"/> Material Handling   |
| <input type="checkbox"/> Beryllium*   | <input type="checkbox"/> Electrical                              | <input type="checkbox"/> Heat/Cold Stress  | <input type="checkbox"/> Noise*  |
| <input type="checkbox"/> Biohazard*   | <input checked="" type="checkbox"/> Elevated Work*               | <input type="checkbox"/> Hydraulic   | <input type="checkbox"/> Non-ionizing Radiation*   |
| <input type="checkbox"/> Chemicals*   | <input type="checkbox"/> Excavation                              | <input type="checkbox"/> Lasers*   | <input type="checkbox"/> Oxygen Deficiency*  |
|   |  |  | <input checked="" type="checkbox"/> Other Purge Flammable Gas Prior to repair procedure  |
| * 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:   |  | <input type="checkbox"/> Other   |  |
| <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 type="checkbox"/> None   | <input type="checkbox"/> Exhaust Ventilation                     | <input checked="" type="checkbox"/> Lockout/Tagout   | <input type="checkbox"/> Spill Containment   |
| <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"/> 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 type="checkbox"/> Coveralls  | <input type="checkbox"/> Ear Muffs                               | <input type="checkbox"/> Goggles   | <input type="checkbox"/> Respirator  |
| <input type="checkbox"/> Disposable Clothing  | <input type="checkbox"/> Face Shield                             | <input type="checkbox"/> Hard Hat  | <input type="checkbox"/> Shoe Covers   |
|   |  |  | <input checked="" type="checkbox"/> Safety Shoes <input type="checkbox"/> Other  |
| <b>Permits Required (Permits must be valid when job is scheduled.)</b>  |  |  |  |
| <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 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 type="checkbox"/> Other   |
| <input type="checkbox"/> Liquid Effluent  | <input type="checkbox"/> Passive Vapor Monitor                   | <input type="checkbox"/> Sorbent Tube/Filter Pump  |  |
| <b>Training Requirements (List below specific training requirements)</b>  |  |  |  |
| PHENIX Awareness, LockOut/TagOut affected, RHIC Access, working at heights, 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 checked="" type="checkbox"/> Low                          | <input type="checkbox"/> Moderate  | <input type="checkbox"/> High  |
| <b>Complexity Level:</b>  | <input checked="" type="checkbox"/> Low                          | <input type="checkbox"/> Moderate  | <input type="checkbox"/> High  |
| <b>Work Coordination:</b>   | <input type="checkbox"/> Low                                     | <input checked="" type="checkbox"/> Moderate   | <input type="checkbox"/> High  |
|   | WCC: _____   |  | Date: _____  |
|   | Service Provider: _____  |  | Date: _____  |
|   | 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):<br>See Attached   |   |                               |  |      |
|--|---|-------------------------------|--|------|
| Special Working Conditions Required:<br>No   |   |                               |  |      |
| Operational Limits Imposed: No   |   |                               |  |      |
| 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  |   |                               |  |      |
| Work Control Coordinator   | Don Lynch                                       |                               | 20146  |      |
| 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)**

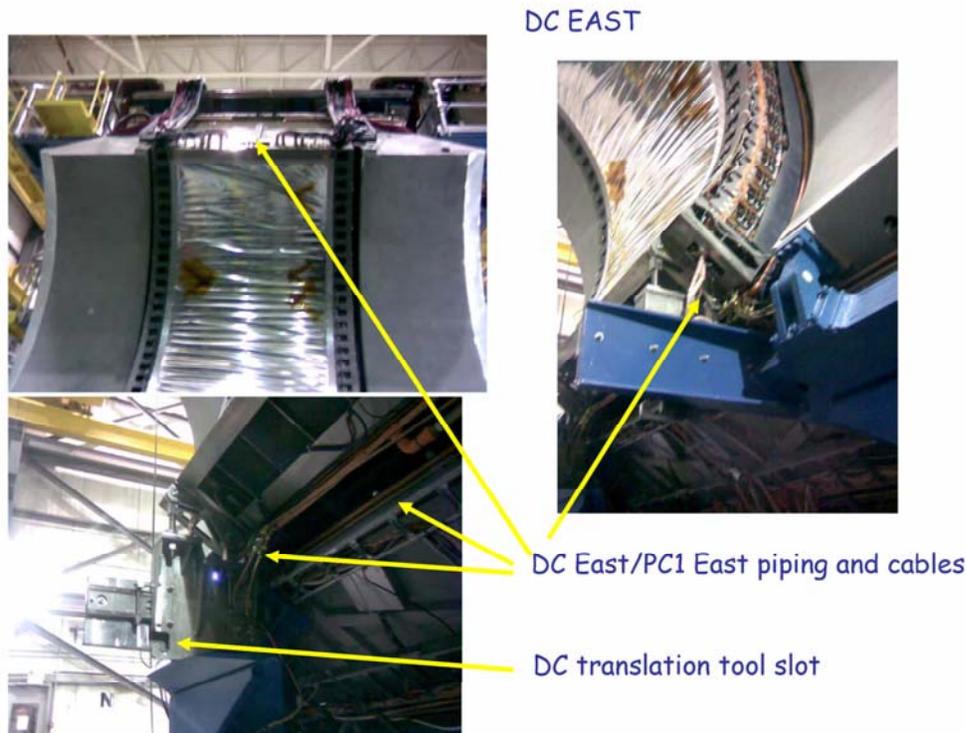
|           |            |        |       |
|-----------|------------|--------|-------|
| Name:     | Signature: | Life#: | Date: |
| Comments: |            |        |       |

DC E and W chamber repairs in the PHENIX Experimental Hall (bldg. 1008).

Problem

Several broken wires in the upper portions of the PHENIX Drift Chamber (DC) East and West detector arrays have been detected, necessitating the repair efforts to remove the broken wires which are shorting other functional wires and/or may short additional functional wires in run 12. The techniques to affect these repairs have been well established by the DC group experts and are handled as worker-planned work within the guidelines of the PHENIX Awareness training.

Access to the defective wires, which are high on the east and west DC chambers requires use of a stationary stable scissor type manlift for the east and use of the CM lift table for the west. It is possible that the west damaged wires may not be accessible.



The procedure by which this repair will be accomplished is provided below.

### Work Plan

This work is to be done by fully trained and experienced personnel (PHENIX mechanical and electrical technicians and DC expert scientists) during the 2011 shutdown.

#### 1. Preparation for repairs

- persons performing this work shall have PHENIX Awareness training, CA access training, BNL ladder training, manlift training (if working in manlift) and BNL working at heights training (if working in manlift) and basic electrical safety.
- prior to commencing work the EC shall have been moved into the PHENIX assembly hall (AH) and parked in its normal shutdown position
- Gas supply to the DC shall be shut off and pressure in the DC chambers equalized to room pressure prior to cutting into the DC chamber face.
- If deemed necessary by DC experts, the DC shall be moved forward on its support rail using the DC translation tool as illustrated in figure 1.
- The EC shall be supplied with electrical power and data communications capability (as determined to be appropriate and adequate by PHENIX electrical, electronic and data acquisition experts) to allow QC operational checks to verify repairs.

#### 2. Removal and replacement of failed wires

- PHENIX technicians and DC experts shall access the regions of the DC east and west by manlift and CM lift table, respectively
- DC experts shall carefully slice the DC face membrane to allow insertion of specialized tools to extract and sever broken wires
- The broken wires shall be detached from inside the DC, removed and discarded.
- The DC membrane shall be sealed with mylar tape after all broken wires have been removed.
- After all repairs have been made, gas shall be restored to the DC chambers as determined by DC experts. (Note: gas mixture shall be non-flammable).

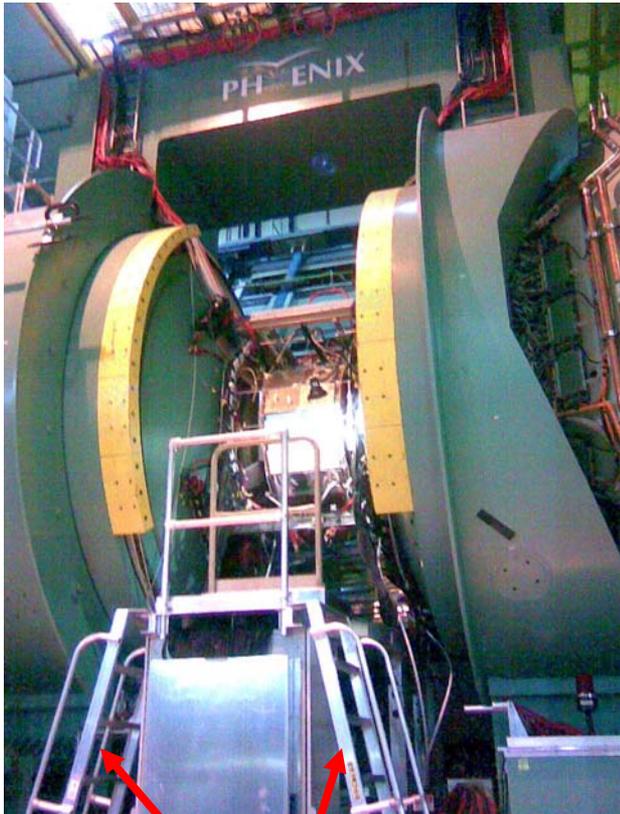
### 3. Final checks

- DC experts shall perform appropriate performance checks to verify successful repairs,
- If problems are encountered DC experts and PHENIX techs shall repeat step 2 until DC experts determine that no additional repairs are warranted and/or feasible.

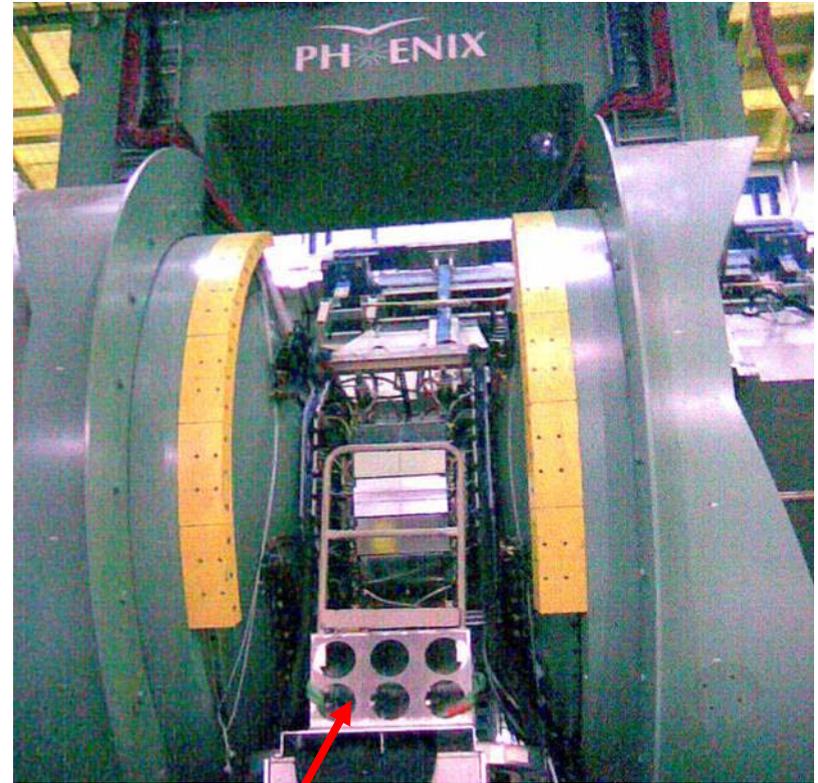
### 4. Post repairs work closeout

After all repairs and tests are completed, The DC east and/or west shall be restored to its normal operating position (if necessary) on the DC support rails.

Any lessons learned, problems encountered and their solutions should be recorded in the appropriate section of the work permit to which this procedure is attached.



Access Ladders



Extension step

