**BROOKHAVEN NATIONAL LABORATORY** — **WORK PERMIT #** SS2002-0026

**Work Order #** _____ **Job #** _____ **Activity #** _____

*Work requester fills out this section* — **STANDING WORK PERMIT** ☐

Requester: DAN WEISS Date: 02/26/02 Ext. 4463 Dept/Div/Group: CA-VACUUM
Other Contact person (if different from requester): PETE KROON Ext. 5114
Work Control Coordinator PETE KROON/DAN WEISS Start Date 02/27/02 Est. End Date 02/27/02
Description of Work / Problem:
REMOVE PHENIX CENTRAL BEAMPIPE FROM PHENIX IR THROUGH THE SOUTH WALL AND INTO THE BEAMPIPE STORAGE CRATE POSITIONED IN THE RHIC TUNNEL PROXIMATE TO THE SECTOR 7 TRIPLET..

Building RHIC/1008 Room _____ Equipment _____ Service Provider _____

*2. Work requester, service provider, and ES&H (as necessary) fill out this section or attach analysis*

## ES&H Analysis

**RADIATION CONCERNS** [X] NONE [X] Activation [ ] Airborne [ ] Contamination [ ] Radiation [ ] OTHER _____
[ ] Special nuclear materials involved, notify Isotope Special Materials Group [ ] Fissionable materials involved, notify Laboratory Criticality Officer

**SAFETY CONCERNS** [ ] NONE

| | | | | |
|---|---|---|---|---|
| [ ] Adding / Removing Walls or Roofs | [ ] Confined Space* | [ ] Explosives | [ ] Lead* | [ ] Penetrating Fire Wall |
| [ ] Asbestos* | [ ] Corrosive | [ ] Flammable | [ ] Magnetic Field | [ ] Pressurized Systems |
| [X] Beryllium* | [ ] Cryogenic | [ ] Fumes/Mist/Dust* | [ ] Material Handling | [ ] Rigging/Critical Lift |
| [ ] Biohazard* | [ ] Electrical | [ ] Heat/Cold Stress* | [ ] Noise* | [ ] Toxic Materials* |
| [ ] Chemicals* | [ ] Elevated Work* | [ ] Hydraulic | [ ] Non-ionizing Radiation | [ ] Vacuum |
| | [ ] Excavation | [ ] Lasers* | [ ] Oxygen Deficiency* | [ ] OTHER _____ |

*Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? [ ] Yes [X] No

**ENVIRONMENTAL CONCERNS** [X] NONE [ ] Work impacts Environmental Permit No. _____

| | | | |
|---|---|---|---|
| [ ] Atmospheric Discharges (rad/non-rad) | [ ] Liquid Discharges | [ ] Soil activation/contamination | [ ] Waste - Mixed |
| [ ] Chemical or Rad Material Storage or Use | [ ] Oil / PCB Management | [ ] Waste - Clean | [ ] Waste - Radioactive |
| [ ] Cesspools (UIC) | [ ] Protected areas / species | [ ] Waste - Hazardous | [ ] Waste - Regulated Medical |
| [ ] High water / power consumption | [ ] Spill potential | [ ] Waste - Industrial | [ ] OTHER _____ |

Waste disposition by: _____

**POLLUTION PREVENTION (P2) / WASTE MINIMIZATION OPPORTUNITY:** [X] None [ ] Yes

## Facility Concerns

[X] NONE

| | | | |
|---|---|---|---|
| [ ] Access/Egress Limitations | [ ] Impacts Facility Use Agreement | [ ] Temperature Change | [ ] OTHER _____ |
| [ ] Configuration Control | [ ] Maintenance Work on Ventilation Systems | [ ] Utility Interruptions | |
| [ ] Electrical Noise | [ ] Potential to Cause a False Alarm | [ ] Vibrations | |

## Work Controls

**WORK PRACTICES** [X] NONE

| | | | |
|---|---|---|---|
| [ ] Back-up Person/Watch | [ ] Exhaust Ventilation | [ ] Lockout/Tagout | [ ] Spill Containment |
| [ ] Barricades | [ ] HP Coverage | [ ] Posting/Warning Signs | [ ] Time Limitation |
| | [ ] IH Survey | [ ] Scaffolding - requires inspection | [ ] Warning alarm (i.e. "high level") |

**PROTECTIVE EQUIPMENT**

| | | | | | |
|---|---|---|---|---|---|
| [ ] NONE | [ ] Ear Plugs | [ ] Gloves | [ ] Lab Coat | [X] Safety Glasses | |
| [ ] Coveralls | [ ] Ear Muffs | [ ] Goggles | [ ] Respirator | [ ] Safety Harness | |
| [ ] Disposable Clothing | [ ] Face Shield | [ ] Hard Hat | [ ] Shoe covers | [ ] Safety Shoes | [ ] OTHER _____ |

**PERMITS REQUIRED** (*Please attach*) — *Initial next to box to show who has responsibility to generate the permit. Permits must be valid when job is scheduled.*

| | | |
|---|---|---|
| [X] NONE | [ ] Cutting/Welding | [ ] Impair Fire Protection Systems |
| [ ] Concrete/Masonry Penetration | [ ] Digging/Core Drilling | [ ] Rad Work Permit - RWP No. _____ |
| [ ] Confined Space Entry | [ ] Electrical Working Hot | [ ] OTHER _____ |

**DOSIMETRY/ MONITORING**

| | | | | |
|---|---|---|---|---|
| [X] NONE | [ ] Heat Stress Monitor | [ ] Real Time Monitor | | [ ] TLD |
| [ ] Air Effluent | [ ] Noise Survey/Dosimeter | [ ] Self-reading Pencil Dosimeter | | [ ] Waste Characterization |
| [ ] Ground Water | [ ] $O_2$/Combustible Gas | [ ] Self-reading Digital Dosimeter | | [ ] OTHER _____ |
| [ ] Liquid Effluent | [ ] Passive Vapor Monitor | [ ] Sorbent Tube/Filter Pump | | |

## Training Requirements (List below any location specific training requirements)

*ased on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below.*

**ES&H Risk Level:** [X] LOW [ ] MODERATE [ ] HIGH
**Complexity Level:** [ ] LOW [ ] MODERATE [X] HIGH QA
**Work Coordination:** [X] LOW [ ] MODERATE [ ] HIGH A2

Note: If all the ratings are LOW, the **Work Control Coordinator** and **Service Provider** must sign for concurrence on the back side. Further review of the work permit is **not** required. If any ratings are MODERATE or HIGH, the entire permit must be completed.

*3. Both work requester and service provider coordinate on work plan (use attachments for detailed plans)*

**Work Plan:** (procedures, timing, equipment, and personnel availability need to be addressed) SEE ATTACHED PROCEDURE.

Special Working Conditions Required: Pipe to be Surveyed After Removal By H.P.

Operational Limits Imposed: AS Per H.P. findings

Post Work Testing Required:

Job Safety Analysis Required IN Procedure Yes ~~No~~ Walkdown Required ___ Yes X No

**Reviewed By:** *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 | P. Grimsich | | 21868 | 2/19/02 |
| ES&H Professional | A. Etkin | | 13163 | 2-20-2002 |
| Other | C. Pearson | for CP | 12415 | 2/19/02 |
| ~~Other~~ P. Kroon | P. Kroon | | 17500 | 2/20/02 |
| Work Control Coordinator* | | DAN WEISS | 20400 | 2/19/02 |
| Service Provider* | | | | |

*Only signatures required for concurrence on LOW rated jobs.* *Review done: in series team*

*4. Job site personnel fills out this section*

*Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including attached permits).*

Job Site 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. Work Requester or designee fills out this section*

**Conditions are Appropriate to Start Work:** (Work permit has been reviewed, work controls are in place, and site is ready for job.)

Name _____ Signature _____ Life # _____ Date _____

*6. Work Requester determines if Post Job Review is required ___No ___Yes (Fill in names of reviewers)*

**Post Job Review:**

Name: _____ Signature _____ Life #: _____ Date: _____

Name: _____ Signature _____ Life #: _____ Date: _____

*7. Worker provides feedback*

**Worker Feedback:** _____

*Work Control Coordinator (requesting dept.) checks quality of completed permit and closes out*

**Closeout:** Name _____ Signature _____ Life #: _____ Date: _____

Comments: _____

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fety Analysis Required ~~Yes~~ ~~No~~ Walkdown Required ___ Yes X No

**ewed By:** *Primary Reviewer will determine the size of the review team and the other signatures required based on hazards a omplexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and wi ontrolled according to BNL requirements.*

| Title | Name (print) | Signature | Life # | Dat |
|---|---|---|---|---|
| imary Reviewer | P. Cunningham | | 21868 | 2/19/ |
| S&H Professional | A. Etkin | | 13163 | 2/20-21 |
| Other | C. Pearson | TRAN CP | 12415 | 2/19/ |
| ~~Other~~ P. Kroon | P. Kroon | | 17500 | 2/20/ |
| Work Control Coordinator* | | DAN WEISS | 20460 | 2/19/ |
| Service Provider* | SAL MARINO | | 15767 | 2/21 |

***Only signatures required for concurrence on LOW rated jobs.** Review done: in series tea

*4. Job site personnel fills out this section*

*Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including attached permits*

Job Site Supervisor Peter J. Kroon Contractor Supervisor ___

| Workers: | Life # | Workers: | Life # |
|---|---|---|---|
| | 15767 | | |
| | 18463 | | |
| | 15805 | | |
| | 19931 | | |

*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. Work Requester or designee fills out this section*

**Conditions are Appropriate to Start Work:** (Work permit has been reviewed, work controls are in place, and site is ready for job.)
Name PETER J. KROON Signature Peter J. Kroon Life # 17500 Date 2/21/0

*6. Work Requester determines if Post Job Review is required ___No ___Yes (Fill in names of reviewers)*

**Post Job Review:**
Name: DAN WEISS Signature [signature] Life #: 20460 Date: 02/25/02
Name: ___ Signature ___ Life #: ___ Date: ___

*7. Worker provides feedback*

**Worker Feedback:** ___

*8. Work Control Coordinator (requesting dept.) checks quality of completed permit and closes out*

**Closeout:** Name ___ Signature ___ Life #: ___ Date: ___
Comments: ___

**Procedure to Remove PHENIX Central Beampipe from IR into Storage Crate in the RHIC tunnel.**

**NOTE:** To insure against breaking of the PHENIX Central Beampipe the beampipe shall, as a minimum, always be supported in a minimum of 2 places. The 2 support positions shall be located on the stainless steel tube extensions on each side of the beryllium central section of the beampipe assembly. If the beampipe is supported on the flanges at the ends of the beampipe, the maximum beryllium stress is less than 2000 psi. **To keep the bending stress below 2000 psi (a safe value), the south support should always be within 65 inches of the south end of the beampipe (on the south Stainless steel extension), and the north support can be anywhere on the north stainless steel section.**

**NOTE:** The 1.5 meter long beryllium section of the beampipe shall be wrapped with kapton sheet and secured with Kapton tape (to the stainless steel sections only) to limit the spread of beryllium fragments and dust in the unlikely event of breakage of the central beampipe during the removal procedure.

**NOTE:** The beryllium section of the pipe is epoxy-coated, so gloves are not required.

1. With the Central Beampipe positioned and supported in the South Muon Magnet, move the South Muon Magnet north to the East West Translation position (20 inches south of the full in position).

2. With the South Muon Magnet positioned for east west travel, move the South Muon Magnet east. The bore of the South Muon Magnet shall align with the midpoint between the vertical wall of the MuID steel and the east most edge of the DX cryostat (approximately 24 inches from the beamline).

**NOTE:** With the South Muon Magnet and Central Beampipe positioned in this way, the Beampipe will have a straight path out of the South Muon Magnet and into the RHIC tunnel. The minimum horizontal clear aperture for removing the 3 inch O.D. tube with 4.5 inch flanges is 9 inches.

3. Personnel shall be positioned at the following locations during this procedure:
   (1) south end of South Muon Magnet;
   (2) inside the South MuID at the railing;
   (3) inside the South MuID at the intersection of the 7:00 DX cryostat and the MuID;
   (4) in the RHIC tunnel at the intersection of the 7:00 DX cryostat and the MuID
   (5) in the RHIC tunnel along the Sector 7:00 DX cryostat.

potential interference or

**CAUTION: If an unexpected resistance to moving the beampipe is encountered, the procedure shall be suspended. The Work Control Coordinator or appointee shall investigate. If the situation cannot be remedied, the removal procedure shall be reversed, until the position of the Central Beampipe inside the South Muon Magnet is restored to its initial position.**

4. Position 1 shall begin to slowly pull the beampipe from the IR toward Sector 7, and prevent the beamtube from hitting the edge of the magnet.

5. Position 2 shall guide the beampipe through the railing.

6. Position 3 shall guide the beampipe past the edge of the DX cryostat and MuID.

7. Position 4 shall guide the beampipe out into the RHIC tunnel.

8. Position 5 shall support the south stainless steel section of the beampipe at a point ~40 inches from the south end of the beampipe.

9. Position 4 shall support the north stainless steel section of the beampipe at a point ~24 inches from the north end of the beampipe.

10. Personnel in positions 4 and 5 shall place the beampipe inside the storage container.

11. HP shall survey the beampipe for activation, prior to transporting the beampipe and container out of the RHIC tunnel.

w: Work Permit # 552002-026

**Remove PHENIX Central Beampipe from IR into Storage Crate in the RHIC Tunnel.**

e pro ɹe was conducted during the morning of February 21, 2002.

procedure as detailed required approximately ½ hour. The actual handling of the beamtube consumed less than ːs of the total time.

ɹion inside the MuID next to the DX cryostat (3) could have been eliminated. The station just outside the MuID the DX cryostat (4) could handle the responsibilities for stations 3 and 4.

ɻh Physics has surveyed the beampipe. A report is on file with HP. The maximum reading for the beampipe was µ5 R ɹe background.