

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section. Standing Work Permit

Requester: Robert Pisani	Date: 9/28/2016	Ext.: 5301	Dept/Div/Group: PO
Other Contact person (if different from requester): Carter Biggs			Ext.:
Work Control Coordinator:	Start Date:		Est. End Date: 11/15/2016
Brief Description of Work: Removal Of TOF.E Sectors (2 on the East) from PHENIX as part of the PHENIX Removal & Repurposing Plan			
Building: 1008	Room: IR and Assembly Area	Equipment: PHENIX TOF.E Sectors	Service Provider: PHENIX Techs, Engineers, Subsystem experts, PHENIX Electricians, C-A Carpenters and Riggers if needed

2. WCC, Requester/Designee, Service Provider, and ESSH (as necessary) fill out this section or attach analysis

ESSH ANALYSIS							
Radiation Concerns	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> NORM	<input type="checkbox"/> Other
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group				<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
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
Safety and Security Concerns	<input type="checkbox"/> None		<input type="checkbox"/> Explosives		<input type="checkbox"/> Transport of Haz/Rad Material		<input type="checkbox"/> Pressurized Systems
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Magnetic Fields*	<input type="checkbox"/> Railroad Work			
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Nanomaterials/particles*	<input checked="" type="checkbox"/> Rigging			
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Noise*	<input type="checkbox"/> Silica*			
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Non-ionizing Radiation*	<input type="checkbox"/> Security Concerns			
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lead*	<input type="checkbox"/> Oxygen Deficiency*	<input type="checkbox"/> Suspect/Counterfeit Items			
<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Penetrating Fire Walls	<input type="checkbox"/> Vacuum			
Ladder Access Required: <input checked="" type="checkbox"/> Portable Ladder <input type="checkbox"/> Fixed Ladder- Status/Restrictions:							
* Safety Health Rep. Review Required		<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM				<input type="checkbox"/> Other	
Environmental Concerns			<input checked="" type="checkbox"/> None		<input type="checkbox"/> Work impacts Environmental Permit No.		
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad/GHG)		<input type="checkbox"/> Land Use Institutional Controls		<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"/> 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"/> Historical Environmental Hazards	
Waste disposition by: <input type="checkbox"/> Other							
Pollution Prevention (P2)/Waste Minimization Opportunity: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				Environmental Preferable Products Available: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
FACILITY CONCERNS			<input checked="" type="checkbox"/> None		<input type="checkbox"/> Intermittent Energy Release		
<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"/> Credited Controls (Use USI Process)		<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change		<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Management		<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions			
WORK CONTROLS							
Work Practices							
<input type="checkbox"/> None		<input type="checkbox"/> Exhaust Ventilation		<input checked="" type="checkbox"/> Lockout/Tagout		<input type="checkbox"/> Spill Containment	
<input 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")	
<input type="checkbox"/> Electrical Inspection Required							
Personal Protective Equipment							
<input type="checkbox"/> None		<input type="checkbox"/> Ear Plugs		<input checked="" type="checkbox"/> Gloves, as necessary		<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 checked="" type="checkbox"/> Hard Hat, As required		<input checked="" type="checkbox"/> Safety Shoes, as req'd	
<input type="checkbox"/> High visibility cloths/vest		<input type="checkbox"/> Other					
Permits Required (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 type="checkbox"/> Confined Space Entry		<input type="checkbox"/> Electrical Working Hot		<input type="checkbox"/> Other			
Dosimetry/Monitoring							
<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 ₂ /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			
Training Requirements (List specific training requirements)							
PHENIX Awareness, C-A Access, Working at Heights (where needed), Electrical Safety 1, LOTO where needed							
Work screening has identified the following as the reason for permitted work:				When work is categorized as worker planned work and a permit is used only the following signatures are required: (Although allowed, there is no need to use back of form)			
<input type="checkbox"/> ESSH				WCC:		Date:	
<input type="checkbox"/> Complexity				Service Provider:		Date:	
<input type="checkbox"/> Work Coordination				Authorization to start:		Date:	
<input checked="" type="checkbox"/> Permit Not Required (Sections 3 through 7 optional)				(Department/Division, or their equivalent, Sup/WCC/Designee)			

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

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): During the 2016 PHENIX R&R Shutdown, PHENIX will be performing R&R work to prepare for a new sPHENIX detector. As part of this effort, it is required that the TOF.E sectors (east) be removed and disposed of safely at 1008. This work will be worker planned work by skilled PHENIX technicians and appropriately trained BNL bargaining unit personnel if needed. An attachment is included visually illustrating the removal of the TOF.E to aid in the process. The sectors will be returned to their owners.

Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)

Notifications to operations and Operational Limits Requirements:

Post Work Testing, Notification or Documentation Required:

Job Safety Analysis Required: Yes No Review Done: in series team

Reviewed by: * Primary Reviewer signature (not required for Worker Planned Work) means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Carter Biggs			
Safety Health Representative				
Research Space Manager				
Other				
Other				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor: Carter Biggs Contractor Supervisor:

Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESSH concerns or on ideas for improved job work flow. Use feedback form or space below.

5. Department/Division, or their equivalent, Line Manager or 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. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Are there any changes as a result of worker feedback? Yes No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/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 job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

Work Plan Attachment, W.P.# SDD-2016-007
Removal and Repurposing of the PHENIX TOF.E Sectors at Building 1008
Note: The TOF North and south are removed separately.

Introduction

Safe handling of the TOF.E Sectors while removing from the PHENIX Detector Carriage will eliminate danger to workers at Brookhaven National Laboratory (BNL). This procedure will provide instructions for safe removal of the detector assembly from the PHENIX East Carriages.

1.0 Purpose & Scope

The purpose of this procedure is to provide directions for handling and removing the TOF.E Sectors. It applies to BNL personnel, outside contractors, contract labor and to personnel designated to operate equipment covered by this procedure. Safety standards provided by BNL for Material Handling (1.6.0) and required training and certification (1.6.1) will apply. This procedure covers the lift of the detector assembly off the Detector Carriage. This procedure will be used for the removal of the 4 TOF.E ½ Sectors on the East Carriage.

2.0 Responsibilities

2.1 All operations shall be performed under the direction of the PHENIX Experimental Hall "Person-in-Charge" or his designee.

2.2 Due to the component value, as well as the inherent personnel risk involved in handling such large objects, this procedure and all relevant BNL safety guidelines must be strictly adhered to. In accordance with BNL policy, any individual may cease operations if they in any way feel unsafe or if they believe unsafe procedures are being followed. Such a complaint shall be reviewed by the cognizant engineer, and if necessary, BNL ES & H Services.

3.0 Prerequisites

3.1 All personnel involved in this procedure shall wear hard hats when required.

3.2 Personnel involved in this procedure shall wear safety shoes when required.

3.3 Personnel involved in this procedure shall wear safety glasses when required

4.0 Precautions

4.1 Visitors shall not be permitted in the PEH during these procedures.

4.2 Some operations will require personnel to work in close proximity to suspended loads. Do not permit yourself or anyone else to be positioned under the load.

5.0 Equipment/Parts List

5.1 The following equipment & hardware is called for in various sections of this procedure:

- a) 4 Slings, 1 ton, 6 foot min
- b) One sling, 2 ton, any length
- c) One shackle, 2 ton min
- d) 2 tag lines, 20 feet
- e) 10 C-lamps—4" min
- f) 12 3/8-16 x 1" long hex socket cap screws
- g) 4 3/8-16 x 1 ¼" hex screws
- h) 4 5/16-18x 1 ¼" hex cap screws
- i) Tof hoist, drawing 022-028-500
- j) Splice plate and shims, drawing number 002-0208-530

6.0 Preparations

Note: All lifting hardware shall be checked for current inspection stickers and shall be visually inspected for defects prior to each lift. Any items found to have expired inspection tags or any evidence of physical degradation shall be immediately removed from service and replaced with conforming hardware of the same capacity.

6.1 Disconnect and remove all cables and gas lines from TOF.E sectors detector.

6.2 Racks and platforms on E3,E2, E1 and E0 will be removed prior to removing any TOF.E Sectors

6.3 Upper Carriage cross support should be removed prior to TOF.E sector removal

7.0 Procedures

Procedure No. 2.5.5.4-08 B should be followed in reverse to remove the TOF.E Sectors. This procedure is attached at the end of this document.

Note that each TOF.E E1 Sector weighs 900 pounds, each E0 sector weighs 400 pounds



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TIME OF FLIGHT INSTALLATION PROCEDURE

PHENIX Procedure No. PP-2.5.5.4-08

Revision B

Date: 9-2-99

SEE ECN # PHX-0208-009

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approvals

<u>W. STOKES</u>	<u>6/23/99</u>	<u>SUSUMU SATO</u>	<u>7/21/99</u>
PHENIX S.E. & I.	Date	Cognizant Scientist/ Engineer/Activity Manager	Date

<u>E KILLIAN</u>	<u>6/23/99</u>	<u>M. GAFFNEY</u>	<u>6/24/99</u>
PHENIX QA/Safety	Date	RHIC ES&H	Date

REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	TYPED BY
A	First Issue	4/21/1999	n/a	Stokes, S. Sato, W. Lenz, M. Gaffney	n/a
B	See ECN PHX- 0208-009	9/2/1999	n/a	Stokes, S. Sato, W. Lenz, M. Gaffney	n/a
RETIRED	Installation completed	3/19/2007	n/a	D. Lynch, P. Giannotti, R. Pisani for PHENIX	n/a

Time of Flight Installation Procedure

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Purpose and Scope

This document shall describe the method to safely handle and install the Time of Flight (ToF) detector onto the East Carriage using a custom designed installation fixture.

1. Responsibilities

Only trained BNL technicians and/or riggers shall perform the tasks described herein, under the supervision of the building 510 hi-bay PIC (for handling in building 510), the building 1008 PIC (for handling in building 1008), and/or a lead rigger.

2. Prerequisites

- 2.1. All personnel performing tasks described herein shall possess a current BNL Safety Awareness Certificate (SAC).
- 2.2. All personnel performing tasks described herein shall possess a current training certifications for the equipment used, per BNL ES&H standard 1.6.0.
- 2.3. All personnel performing tasks described herein shall wear proper personal protective equipment, per BNL ES&H standard 1.16.0.
- 2.4. All materials handling equipment shall have been maintained and inspected per BNL ES&H standard 1.6.0.
- 2.5. Only personnel actually involved with the handling or installation process shall be permitted in the work area.

Time of Flight Installation Procedure

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3. Required equipment

Four slings, rated 1 ton min., 6 ft. long min. (for horizontal lifting)

One sling, rated 2 tons min., any length suitable (for installation lifts)

One shackle, rated 2 tons min.

Building crane, rated 2 tons min.

Two tag lines of sufficient strength

Ten C-clamps

Twelve 3/8-16 x 1" long hex socket head cap screws

One 5/16 hex wrench

Four 3/8-16 x 1 1/4 long st. stl. hex head machine screws

Four 5/16-18 x 1 1/4 long st. stl. hex head cap screws.

ToF hoist, BNL drawing no. 002-0208-500

Splice Plate and shims, BNL drawing no. 002-0208-530

Time of Flight Installation Procedure

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4. Procedure

4.1. Handling

4.1.1. Before installing the lifting fixture onto the ToF, verify that **all** of the ToF's top bearings have been shimmed properly to ensure proper engagement of the bearings into the lift fixture groove. See figure 4.

CAUTION: Do not proceed beyond this point unless 4.1.1 has been accomplished.

4.1.2. With the fixture lying horizontally on cribbing with I-beam and C-channels on topside, attach the 1 ton x 6' slings choker style around the outermost channels at the four corners. See figure 1.

4.1.3. Attach four slings to crane hook and move the fixture to a position abutting the end of the ToF panel assembly with the fixture grooves aligned horizontally to the ToF's mounting bearings.

4.1.4. Carefully move the fixture horizontally engaging the ToF's top and bottom mounting bearings into the bearing grooves in the fixture allowing the slings to support the fixture weight. Little or none of the weight of the fixture's weight should be supported by the TOF.

4.1.5. When ToF is fully installed in the fixture, **before lifting**, install the top rail to TOF safety jackscrews then the safety retaining screws. Install four C-clamps onto the fixture at each end of the TOF (top and bottom) to prevent movement of the ToF within the fixture.

4.1.6. Lay and fasten cables with cable ties to the back of the lift fixture C-channels evenly distributed for equal weight distribution.

CAUTION: Do not lift assembly without c-clamps, jackscrews, and safety screws installed.

4.1.7. Verify C-clamps to be tight and safety screws installed and lift the assembly to transfer it to a storage table or assembly table for delivery to building 1008

4.1.8. Once the TOF is resting on the table, remove the C-clamps, jackscrews, and safety screws. Then remove the lift fixture from the TOF assembly.

Time of Flight Installation Procedure

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4.2. Installation

- 4.2.1. The ToF assembly shall arrive via flat bed truck, strapped to a rolling assembly table.
- 4.2.2. Remove the TOF assembly and rolling table together from the flat bed.
- 4.2.3. Remove strapping from the TOF and assembly table.
- 4.2.4. Install the lift frame as described in Section 4.1 (Handling).
- 4.2.5. Verify that all four C-clamps holding the ToF in position within the fixture are secure and tight and that the jackscrews and safety screws have been installed. Verify that the lift rings are in the proper location along the slide according to Figs 2.
- 4.2.6. Lift the assembly, using a 10' foot long 2 ton sling attached to the fixture lift rings, rotating it to its installation position as the bottom of the fixture rotates on the cribbing blocks on the flat bed truck.

CAUTION: Be aware of the lower fixture kicking out when CG is passed over by the crane hook.
- 4.2.7. Using duct tape or sash rope, bring cables, that were cable tied to the fixture, around to the front of the ToF panel and secure appropriately, evenly distributed.
- 4.2.8. Move the assembly adjacent to the NORTH side of the east carriage and to the appropriate sector level.
- 4.2.9. Readjust the position of the hoist rings on the fixture to fine-tune the hanging position to match the appropriate sector if necessary. Figures 2 & 3.
- 4.2.10. Connect the fixture's upper and lower rails to the ToF's permanent mounting rails using the twelve 3/8-16 bolts.
- 4.2.11. Install a C-clamp to the far end of the permanent installation track on the carriage to prevent over travel of the TOF assembly while rolling it into position.
- 4.2.12. Check and adjust, if necessary the alignment of the fixture to the tracks.

Time of Flight Installation Procedure

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- 4.2.13. From the lift fixture, remove the two C-clamps closest to the permanent tracks and remove the four jackscrews and four safety screws.
- 4.2.14. Roll the ToF panel into its appropriate position. Pushing or pulling **ONLY** on its lower continuous plate.
- 4.2.15. Install another C-clamp to the permanent tracks to temporarily secure the TOF assembly until both panels have been installed onto the tracks.
- 4.2.16. Remove the fixture from the ToF permanent rails.

Caution should be heeded to the shift of the center of gravity of the fixture without the weight of the ToF panel installed in it. The bottom of the fixture will tend to move forward to achieve equilibrium when hanging from the lift rings.

5. References

- 5.1. BNL ES&H Standard 1.6.0
- 5.2. BNL ES&H Standard 1.16.0
- 5.3. ToF Hoist Assembly drawing 002-0208-500

Time of Flight Installation Procedure

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6. Attachments

6.1. Drawings

002-0208-500

002-0208-502

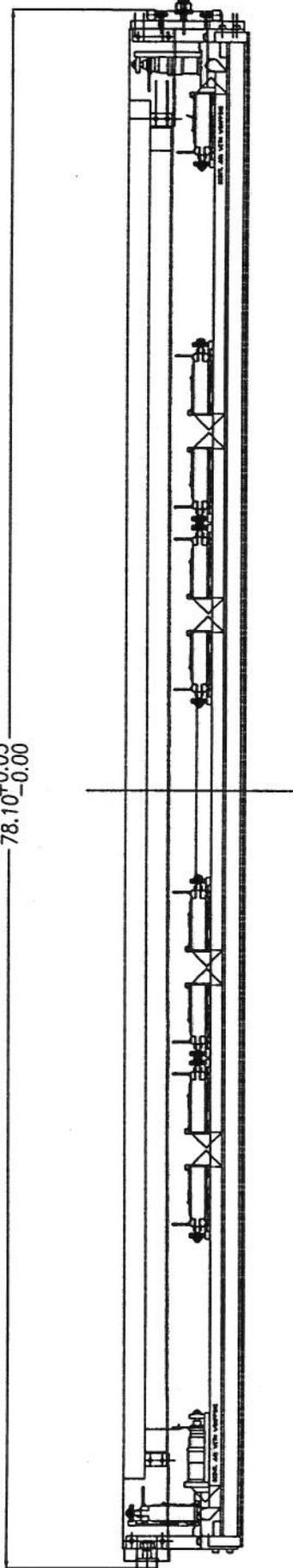
Figures 1 - 4

Distribution:

Sal Marino (file)
Sal Marino (group)
Steve Mulhall
Bill Lenz
Pete Kroon
W. Stokes
Mike Gaffney
Susumu Sato

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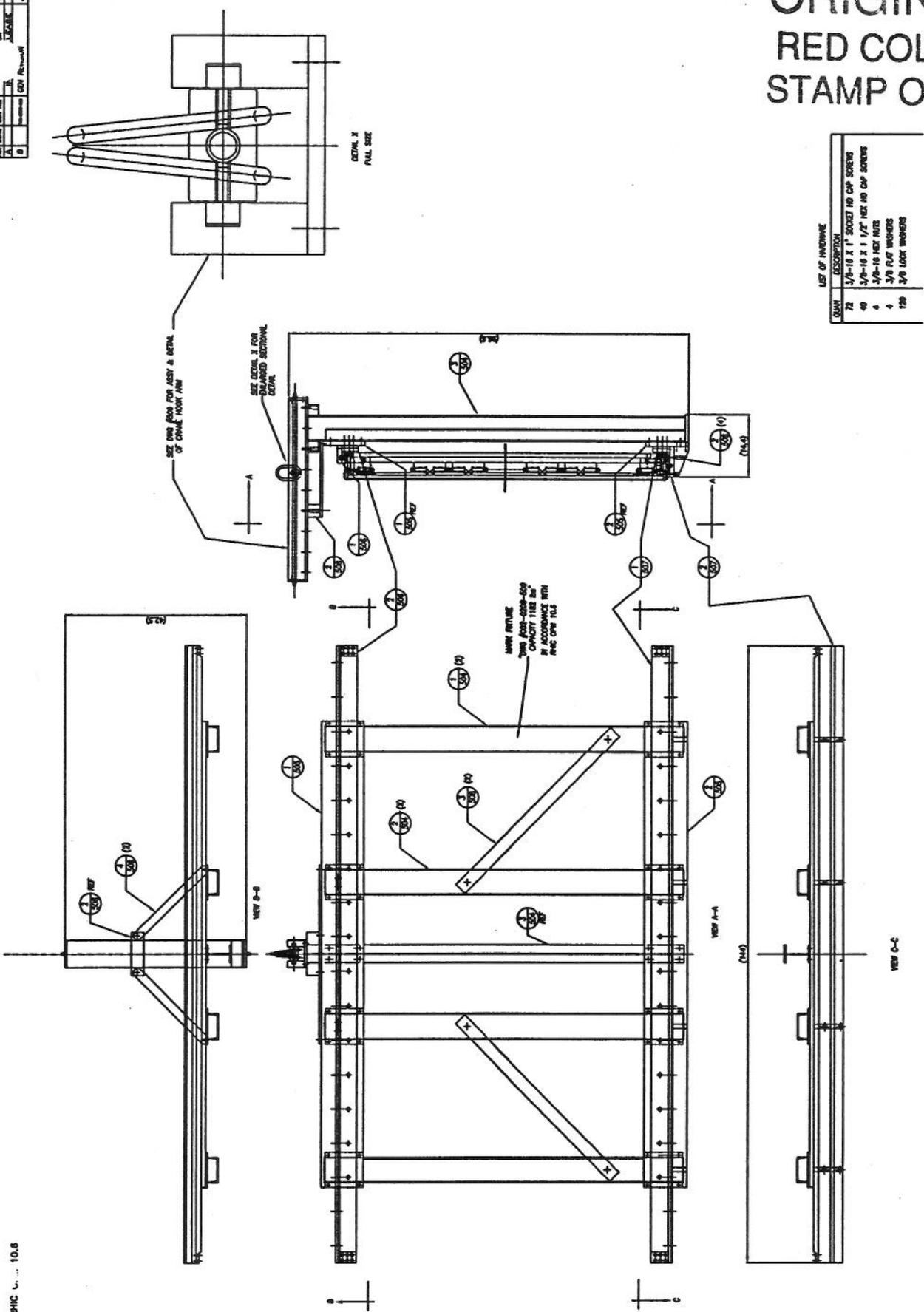
78.10^{+0.03}
-0.00



BROOKHAVEN NATIONAL LABORATORY MPS-100, U.S. 2023		FIGURE 4	
PROJECT NO.	78-10	DATE	1/28/58
DESIGNED BY	W. J. ...	DR.	...
CHECKED BY	...	DATE	...
APPROVED BY	...	DATE	...
SCALE	AS SHOWN	INCHES	...
NO.	...	REV.	...
MATERIALS		...	
FINISHES		...	
TOLERANCES		...	
THREADS		...	
WELDING		...	
OTHER		...	

REV	DATE	BY	CHKD
A			
B			

NOTES:
1-LABEL AS PER RHIC 10.6



LIST OF MATERIAL

QTY	DESCRIPTION
72	3/8-18 X 1" SOCKET HD CAP SCREWS
48	3/8-18 X 1 1/2" HEX HD CAP SCREWS
4	3/8-18 HEX NUTS
4	3/8 FLAT WASHERS
120	3/8 LOCK WASHERS

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MPTOWN, N.Y. 10773

PHENIX
T O F HOST FRAME
ASSEMBLY

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Some Photos of TOF.E Installation

