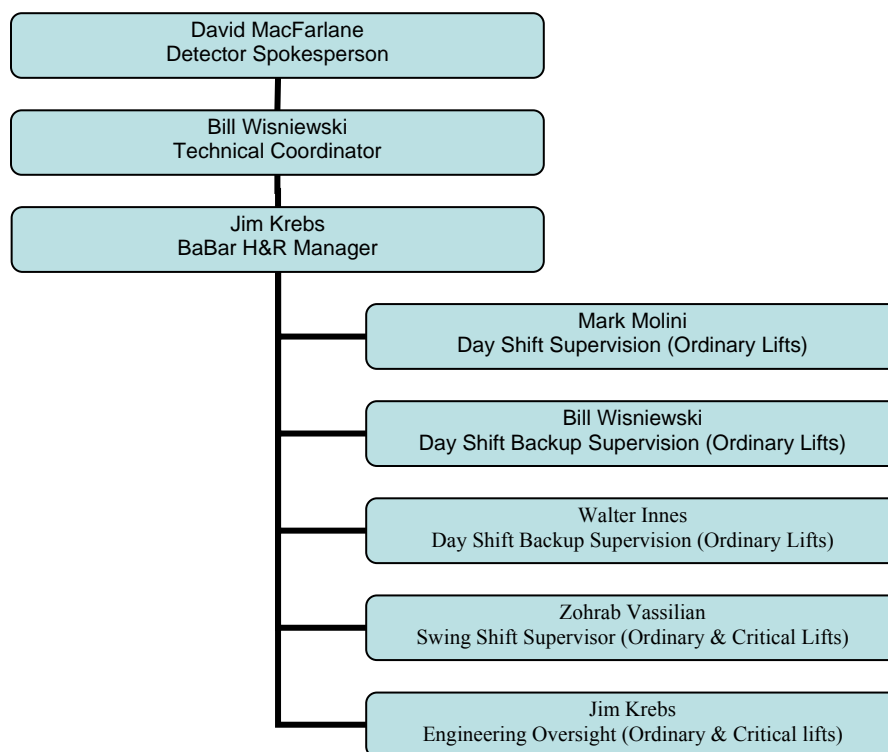


An ISMS Approach To BaBar H&R Safety

1.0 Governing Standard (GP 5)

The governing guidance document used to preserve a safe environment for BaBar related Hoisting & Rigging activities is DOE-STD-1090-2004. Additional or area-specific requirements are provided as follows:

2.0 Line Management Authority for BaBar H&R Activities (GP 1)



3.0 Definitions:

Lift Plan, Formal. Written and approved procedure used to plan systemically and carry out safely hoisting and rigging activities, with appropriate controls in place

4.0 Qualified Operators for BaBar H&R Activities (GP 3)

A qualified operator is an individual whose knowledge and competence in operating hoisting and rigging equipment has been demonstrated to the satisfaction of the BaBar line management through experience, training, and/or

certification. The following operators are considered qualified for the appropriate class of lift:

4.1 Critical Lifts or Non-Routine Lifts

David Engesser
 Scot Johnson (with engineering oversight)
 Jim Krebs (with oversight)

4.2 Ordinary Lifts

All personnel listed for critical lifts plus:
 Any other CEF rigger
 Mark Molini
 TBD (Unidentified REG personnel)
 TBD (Unidentified REG personnel)

5.0 Classification of Lifts (GP 5 & 6)

The BaBar H&R Manager shall classify lifts as either *ordinary*, *pre-engineered production*, or *critical* in accordance with DOE-STD-1090-2004.

Exception: There are several lifts at BaBar requiring an intricate load transfer of an elevated load with personnel immediately adjacent to a special purpose below-the-hook lifting device. These lifts shall be considered *Critical Lifts* and shall be subject to the requirements of such lifts as dictated by DOE-STD-1090-2004.

Examples of these types of lifts include:

- Remove/install Barrel Gap Plates
- Remove/install Forward Corner Blocks
- Remove/install Barrel Side Flux Bars
- Remove/install Solenoid Support Arms
- Remove/install Forward End Plug

The written procedures and non-routine JHAM for any critical lift or non-routine ordinary lift shall reside in a web based repository.

6.0 Performing Lifts

All lifts will be rigged and performed only by qualified personnel designated by the BaBar H&R Manager. Each lift will have a Person-in-Charge responsible for

planning the lift and verifying lift conditions, including the qualifications of participants, condition of equipment, and the condition of the load. For critical lifts, the Person-in-Charge must follow an approved formal lift plan and the Person-in-Charge must be identified on that plan. Normally, the Operator and the Person-in-Charge is the same person.

7.0 Roles and Responsibilities (GP 2)

7.1 BaBar H&R Manager (Jim Krebs)

The BaBar H&R Manager will carry the hoisting & rigging responsibility and acts as a functional supervisor for area hoisting and rigging activities. This is a designated leader position. This individual enforces appropriate work controls and authorizations to mitigate area H&R hazards. Therefore, depending on the equipment and its application, operator experience, and the complexity of the task, the BaBar H&R Manager may impose requirements including one or more of the following:

- Use of CEF Riggers only
- Continuous supervision of the operator by a more experienced operator.
- A formal lift plan for an ordinary lift.
- Continuous supervision of operator during setup and/or lift.
- Continuous engineering oversight during setup and/or lift.
- Continuous safety oversight during setup and/or lift.
- Lift-specific training.
- A test-lift using similar or dummy loads.

In addition, the BaBar H&R Manager shall ensure that its organization has clearly defined roles and responsibilities for all its hoisting and rigging personnel and criteria including:

- Person-in-Charge
- Qualified Operator
- Qualified Rigging Accessory Inspector
- Equipment Custodians
- Area lift specific requirements
- Designate qualified personnel to perform hoisting and rigging activities, such as maintaining equipment, classifying lifts, completing and approving lift authorizations, and performing lifts

7.2 Load Owners (Load Specific)

The H&R operations at IR-2 include lifts for PEP-II as well as BaBar. However, it is BaBar that takes the lead role in these lifting operations and PEP-II shall schedule and coordinate H&R activities with the BaBar H&R Manager. Load owners (either PEP-II or BaBar) will:

- Request lifts
- Make sure loads are maintained in safe working condition
- Assume responsibility for the structural integrity of the load and its lift/attachment points
- Provide load and positioning information to the BaBar H&R Manager, Qualified Operators, and Persons in-Charge to allow safe lift preparation, authorization, and execution.
- Provide formal lift plans when necessary

7.3 Below-the-Hook Lifting Device Custodian (Jim Krebs)

Custodian will:

- Control the use of the equipment
- Maintain equipment in safe working order
- Remove non-compliant equipment from service
- Work with the Hoisting and Rigging Program Manager to keep the hoisting and rigging inventory up to date
- Maintain documentation as required by DOE STD-1090-2004

7.4 Crane Custodian (Zohrab Vassilian)

Crane Custodian will:

- Maintain a record of usage, inspection, and maintenance, through a logbook or other suitable means
- Ensure the Person-in-Charge returns the pre-use inspection checklist, if required, after completion of the lift
- Review inspection records periodically to ensure that pre-use inspections are being performed
- Ensure that cranes and lifting devices are labeled with an inventory number

7.5 Person-in-Charge (Assigned by BaBar H&R Manager)

The person-in-charge of a lift will:

- Be qualified for the type of lift
- Verify the qualifications of participating personnel (other than him or herself)

- Check the condition of equipment and load, including completing a pre-use inspection checklist if required
- Review the lift process and hardware with all participating personnel before the lift
- Request a formal lift plan, if needed
- Be present during the entire lift operation, ensuring its safe completion
- Return control of the equipment to the equipment custodian, and pre-use inspection checklist if necessary

7.6 Shift Supervisor (Assigned by BaBar H&R Manager)

The shift supervisor will:

- Supervise the rigging and technical support staff
- Act as the Designated Leader in absence BaBar H&R Manager

8.0 ISMS Core Functions - BaBar H&R Safety

8.1 Core Function 1 - Define Scope of Work

- BaBar H&R Manager shall determine if lift is "Routine" or "Non-Routine". A "Routine" lift is equivalent to an "Ordinary" lift as defined by DOE-STD-1090-2004. A "Non-Routine" lift is a "Critical" lift or an "Ordinary" lift that has complexity beyond the operator's level of experience. This judgment is based on the complexity of the lift as well as the skill and experience level of the operator. The operator may also determine a lift to be "Non-Routine" if the complexity of the lift is beyond his level of comfort.
- If lift is "Non-Routine", write non-routine JHAM (Formal Lift Plan) and determine if Riggers should perform lift. This is a judgment call based on operator experience, complexity of the lift, and knowledge of the load and rigging equipment. If lift is performed by a casual operator, then a "Non-Routine" JHAM (Formal Lift Plan) is required and the lift must be performed in the presence of a qualified operator.

8.2 Core Function 2 - Analyze Hazards

- Read Area Hazard Analysis and inspect lift area for potential hazards such as radiation, magnetic fields, oxygen deficiency, clutter, workers, etc.

- Identify typical hazards:

Pinching, crushing and amputation - severe injury or death

Unexpected load movement

Potential back and muscle sprain from lifting heavy rigging components

Equipment failure

Operator error

Rigging error

- Identify area-specific hazards:

Workers in lift area

Lift located in proximity of hazards - radiation, magnetic fields, electrical equipment, pressure vessels, oxygen deficiency, etc.

Uneven work surfaces, potential trip or fall areas

8.3 Core Function 3 - Develop/Implement Hazard Controls

- Identify for the area:

Area H & R Manager

Designated Leader

Qualified crane operators

Rigging support personnel

Person-in-charge

Inspection personnel

Equipment custodians

Load Custodian

- Maintain current crane operator training and periodic refresher training
- Maintain control of crane box
- Determine lift-specific requirements
- Remove people from lift area
- Provide inspection of:
 - Load for possible structural defects
 - Rigging accessories for defects & remove from service if necessary - replace rejected accessories
 - Manual chain hoists and manual lever hoists for defects and remove from service if necessary - also notify H&R Committee about rejected components. Replace rejected manual chain hoists and manual lever hoists
 - All devices requiring current H&R inspection stickers
- Select appropriate rigging accessories including:
 - Slings and shackles that are rated for the load for the given sling angle
 - Load cell in the rigging setup if the hook load is uncertain or if a specific hook load is required
 - Swivel hoist rings instead of eye bolts or eye nuts, if appropriate
- Wear PPE - safety shoes, gloves, hardhat and fall protection as appropriate
- Crane operator shall attend any lifted load

8.4 Core Function 4 - Perform Work Within Controls

- Pre-lift operations:
 - Retrieve crane control box

Fill out crane pre-operations checklist

Direct technical support staff to assemble rigging

- Ensure proper rigging practices including:

When using wire rope slings & grommets, check pin diameter/wire rope diameter ratio - substitute rigging components if necessary

When using synthetic slings, install pads between slings and sharp edges

Ensure that shackles are not rotated and that shackle pins are oriented towards the load

Check rigging setup before lifting. Make sure slings are not twisted or knotted

When using slings in a "choke" mode, slowly raise load to assess load balance. Lower load and reposition slings if necessary

- Move all personnel away from lift and path of load movement
- Check to make certain that there is no external connection to the load that could hinder the lift
- Perform lift:

Slowly lift hook to tension slings. Manually check sling tension for uniformity. Readjust sling length if necessary. Reposition trolley and/or bridge if necessary.

Slowly perform lift. Lower load and modify rigging setup if necessary.

Ring bell to announce bridge movement. Slowly move lift to appropriate location.

Prevent rotation or swinging of load. Tag lines may be necessary.

At the desired location, slowly lower load until slings are slack

- Post lift operations:

Disconnect rigging from load.

Slowly lower hook and remove all rigging hardware. Move hook and rigging to a more accessible location if necessary.

Raise hook up to trolley and position trolley and bridge in appropriate location

Secure crane control box in appropriate location

8.5 Core Function 5 - Feedback and Improvement

- Inspect all rigging hardware for defects and remove from service if necessary
- Use what is learned from earlier lifts to improve safety

9.0 Area-Specific Requirements

All BaBar related H&R activities occurring in areas other than IR-2 shall adhere to the requirements in this document PLUS any area-specific H&R requirements, if such requirements exist.

10.0 Reviewed By:

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