

**Environment, Health & Safety
Integrated Functional Appraisal
of the Physics Division**

FY 2000

Integrated Functional Appraisal Team Leader: Matt Kotowski

Executive Summary

An Integrated Functional Appraisal (IFA) was conducted for the Physics Division in the spring of 2000. The IFA was designed to evaluate the hazards that exist in the Physics Division as well as the corresponding controls, and to provide recommendations for improvement where appropriate.

The IFA was conducted by a team of EH&S subject matter experts and by the Physics Division Safety Coordinator. The appraisal consisted of an initial updating of the hazard inventory; a review of accident records, past appraisals, and work authorizations; and a physical inspection of selected facilities that the team chose to visit based on available hazard information. The IFA field visits were coordinated with the 2000 MESH Review for the Physics Division.

In general, this Integrated Functional Appraisal confirmed that the Physics Division has addressed safety issues in a satisfactory manner. The most significant issue is ergonomic injuries from computer and microscope use. Based on this, it is recommended that the Physics Division request an in-depth analysis of the microscopy work in Building 50B, Rooms 6209 and 6238. It is further recommended that the Physics Division request formal ergonomics evaluations from EH&S for all personnel that work regularly on a computer, to be phased in over a period of a year or so.

Additional detailed recommendations are contained in Appendix A of the report.

It was also noted that the Physics Division's review and control of significant hazards - such as the toxic gas use in the Microsystems Lab and the liquid argon use in the Light Assembly Lab - are exemplary. There also seems to be excellent control and supervision of the use of the machine shop equipment by staff and students.

Physics Division IFA Technical Report

1.0 Introduction

Since 1996, the EH&S Division conducts routine Integrated Functional Appraisals (IFAs) of all Laboratory organizations on a triennial basis. The intent of these IFAs is to provide a technical review of EHS matters for each Laboratory division in a manner that complements the divisions' self-assessment programs and the MESH Reviews carried out by the Safety Review Committee. The IFA process also supports the maintenance of the Work Smart Standards process, under which the Laboratory must routinely review its hazards to determine what EH&S standards are included in the UC/DOE contract.

2.0 Appraisal Objectives

The 2000 Physics Division IFA was designed to evaluate the hazards that exist in the Physics Division as well as the corresponding controls, and to provide recommendations for improvement where appropriate. At the same time, we needed to update the listing of hazards for the division in support of the Work Smart Standards process, and we aimed to coordinate the 2000 IFA field visits with the 2000 MESH Review for the Physics Division.

3.0 Appraisal Procedures

In a preliminary meeting, the IFA Team Leader and the Division Safety Coordinator updated the hazard listing for the Integrated Hazards Assessment database. At the same time, hazard information was collected and recorded as a pilot effort for the new Hazards, Equipment, Authorizations & Review (HEAR) database, which is scheduled to replace the IHA database. This hazard information is needed to determine which EH&S disciplines should participate in the IFA and later to develop the scope of the IFA.

On March 31, 2000, an initial IFA meeting was held with representatives of all concerned disciplines invited. Discipline representatives were selected on the basis of hazards in the IHA database, technical expertise, and familiarity with Physics Division operations. At this meeting the scope of the IFA and the areas to be visited were established, based on the hazard information in the IHA database, accident information, the last IFA, the last MESH Report, the Self-Assessment summary, and input from the participants.

As a result of this meeting, it was decided to focus this IFA on chemical inventory compliance, ergonomic hazards, and emergency team member training. It was also determined that field visits would be made to the following areas, which included all areas presenting moderate or high levels of concern. This list overlapped with the MESH Review Team list of areas, and those areas visited jointly by the two teams are identified with asterisks:

Microsystems Lab, Bldg. 70A, 4435 – 4457 *
 Light Assembly Lab, Bldg 50, 6040 *
 Gas Microdetector Lab, Bldg 50A, 2155 *
 Machine Shop, Bldg 50, 6035*
 Multipurpose Electronics Lab, Trailer 51G
 Clean Room, Bldg 50. 4004 & 4008
 Atlas Project, Bldg 50B, 6209
 Electronics Lab, Bldg 50B, 6238
 Holland Lab, Bldg 50B, 6216

The following individuals were selected as team members, or otherwise participated in various of the site visits:

Discipline	Team Member / Participant
IFA Team Leader & Division Liaison	Matt Kotowski
Division Safety Coordinator	Kathy Hardy
Assurance & Assessment	Otis Wong
Electrical Safety	Tom Caronna
Fire Protection	Tony Yuen
	Robert Campbell
Health Services	Peter Lichty
	Connie Grondona
	Barbara Brown
Industrial Hygiene	Carole Fried
Occupational Safety	Matt Kotowski
Radiation Protection	Christine Donahue
	Linnea Wahl
Waste Generator Assistance	John Chernowski
DOE Berkeley Site Office Representative	Hattie Carwell

During the site visits, various of the participants documented the findings of the team on the standard Integrated Functional Appraisal checklists, and this report is based on the findings on those checklists.

4.0 Results

The detailed findings of the team are contained in the checklists that were completed during the survey. These results are summarized in Appendix A "Physics Integrated Functional Appraisal Summary 2000".

All work observed was covered by the current set of Work Smart Standards. In addition, it should be noted that no significant chemical inventory problems were observed, and that all emergency team training was current, excepting only recently appointed new members, who are scheduled to complete the training at the next available opportunity.

The key issues are discussed in Section 5.0 below. In addition, the IHA database information was updated, and the hazard information for the HEAR database was also collected.

5.0 Discussion of Results

5.1 Key Issues

The key safety issue for the Physics Division is ergonomics. There have been several computer related ergonomic injuries to Physics Division employees and to ASD employees assigned to work with Physics Division in recent years. In addition, there was a serious ergonomic injury to an Engineering Division employee in Electronics Lab, Bldg 50B, Room 6238, which is sponsored by the Physics Division. This injury was caused by extended work under a microscope.

Based on this, it is recommended that the Physics Division request an in-depth analysis of the microscopy work in Building 50B, Rooms 6209 and 6238.

It is further recommended that the Physics Division request formal ergonomics evaluations from EH&S for all personnel that work regularly on a computer, to be phased in over a period of a year or so.

5.2 Noteworthy Practices

The Physics Division review and control of significant hazards, such as the toxic gas use in the Microsystems Lab and the liquid argon use in the Light Assembly Lab are exemplary.

There seems to be excellent control and supervision of the use of the machine shop equipment by staff and students.

6.0 Conclusion

This Integrated Functional Appraisal confirmed that the Physics Division has addressed safety issues in a generally satisfactory manner. The most significant issue is ergonomic injuries from computer and microscope use. Other than that, only minor hazards were noted.

Appendix A Physics Division Integrated Functional Appraisal Summary April 2000

Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50	4004	Two compressed gas cylinders were connected to gas systems without pressure relief devices	4/19/00		For each compressed gas system, provide a pressure relief device set at no more than the MAWP for the lowest rated component
50	4004	A bare syringe with needle was found	4/19/00		Provide safe storage for the syringe to preclude inadvertent punctures and misuse.
50	4004	The SSA did not list the correct room number for the	4/19/00		Fred Goozen will update the paperwork to reflect the

		sealed source location			renumbering from 50-104 to 50-4004
50	4004	There was confusion about the requirement for TLDs during sealed source use	4/19/00	L. Wahl, EH&S, clarified the requirement & advised the user	Wear TLDs while using sealed sources
50	4004	There was a question about the need for an eyewash	4/19/00	C. Fried has reviewed the situation and has determined that no eyewash is needed (5/26/2000)	C. Fried (EH&S) will investigate the need & advise
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50	6035	Old chips and debris were found in one lathe	4/24/00		Clear chips and debris from each machine tool daily.
50	6035	All guards and safety features present & properly adjusted, excellent housekeeping, excellent controls for researcher-users	4/24/00	n/a	n/a
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50	6040	Two shelves should be designated as an RSA	4/24/00		Designate 2 shelves as an RSA - Jim Case or Shawn Rasmussen (EH&S) will provide posting & tape needed for this
50	6040	The argon dewar and the clean bench were not seismically anchored	4/24/00		Chain the argon dewar to a structural member and provide permanent seismic anchoring for the clean bench
50	6040	Emergency shutdown instructions for the liquid argon experiment are not clear	4/24/00		Clearly label all valves and post shut-down instructions for the liquid argon system before it is used by multiple users.
50	6040	The computer set-up in the office appears to be ergonomically deficient	4/24/00		Request an ergonomic evaluation for the computer used in this room.
50	6040	General attention to safety details and excellent housekeeping are noted.	4/24/00	n/a	n/a
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50A	2155	A second x-ray machine is no longer in use, but is still labeled	4/24/00		John Kadyk will deface the labels on the second x-ray machine

50A	2155	X-ray machine records are excellent	4/24/00	n/a	n/a
50A	2155	RSA needs "See Inventory" on sticker	4/24/00		Jim Case (EH&S) will address this
50A	2155	Sealed Source authorization log is stored in the safe	4/24/00		Designate a shelf or storage location for the log on the outside of the safe.
50A	2155	The isobutane in argon cylinder was not seismically secured	4/24/00		Install chain near the top of the cylinder
50A	2155	Two unsafe chairs were noted	4/24/00		Replace the 4-caser office chair and the drafting chair with the broken back rest.
50A	2155	There were no pressure relief devices on various compressed gas systems	4/24/00		For each compressed gas system, provide a pressure relief device set at no more than the MAWP for the lowest rated component
50A	2155	One gas system with multiple cylinders connected allowed for the possibility of gas flowing from one cylinder into another	4/24/00		Where multiple gases are connected to the same experiment, provide check valves on each gas cylinder to positively preclude backflow of gas from one cylinder into another.
50A	2155	There was a gas cylinder mounted on a cart with the regulator in place and a hose connected	4/24/00		Chain the cylinder to a solid support to preclude it from rolling during an earthquake. Remove the regulator when the cylinder is not in use for any length of time.
50A	2155	Correction of prior deficiencies and improved housekeeping are noted.	4/24/00	n/a	n/a
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50B	6209	Various microscopy stations are used principally for testing of electronics assemblies	4/19/00		The laboratory owner should request a detailed ergonomic evaluation of all microscope work by Dr. Jeffrey Chung (EH&S)
50B	6209	Some of the shelves and instrument racks were not seismically anchored	4/19/00		Complete the seismic tie-down of all tall shelves and instrument racks.
50B	6209	Out of date emergency response posters were noted	4/19/00		Kathie Hardy will update the emergency response posting with the current information.
50B	6209	Battery was dead in beta gamma meter	4/19/00	Meter has been removed by EH&S for service and for	

				replacement of battery	
50B	6209	The Sealed Source Authorization was not near the Sealed Source storage area	4/19/00		Kathie Hardy will post the SSA near the storage area.
50B	6209	Lead containing solder was found	4/19/00		If personnel are soldering with lead, they should complete the new HazCom Lead Training Course #329
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50B	6216	3cylinders were connected to gas systems without pressure relief	4/19		Steve Holland will disconnect the cylinders from the presently unused systems, will refurbish systems if they are used again.
50B	6216	Lead containing solder was found	4/19/00		If personnel are soldering with lead, they should complete the new HazCom Lead Training Course #329
50B	6216	Cords and cables were entering instrument enclosures through holes	4/19		Provide grommets and strain relief where cables enter instrument cabinets
50B	6216	There is a shock hazard at the Probe Station	4/19		Provide GFCI protection for the Probe Station
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
50B	6238	There is much clutter under desks and benches, leaving no room for "duck and cover" during an earthquake	4/19/00		Clear out spaces under desks and workbenches to provide room for "duck and cover" during an earthquake
50B	6238	Lead containing solder was found	4/19/00		If personnel are soldering with lead, they should complete the new HazCom Lead Training Course #329
50B	6238	Out of date emergency response posters were noted	4/19/00		Kathie Hardy will update the emergency response posting with the current information.
50B	6238	Some of the shelves and instrument racks were not seismically anchored	4/19/00		Complete the seismic tie-down of all tall shelves and instrument racks.
50B	6238	Heavy material was stored on top of tall cabinets	4/19/00		Remove the material stored on tall cabinets, or provide seismic anchoring to preclude it from falling.
50B	6238	A furnace was found sitting on top of a laboratory bench with a combustible surface	4/19/00		Check the manufacturer's operating instructions to determine required clearance from combustible materials, correct if needed.

50B	6238	Numerous microscopy stations are used for assembly and testing of electronics components	4/19/00		The laboratory owner should request a detailed ergonomic evaluation of all microscope work by Dr. Jeffrey Chung (EH&S)
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
51G		The emergency lights in the room need to be secured. This was previously noted on the 1998 IFA	5/2/00		
51G		There are power cords that run through holes in the exterior wall and in an office wall. These cords should be removed, and permanent wiring should be installed instead.	5/2/00		
51G		A permanently mounted light fixture needs permanent wiring instead of the temporary wiring.	5/2/00		
51G		The old oven with the exposed heating elements should be discarded.	5/2/00		
51G		Several squeeze bottles need to be labeled as to contents	5/2/00		
51G		The exit sign over the door no longer used as an exit should be removed.	5/2/00		
51G		Lead containing solder was found.	5/2/00		If personnel are soldering with lead, they should complete the new HazCom Lead Training Course #329
51G		Two four-legged chairs with casters should be replaced.	5/2/00		
Bldg	Room	Findings & Comments	Date Found	Actions Taken	Actions Needed
70A	4435	A hand-held drill motor was connected to an outlet in the water treatment area	4/24/00		Recommend installation of GFCI protection for the outlets in the water treatment area.
70A	4435	Generally excellent safety conditions were noted	4/24/00		n/a