

27 April, 2009

MEMORANDUM

To: Division Safety Coordinators
Division Liaisons
All JHA Users

From: John Seabury
Environment, Health & Safety Division

Subject: JHA – Description of Work

One of the major features about the required FY09 annual update to Work Group and Individual Job Hazards Analyses is the “Description of Work” feature that was added in October 2008. This feature was inadvertently left off of the JHA system during development and was not added in until after the first round of JHAs had been completed. This memorandum serves to provide additional detail on the specifics required in the “Description of Work” in the JHA process, including some examples.

We anticipate that as the JHA program and tools undergo additional review in light of the recent HSS audit, some features and processes may change. However, it is not likely that fundamental change will come during the FY09 annual update cycle (ending 9/30/2009). ***The purpose of this guidance is to provide input as to where the JHAs should be now so that we can build upon these efforts in the future, and to provide examples.***

Requirement

The elements of a Job Hazards Analysis parallel Integrated Safety Management:

- Define the Work (ISM Core Function #1)
- Analyze the Hazards (ISM Core Function #2)
- Determine the Controls (ISM Core Function #3)
- Perform the Work in accordance with the Controls (ISM Core Function #4)
- Review the Work and make improvements (ISM Core Function #5)

The Description of Work fits into Core Function 1 above. The balance of the JHA process fulfills Core Functions 2, 3 and 5.

PUB-3000, Chapter 32, Section 32.c.1.a, provides the following:

“The Description of Work statement is a critical element of the JHA. This statement describes the Work objectives, locations, materials used, processes employed, equipment used, and expected outputs. The Description statement is generally on the order of a few paragraphs in length, and is of sufficient detail that the tasks can be determined by a trained individual. The Description provides the

basis for the further analysis of the tasks, hazards and controls: any Work performed and analyzed must be described in this statement.”

There are six elements that must be included in the Description:

- Work Objectives
- Work Locations
- Materials Used
- Processes Employed
- Equipment Used
- Expected Output

While the actual level of detail for each of these elements will vary depending upon the specific work described, all of the elements must be present and complete. Descriptions of Work for Work Groups need to be updated by June 30, 2009 and for Individuals by September 30, 2009.

Examples

The Descriptions of Work below, pulled from actual JHAs, provide examples of these expectations.

1. Description of Work (from a Work Group)

This JHA Work Group covers work in 70-158, 70-120, associated staff offices, and at the Advanced Light Source. Work at the ALS is further analyzed in the approved Experiment Summary Sheet for that experiment. Work at offsite locations (e.g., UCB campus, other US synchrotron labs) is analyzed by the safety systems in use at those facilities.

70-158 is a basic research laboratory specializing in the study of the geochemistry of naturally occurring nanoparticles. This research requires the synthesis of engineered nanoparticles that serve as analogs of natural materials, principally transition metal oxides and sulfides prepared and analyzed as suspensions in aqueous solutions.

Sample synthesis involves chemical handling, including the use of acids and bases. Oxygen-sensitive materials require handling in an anaerobic chamber under an inert (4% H₂ - N₂) atmosphere maintained by compressed gas cylinders.

Sample analysis methods performed in this laboratory include dynamic light scattering (with enclosed laser), optical absorption spectroscopy and potentiometric titration. Additional sample analyses are performed at other locations at LBNL and on campus, and include x-ray diffraction, x-ray photoelectron spectroscopy, optical fluorescence spectroscopy and x-ray synchrotron methods performed at the Advanced Light Source.

In addition, computers are used for data analysis and manuscript preparation.

Analysis: Overall, this is a pretty good Description of Work. Areas for improvement might be to describe 70-120 in the same level of detail that 70-158 is, and to provide more specifics on the exact chemical identities and concentrations of the acids and bases that are used.

2. Description of Work (from a Work Group)

Working in laboratories 160 and 471 in Donner on basic research involving the determination of spatial 3D molecular organization of macromolecular machines in cells, tissues and microbial communities. Includes growing microbial cell cultures under aerobic and anaerobic conditions, labeling with a tag-specific reagent, followed by either chemical or cryo-fixation and subsequent workup for TEM, including water-organic solvent exchanges, resin infiltration and polymerization, sectioning and TEM analysis. Similarly, animals/tissues are fixed and subjected to TEM preparation. Chemicals handled include neutral salts, dilute acids and bases (below 0.1M) necessary to prepare buffers and nutrient media. Work also includes extensive computer work for research (3D volume reconstruction, inspection, visualization, and analysis), report, poster and presentation preparation and general communication.

Analysis: Also a pretty good description. Could be improved by detailing more specifically the equipment used to grow the cell cultures, cryo-fix (does the cryo-fixation require the use of liquid cryogenes, or is this performed by a machine?) and visualize using TEM. A more complete description of the use of animals (live? organs? tissues?) would be helpful.

3. Description of Work (from a Work Group)

Description of the Work that this Work Group performs and to which this analysis applies: There are three main tasks associated with this JHA. One is to make cables from superconducting wire. This requires that wire is re-spooled from the manufactures spool onto special spools that are mounted on the cabling machine. Once the spools are on the machine the wire from the spools is run over pulleys, passed through guides and around brakes prior to entering the roller assemble that deforms the wire into a rectangular. For details of the cabling machine see AHD 123 (60 STRAND EXPERIMENTAL CABLING MACHINE).

The second and third tasks requires the preparation of both metallographic samples to study the deformation of the strand due to cable and the measurement of critical properties of the wire that can change due to the cabling process. The critical current of the wire is measured at cryogenic temperatures between 4.2K and 77K.

General work objectives: There are two main objectives of this effort. One task is to take wire and fabricate rectangular cables that will be used in superconducting magnets. The other task is to characterize the cables, and the wire they are made from.

1. Work locations:

- a. Bldg. 52 and Bldg. 46

2. Materials used

a. During cabling of wires:

- i. Wires of Cu-Nb-Sn, Cu-Nb-Ti, Bi₂Sr₂CaCu₂O₈
- ii. Wire lubricate: RichardsApex (V-4BR) vanishing oil (hydrotreated naphtha petroleum)

- iii. *Pb-Sn solder*
 - iv. *Palmitic acid*
 - b. *Materials used during critical current measurements*
 - i. *Liquid helium, liquid nitrogen,*
 - ii. *Pb-Sn solder, Bi-Sn, and silver solders*
 - iii. *Stycast epoxy and LV24 hardener*
 - iv. *Solvents to clean parts and samples: Acetone and ethanol*
 - v. *Formic acid to remove Stycast epoxy from materials*
 - c. *Metallographic sample preparation:*
 - i. *Epoxy mounting material, polishing paper, and polishing compounds.*
 - 3. *Processes employed:*
 - a. *Cryogenic testing of materials*
 - b. *Use of mechanical equipment to process cable*
 - 4. *Equipment used:*
 - a. *Cabling equipment:*
 - i. *Wire re-spooling bench, optical micrometer, lathe, roller housing (Turks head) to deform cable, roll grinder.*
 - b. *Critical current measurements:*
 - i. *15T superconducting solenoid, two 1,000 A, 10V power supplies*
 - ii. *Sample mounting: soldering irons, hair driers,*
 - c. *Metallographic sample preparation:*
 - i. *Rotating dish polishing stations.*
 - 5. *Expected outputs:*
 - a. *Rectangular (Rutherford style) cables from various wires.*
 - b. *Critical current data of superconducting wire.*
 - c. *Resistivity measurements of the Cu matrix of superconducting wire.*
 - d. *Photographs of cable and wire cross sections.*

Analysis: Although somewhat lengthy, this is an excellent and complete Description of Work.

4. Description of Work (from an Individual JHA)

Using strong acids to prepare dilute solutions, digest samples, clean labware, and for other chemical reactions. The strong acids referred to here are the usual strong mineral acids, sulfuric, phosphoric, nitric, hydrochloric, hydrobromic, perchloric, and similar strong acids such as fluoboric, trifluoroacetic, triflic, and para-toluenesulfonic acids. This activity does not include either work with hydrofluoric acid or work with perchloric acid at temperatures above room temperature.

Analysis: an excellent description of the work at the activity level. The listing of materials included and excluded provides a good description of the “envelope” defining the further analysis. Should include listing of work locations.

5. Description of Work (from an Individual JHA)

All Work is described by the Work Groups above.

Analysis: This is a perfectly acceptable Individual description provided that it reflects reality. In this case the JHA showed that the individual has a Lockout-Tagout requirement at the individual level, which meant in fact that the work was not fully described by the “Work Groups above”. The lesson here is, if additional hazardous tasks are added at the Individual level, then the Description of Work for the individual needs to support the additions.

6. Description of Work (from an Individual JHA)

Responsible for daily coordination of hazardous waste technician team for picking up waste and managing the waste at hazardous waste handling facility including waste pick up, inspection, sampling, packaging and shipment.

Analysis: There is no discussion of work locations here – duties will differ depending upon whether the individual is at the Hazardous Waste Handling Facility or out in the field collecting waste. Also, the further analysis discusses a number of hazardous tasks (climbing ladders, working with engineered nanomaterials, driving forklifts among other), but there’s nothing in this description that would logically point an analyst to those tasks. This is a good start to a Description of Work, but needs additional amplification.

JJS/jjs

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