

## **SECTION B: CHAPTER 9: TRAINING**

Section 450-8.016(b)(1)(C) of County Ordinance Code Chapter 450-8, as amended by County Ordinance 2006-22<sup>1</sup>, requires Stationary Sources to train employees in the human factors program. The success of the human factors program at each Stationary Source relies heavily on employee (e.g., operator) input. Therefore, employees must have a basic understanding of human factors and should have specialized training to ensure that they can fulfill their specific responsibilities within the program. This chapter outlines the general requirements of a human factors training program that each Stationary Source should then customize to meet their particular needs. This chapter addresses identifying training participants (Section 9.1), initial training (Section 9.2), and refresher training (Section 9.3). Stationary Sources adopting an alternative method to the one presented in this chapter must consult with Contra Costa County Hazardous Materials Programs (CCHMP) representatives.

### **9.1 IDENTIFYING TRAINING PARTICIPANTS**

The training curriculum and participants at each Stationary Source will vary to some degree depending upon the programs that comprise the overall human factors program. Stationary Sources should recognize all employee responsibilities within the human factors program (e.g., human factors program development and review, incident investigation team member, management of organizational change team member, PHA team member, procedure writer, procedure reviewer, responsibilities to complete a latent conditions checklist, etc.). Stationary Sources should identify the employees that are best suited to fulfill those responsibilities. The Stationary Source should document the criteria used to identify training participants. All employees must receive human factors program training.

### **9.2 INITIAL TRAINING**

Initial human factors training applies to a Stationary Source when first subject to the Industrial Safety Ordinance (ISO) requirements (i.e., when the ordinance was first adopted or when a Stationary Source is determined to be subject to ISO requirements).<sup>2</sup> The Stationary Source should develop an initial training curriculum for each group of employees identified in Section 9.1. Initial human factors training should be provided to all employees currently working at the Stationary Source and upon hiring of new employees. Three general areas of initial training should be addressed: basic awareness of human factors; training on the overall Stationary Source's human factors program (once developed); and specialized training to ensure that employees can fulfill their specific responsibilities for implementing the program (e.g., completion of Latent Conditions Checklist, incident investigation team members). Stationary Sources must maintain documentation for initial employee training (i.e., course curriculum, instructor qualifications, course duration, course participants, and means used to ensure participants understood training). Stationary Source representatives should devise some method to verify that course participants understood the training.

### **9.2.1 BASIC AWARENESS TRAINING**

The concept of basic awareness training is to provide all employees with key fundamentals of: what are the concepts of human factors; what constitutes a human factors program; why it is being developed; and some level of understanding of the key terms used. Since a Stationary Source's human factors program must be developed with employee participation (Chapter 8), employees need to have a basic skill set before they can assist in developing a human factors program. All employees should be provided with basic awareness training on human factors. Each Stationary Source should develop and document their curriculum for human factors; however, the Stationary Source may find it beneficial to include:

- Philosophy and reasoning behind human factors
- Active failures versus latent conditions
- Types of active failures (e.g., slips, lapses, violations)
- Performance shaping factors – overview of categories
- Human failure analysis techniques
- Automation and impact on worker
- Management systems and human factors
- Possible effects of staffing, shiftwork, and overtime

Each Stationary Source should determine the most appropriate time for conducting training within the development of the human factors program. Employees involved in the initial development of the program need to have basic awareness training earlier than those employees not directly involved in the development of the written human factors program. As a result, the basic awareness training provided to these two groups of employees may be different. After the written program is developed, Stationary Sources may combine basic awareness training with the site's overall human factors program training.

### **9.2.2 OVERALL HUMAN FACTORS PROGRAM TRAINING**

After the Stationary Source's initial human factors program is developed, the workforce must be trained on the requirements of the program before it can be implemented. All employees must be provided with training on the Stationary Source's human factors program. The training should describe how the program elements are interconnected and who has overall responsibility for the human factors program and for each of the elements. The overall human factors program training should include general training on when to complete latent conditions checklists. Optionally, the overall human factors program training could include all the specialized training requirements identified in Section 9.2.3.

### 9.2.3 SPECIALIZED TRAINING

Prior to implementation of the human factors program elements (except employee participation), employees should have received a basic awareness training and training on the overall human factors program. After the basic awareness and overall training, initial specialized training should be performed before employees need to evaluate a human factors concept. Since every employee may not be involved with implementing the human factors program, specialized training should be tailored to meet the needs of those employees more directly involved. The following are examples of activities subject to specialized training:

- Employees participating in completing the latent conditions checklist, conducting PHAs, procedural PHAs, developing procedures, conducting management of organizational changes, and conducting incident investigations/root cause analysis should receive training or orientation that includes the human factors considerations required to be reviewed for each program.
- Employees responsible for completing the latent conditions checklist should be trained in properly completing the checklist and the need to truly contemplate each question (i.e., not simply checking boxes). This includes being trained to understand the specific reason for each question; relative importance of different questions; and degree to which items fail to meet the criteria.
- Employees should also be trained to understand that the focus of completing the checklist is to identify existing conditions that could cause someone to make a mistake not to assign blame.
- Employees responsible for procedure writing (e.g., operating, emergency, maintenance, safe work practices) should be trained in techniques for effective procedure writing.
- Employees performing management of organizational change (MOOC) assessments should be trained in the MOOC program and techniques developed by the Stationary Source.
- Employees responsible for completing the latent conditions checklist should be trained to properly analyze latent conditions questions receiving a "No" answer and encourage the development of recommendations that resolve "system" problems, not just the "checklist question".

The specialized training provided should explicitly describe how the programs, including incorporation of human factors, are to be implemented.

Many of the human factors programs described in the previous chapters of this guidance rely heavily on employees completing the latent conditions checklist included in Attachment A. Chapter 3 of this section describes how to customize/develop a checklist and how to apply the checklist. Employees should be trained to understand management's expectations for completing the checklist

and the issues listed in Section 3.2 (e.g., Personnel applying the checklist should be trained to view the checklist indicators as examples to lead the thought process).

### **9.3 REFRESHER TRAINING**

Employees should be provided with refresher training on each of the three topics discussed in Sections 9.2.1, 9.2.2, and 9.2.3 in accordance with the following schedule. Documentation must be maintained for employee refresher training as well as on each course (i.e., course curriculum, instructor qualifications, course duration, course participants, and means used to ensure participants understood training). The Stationary Source should consult with employees to determine the appropriate frequency and content of refresher training.

- Basic Awareness Training – Every three years, and more often if necessary, the Stationary Source should provide general human factors training. This training may be an extension of the material provided in the initial basic awareness training curriculum. Stationary Sources may elect to focus the training on latent conditions that are prevalent at their facility. Basic awareness refresher training may be combined with the overall human factors program training.
- Overall Human Factors Program Training – Every three years, and more often if necessary, the Stationary Source should provide refresher training to all employees regarding the human factors program
- Specialized Training – Stationary Sources should provide refresher training to employees who have specific responsibilities for implementing the human factors program (i.e., completion of the Latent Conditions checklist, incident investigation team members, those involved with procedure writing, management of organizational change team members). Although specialized refresher training should be provided on an as needed basis, the frequency of this training depends on the employee and their involvement with implementing the human factors program. Employees who frequently (e.g., monthly) perform tasks (e.g., complete latent conditions checklists) are not likely to need refresher training as often. Conversely, employees who complete tasks on an infrequent basis (e.g., annually) are likely to need refresher training before they need to complete the task as they are less likely to remember the training. Studies on training retention have shown that in as little as three days after training, most people remember 90% of what they do, 50% of what they see and hear, (30% of what they see, and 20% of what they hear).<sup>3</sup> At a minimum, Stationary Sources should provide specialized refresher training to appropriate individuals not involved with on-going implementation of the human factors program at least every three years. Stationary Sources should recognize that for select individuals it may be sufficient to provide just in time specialized refresher training than the traditional once every three years schedule.

## 9.4 ADDITIONAL TRAINING CONSIDERATIONS

- It is evident that some individuals are visual learners, some learn better by listening, and yet others learn by doing. Stationary Sources that recognize these traits in their employees and are able to modify their initial/refresher training programs to meet individual's needs may benefit greatly for their efforts.
- Most adults need to validate training they are provided instead of just accepting it at face value.<sup>2</sup> Adults also expect to use what they learn immediately, not years from now.<sup>2</sup> Stationary Sources are encouraged to structure their human factors training program such that it accommodates these traits.
- Stationary Sources should develop minimum qualification and experience requirements for those individuals assigned a role as a trainer in the human factors program. Those responsible for conducting basic, overall, and specialized human factors training should be well versed in the subject area.
- From audits performed by CCHMP, human factors program training conducted by knowledgeable individuals with group interactions has been more effective than computer based training. As such, Stationary Sources are encouraged to maximize person-to-person training for the human factors program with site-specific examples as part of the materials reviewed.

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<sup>1</sup> Modifications were made to the Contra Costa County's Industrial Safety Ordinance (ISO) in 2006. Major changes made to the human factors program requirements included: requiring changes to maintenance and emergency response staffing to undergo a Management of Organizational Change evaluation; and requiring human factors evaluations of maintenance safe work practice procedures and maintenance procedures for specialized equipment, piping, and instruments. Since the corresponding City of Richmond's Industrial Safety Ordinance has not been amended, Stationary Sources subject to the City of Richmond's ISO are encouraged to comply with the County ISO amendments.

<sup>2</sup> The City of Richmond adopted their own Richmond Industrial Safety Ordinance (RISO) in 2002 that requires regulated Stationary Sources to develop their human factors programs that also follows the Contra Costa County Safety Program Guidance Document.

<sup>3</sup> J. Mihall, H. Belletti, FDIC ADR Presentation Handouts, "Adult Learning Styles and Training Methods", February 1999