

University of Florida  
Division of Environmental Health & Safety

## **Chemical Hazardous Waste Management Training: Meeting Requirements, Managing Resources and Training for Effect**

*A look at strategies for training satellite accumulation area staff*

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### Introduction

As a Large Quantity Generator and as an operator of a Treatment, Storage and Disposal Facility, the University of Florida must meet the standards set forth in Parts 262, 264 & 265 in Title 40 of the Code of Federal Regulations<sup>1</sup>. As it applies to personnel training, UF must meet the requirements of 264.16, 262.34 and 265.16. That is, “facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility’s compliance with the requirements of this part” (264 & 265.16 (a)(1)) and “the generator must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies” (262.34 (d) (5) (iii)). The Division of Environmental Health & Safety at the University of Florida is charged with the responsibility of ensuring compliance at our storage facility and for providing compliance assistance to all UF hazardous waste generators. To that end, it is the policy of the University of Florida to provide appropriate training for staff that generate, accumulate, or handle hazardous waste.

Providing training on this scale has become an increasing burden. Determining who should receive training, scheduling the training, and documenting and maintaining the associated data are all part of the task. Current and incoming personnel must be made aware of the training and complete the training annually. At present, the University of Florida has an enrollment of

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<sup>1</sup> Title 40 U.S Code of Federal Regulations Parts 262; 264 & 265

approximately 45,000 students. Combined, the University of Florida and the University of Florida Health Science Center represent more than 1800 potential hazardous waste generating research laboratories as well as numerous maintenance operations that regularly generate hazardous waste. With the addition of newly constructed research facilities, the total number of satellite accumulation areas could top 2000 as early as the year 2005. Each Fall, the Division of Environmental Health & Safety provides Chemical Waste Management Training for all appropriate staff members and students. Nearly one half of one Full Time Employee (FTE) is currently devoted each year to the task of developing and providing classroom sessions for training. As the number of staff that require training increases, so will the time and effort involved. In an effort to improve the efficiency of the training program and to accommodate the growth of the training audience, the survey researched the current state of training across the country and to identify the keys to an effective training method.

### Information Collection and Organization

The purpose of the data collection was twofold. One purpose was to identify the characteristics of an effective and efficient training program for the University of Florida. The other was to provide insight to an audience of College and University Hazardous Waste Managers. To make the information useful to a larger audience, Information was collected not only from large universities, but from a list of colleges and universities across a broad size spectrum. Enrollment, including graduate and undergraduate students, was chosen to define size among universities. Enrollment totals ranged from 2,500 at a university teaching medical center to over 50,000 at a multi-campus land-grant research university. University information was collected via e-mail survey, via telephone and e-mail interviews, or by searching college and university web-sites. Information such as enrollment, method of training, method of registration, number of satellite personnel receiving training, number of annual trainees, frequency of training, target audience, number of personnel trained, percentage of accumulation areas represented in the training, satisfaction of the EHS staff, satisfaction of the laboratory or Satellite accumulation area (SAA) staff, any plans to change current method, and violations recorded during the period in which the current method has been in use (see Appendix A for copy of on-line survey) was collected. Survey information was solicited from participants in a Hazardous Waste Forum list-serve as well as from a selection of Hazardous Material Managers at colleges and universities developed during an internet search. The emailed on-line survey response was limited, but not unexpectedly so. An approximately 15-30 percent response was expected. Less than ten percent of those solicited, responded. Survey questions were answered for the most part in detail and additional discussion of the subject via e-mail response was also received. Additional Information on the variety of training, registration and data management in use was collected by visiting college and university environmental health & safety websites.

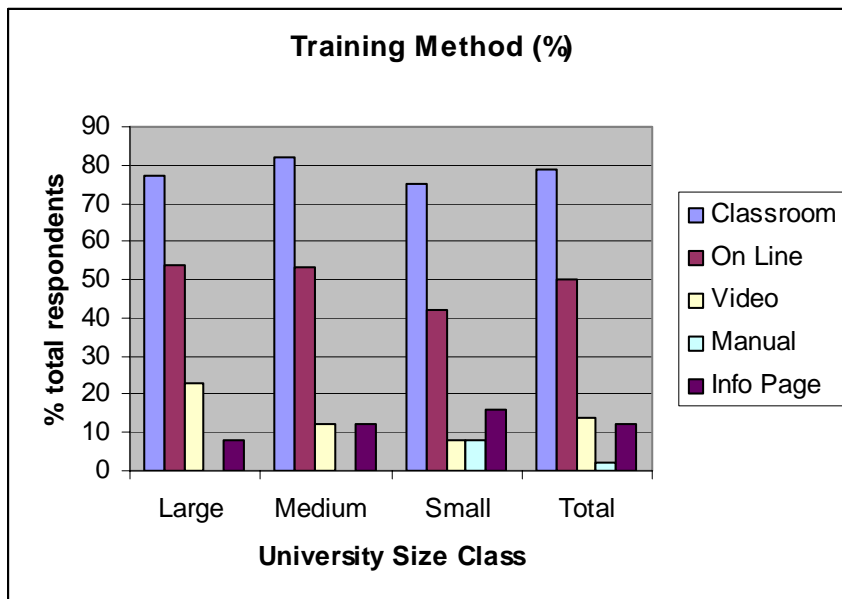
### Results

Unfinished and misinterpreted surveys led to an incomplete data set and limited the descriptive value of the information gathered. Due to the limited amount of information collected via the survey, inferences or conclusions could not be made about the effectiveness of methods for training used by the institutions involved. Rather, a description of the variety of methods in use and identification of the most common responses to the survey questions was possible. Some evaluation and comparison was made among the most commonly encountered training methods.

Judgments of the value of this information must be made by the individual, as statistical inference cannot be made considering the sample size. Information from the internet search and from the online survey was grouped into three college and university enrollment size classes: greater than 30,000 students, 15,000 to 30,000, and less than 15,000. The size of enrollment of the university or college was originally expected to predict the demand on resources and the need for training. Enrollment proved to be a poor means to determine the number of satellite accumulation areas and thus the number of persons to be trained. Little or possibly no correlation exists in the data set between the number of accumulation areas and enrollment, or between the number of trainees and enrollment.

Using survey and web-page information, descriptions of the training methods used, the registration methods used, and the target audience was made for each of the three university size classes. The survey questions allowed in some cases multiple answers as well as a fill in the blank “other” category. Respondents were asked to choose all answers that applied. Figure 1 illustrates the percentage of respondents using a particular method, but not that method exclusively. In fact, most respondents used a combination of methods. The most common training method among all three class sizes was the classroom session. Nearly eighty percent of all universities examined used regularly scheduled classroom sessions alone or in combination with other methods. On-line training, in the form of an on-line Power Point presentation or sequenced web pages, was popular as well. At least fifty percent of all colleges and universities examined had on-line training available. Between the three size classes there was little variation, much less a discernable trend. Other training methods encountered included training videos, on-line policy manuals in Adobe Acrobat format, and simple hazardous waste information web-pages.

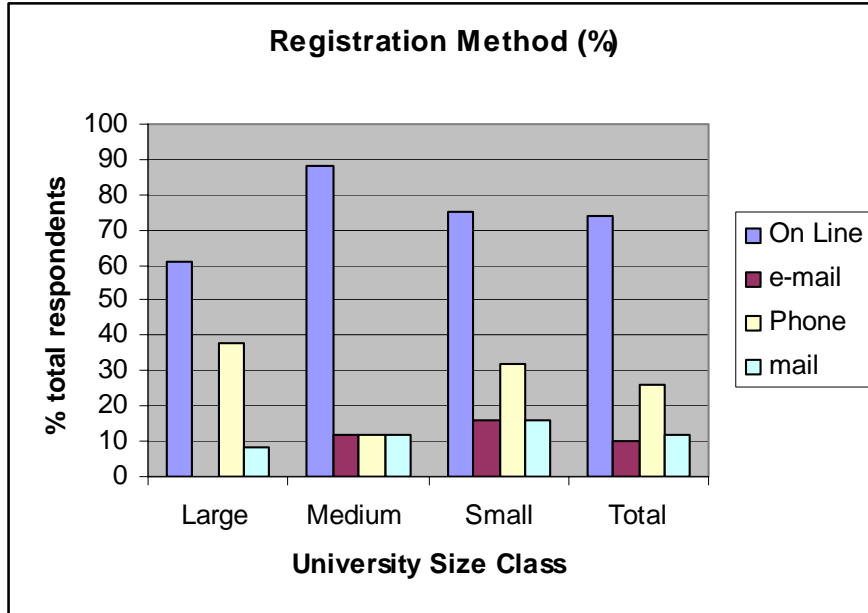
Figure 1. Size Class and Training Method



The most common registration method was on-line registration. Again, nearly eighty percent of all universities examined used a website to register trainees or to post training schedules. Figure

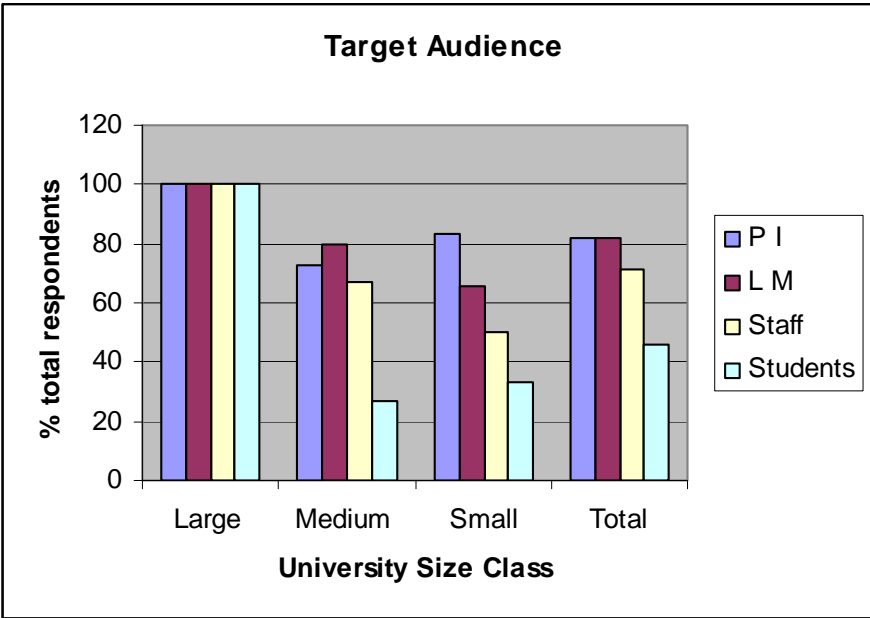
2 illustrates the clear choice of on-line registration over other methods. Other methods encountered include e-mail, phone registration, or mail in registration forms.

Figure 2. Size Class and Registration Method



The targeted audience for the training, according to the results of the survey, included principal investigators (PI), laboratory managers (LM), research staff, students, physical plant or maintenance staff, and EH & S staff. The primary targets were Principal Investigators and Laboratory Managers.

Figure 3. Size Class and Target Audience



Using the limited survey information, some evaluation of the most common methods of training, classroom and on-line training was made. The methods were compared using mean values for EHS and laboratory staff satisfaction, resources required in the form of percentage Full Time Employees (FTE) dedicated to training, and percentage of Satellite Accumulation Areas represented in the actual training audience. Little in the way of trends, distinctions, or differences was discovered. A confounding factor was the fact that very few programs used one method exclusively. This further reduced the sample sizes from which inferences may be drawn. What was left to be described was the multiple combinations of the two main methods along with other methods in use.

As part of the survey, Hazardous Waste Managers were asked to estimate the level of satisfaction of their staff and of the laboratory or SAA staff (the trainees) with the training program. Five different groups were compared, including single training methods and the different combinations of the training methods: the first group using classroom training only; the second group including all programs that used classroom training, the third group which includes those programs using just the combination of classroom and online training, but no other method; the fourth group including all programs using on-line training, and the last group which used on-line training exclusively. A graphical demonstration of these groups and of the comparison of the mean survey values for each group is provided in Figure 4. It was expected that a trend of increased satisfaction across a continuum from the group solely using the less preferred method to the group solely using the more preferred method would be observed. However, instead an ever slightly higher mean value for those programs using a combination of the two methods

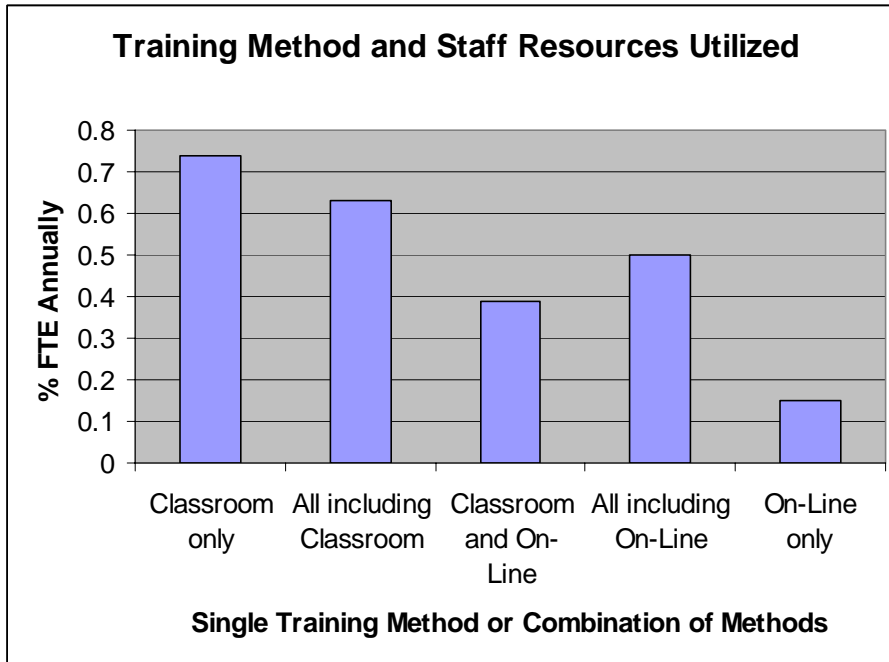
emerged. This held true for both the EHS staff satisfaction level and for that of the laboratory and SAA staff.

Figure 4. Training Method and Staff Satisfaction



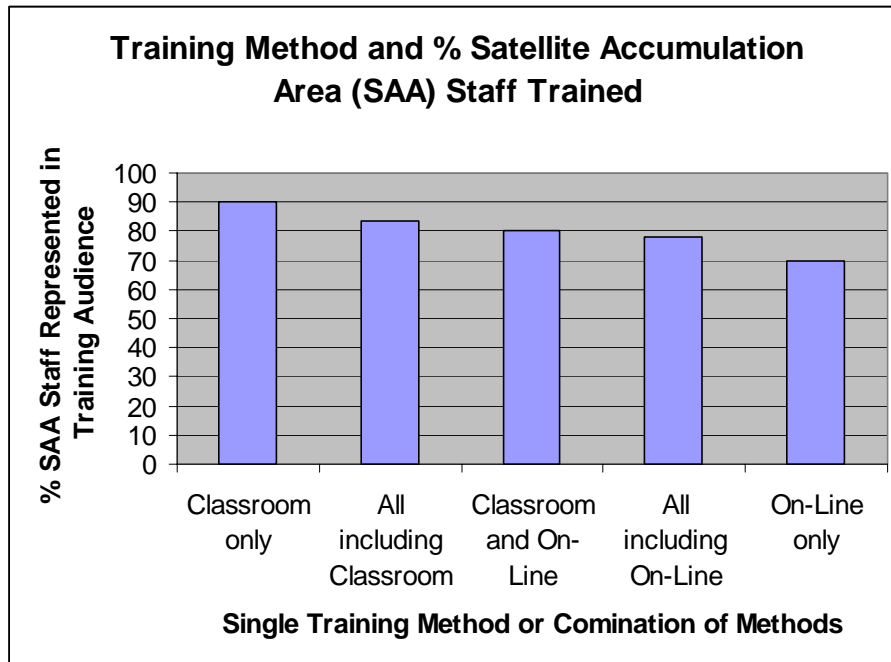
Another comparison was made using the same five groups involving the amount of staff resource (given in mean percentage FTE dedicated to the task of training). In this comparison the expected trend was demonstrated. Figure 5 displays a trend of lessening manpower utilized from the classroom only training group to the on-line only training group.

Figure 5. Training Method and Staff Resources Utilized



The last comparison made among the five groups was an attempt to connect training method to the success of training a high percentage of SAA staff. Hazardous Waste Managers were asked to estimate the percentage of SAA's that were represented by the group of persons trained. In other words they were asked whether or not the training methods were reaching the target audience. The slight trend shown in Figure 6 surprisingly favors the classroom method. It seems intuitive that the less time consuming on-line method would attract a greater audience and thus be more effective. In the absence of formal statistical analysis, however, any trend this slight may be well dismissed as a chance occurrence.

Figure 6 Training Method and % Satellite Accumulation Area (SAA) Staff Trained



### Conclusions

Despite the fact that the response to the survey was limited and the non-exclusive nature of some of the survey data confounded efforts to assign it meaning and perform formal statistical analysis, some conclusions or rather some suggestions may be made. The most common methods of training staff are the classroom training session and the on-line training session. In terms of staff satisfaction, a combination of methods seems to be the best liked. In terms of utilizing a minimum of resources to affect the training, on-line training is the most efficient. In terms of reaching the target audience, at best a weak trend towards classroom training was shown. Reaching the target audience seems best achieved by providing a variety of methods and opportunities. Though most respondents to the survey employed a combination of strategies in providing training, many suggested that they would be switching to an on-line system or Web based system in the near future. In terms of training registration, however, most programs were already using an On-Line system. Most On-Line training systems had been in use for three years or less. These programs will likely mature and see their effectiveness as assessed by these parameters increase with time. The last issue surveyed was compliance history, and the questions on that subject generated an unsurprisingly small data set. The overwhelming majority of respondents had no compliance issues and those who did had only minor concerns.



## University of Florida Hazardous Waste Management Training Survey

Results and analysis to be presented at the 22nd Annual College & University Hazardous Waste Management Conference, Virginia Tech University, Roanoke, Virginia.

All information will be kept strictly confidential, results will be presented without reference to any specific institution. Please complete the following questions as completely and accurately as possible. If you have any questions please contact Matt Doty at (352) 392-8400 or [mdoty@ehs.ufl.edu](mailto:mdoty@ehs.ufl.edu).

Organization:

Name:

Title:

Mailing Address:

City, State, Zip:

Phone:

Email address:

1. Please estimate the current enrollment (including undergraduate and graduate students) at your University/College

2. Please estimate the number of locations on campus that would be considered a satellite waste accumulation area (i.e. research labs, teaching labs, maintenance workshops, etc.)

3. Please estimate the number or percentage (if less than one) of FTE Full Time Employee(s) dedicated to the task of managing hazardous waste at your institution

4. Please estimate the number or percentage (if less than one of FTE dedicated to the task of providing annual hazardous waste management training (please include preparation, scheduling, training, and management of the associated data)

5. How long have you been using your current method of training?

- Less than 1 year     1 to 3 years     3 to 5 years     More than 5 years

6. How would you best describe your current method of providing hazardous waste management training? Check all that apply:

- Classroom session  
 Video/DVD  
 On-line/Web-based  
 Other

7. How would you best describe your current method of Notification /Registration? (How do you get the word out about training and how do your trainees sign up with you?) Check all that apply:

- Mail  
 Phone/Fax  
 On-line/Web-based  
 Other

8. How would you best describe your target audience? (Who is required by your department to receive your training?) Check all that apply:

- Principal Investigator
- Lab Manager
- Staff Scientist/Technician
- Student
- Other

9. Approximately how many persons receive training each year?

10. What percentage of the locations (labs, classrooms, workshops) considered satellite accumulation areas are represented in the training audience?

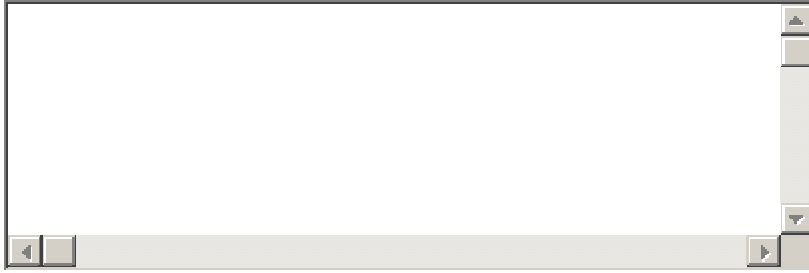
11. How satisfied are you with the current training method/program?

- Extremely Satisfied
- Very Satisfied
- Satisfied
- Dissatisfied
- Extremely Dissatisfied


12. How satisfied is your training audience with your training method/program?

- Extremely Satisfied
- Very Satisfied
- Satisfied
- Dissatisfied
- Extremely Dissatisfied

13. If you plan to change your current method of training in the near future, what new method will you choose to implement and why?

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14. If you have had any official RCRA compliance violations associated with your satellite accumulation areas during the period in which the current method of training has been in use, what was (were) the offense(s)?

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Would you like a copy of the results of this survey?  Yes  No