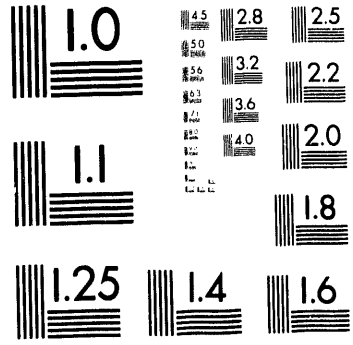
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Hazardous Materials Management and Emergency Response Training Center Needs Assessment

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HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE TRAINING CENTER NEEDS ASSESSMENT

K. A. McGinnis
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ABSTRACT

For the Hanford Site to provide high-quality training using simulated job-site situations to prepare the 4,000 Site workers and 500 emergency responders for known and unknown hazards a Hazardous Materials Management and Emergency Response Training Center is needed. The center will focus on providing classroom lecture as well as hands-on, realistic training. The establishment of the center will create a partnership among the U. S. Department of Energy; its contractors; labor; local, state, and tribal governments; and Xavier and Tulane Universities of Louisiana. This report presents the background, history, need, benefits, and associated costs of the proposed center.

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EXECUTIVE SUMMARY

For the next 30 yr, the main activities at the Hanford Site will involve the handling and cleanup of toxic substances. If the U.S. Department of Energy is to meet its high standards for safety, the thousands of workers involved in these activities will need systematic training appropriate to their tasks and the risks associated with these tasks. Meeting the training needs of the Hanford Site will be a challenge and must be met with explicitly designed hands-on, practical training in realistic situations for radioactive and mixed hazardous-radioactive materials.

The proposed Hazardous Materials Management and Emergency Response Training Center will provide a high-quality way to meet Hanford Site training needs. It will be an 80-acre hands-on training facility for hazardous material workers.

The hands-on props at the center can be justified based on regulatory training requirements, the desire for enhanced safety, and commitment to continuous improvement of training quality. All three elements must be considered because the regulations tend to describe broad goals but lack detailed guidance. The diversity of hazards, settings, and work tasks in environmental cleanup operations and the uncontrolled nature of the pollutants call for more in depth and focused skill training. The comprehensive training facility will permit the combination of classroom for providing basic knowledge through lectures and hands-on skill development and practice with devices and in settings that can provide challenges similar to those in the actual work environment.

The training center is cost effective because the annualized cost for providing hands-on training are insignificant and justified by the increased safety and performance it provides. The health, safety, and associated productivity improvements are estimated at $10 M/yr in avoidance costs.

The center creates a partnership among U.S. Department of Energy; its contractors; labor; local, state, and tribal governments; and selected institutions of higher education. The Hanford Atomic Metal Trades Council and the Central Washington Building and Construction Council give their undivided support of the training center. On an international level, support has been secured from Sheet Metal Workers International Association, Oil Chemicals and Atomic Workers, and International Union of Operating Engineers. Unions want to share in the core programs, props, and facilities using their own specialized trainers, training programs, and props as valuable adjuncts to the core program[1]. Labor has requested that national certification be a component of the training center, which is important to both Site workers and emergency responders. Certification would ensure that training is transferable and accepted across U.S. Department of Energy sites and eventually across all cleanup sites.

The U.S. Department of Energy requested Westinghouse Hanford Company evaluate the training center proposal. The evaluation, completed in November 1989, found it to be feasible. This study found that within the United States only a small number of facilities provide integrated technical training in a hands-on environment. This is grossly inadequate to train the thousands of people who require training on the Hanford Site and throughout the Northwest

[1]Ayre, Larry, 1993, *HAMMER Training Center-Compendium of Supporting Documentation and Advocacy Letters*, Ray Robinson and Associates, Kennewick, Washington.

region. This report presents the background, history, need, benefits, and associated costs of the proposed training center.

In summary, it is important that the U.S. Department of Energy proceed with the construction and operation of the center. This is justified by improved performance and safety and reduction in costs associated with injuries, deaths, work stoppages, and stand downs.

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LIST OF FIGURES

ACRONYMS

DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
FY	fiscal year
HAMMER	Hazardous Materials Management and Emergency Response
HMTUSA	*Hazardous Materials Transportation Uniform Safety Act of 1990*
NFPA	National Fire Protection Association
SARA	*Superfund Amendments and Reauthorization Act of 1986*
WHC	Westinghouse Hanford Company

HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE CENTER NEEDS ASSESSMENT

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

For the next 30 yr, the main activities at the Hanford Site will involve the handling and cleanup of toxic substances. If the U.S. Department of Energy (DOE) is to meet its high standards for safety, the thousands of workers involved in these activities will need systematic training appropriate to their tasks and the risks associated with these tasks. Meeting the training needs of the Hanford Site will be a challenge for the following reasons.

- While many training courses exist in hazardous material handling, few training facilities in the nation are explicitly designed to give hands-on, practical training in realistic situations; even fewer provide practical training for radioactive and mixed hazardous-radioactive materials.
- The facilities are aged at the Hanford Site and special attention must be given to occupational safety.
- The Hanford Site has many unique needs that require a specific training infrastructure.
- Emergency response for DOE shipments is the primary responsibility of state, tribal, and local governments. A collaborative training initiative with the DOE will strengthen emergency response off the Hanford Site.
- The annualized cost for providing Hazardous Materials Management and Emergency Response (HAMMER) hands-on training are insignificant; amounting to about a 6% increase in the total training budget and is easily justified to increase safety and performance.
- The health, safety, and associated productivity improvements are estimated at $10 M/yr in avoidance costs.

The proposed HAMMER Training Center will provide a cost-effective, high quality way to meet Hanford Site training needs. HAMMER creates a partnership among DOE; its contractors; labor; local, state, and tribal governments; and selected institutions of higher education. Through this partnership, HAMMER can ensure the following.

- Provide training appropriate to Hanford Site needs.
- Create a highly-skilled work force for meeting the cleanup needs of the broader complex.

- Support the diversification of the regional economy surrounding the Hanford Site.

This report presents the background, history, need, benefits, and associated costs of the proposed HAMMER Training Center.

1.2 BACKGROUND

HAMMER is a joint initiative between DOE and local officials. Recent federal and state laws require specific training for all persons who may work with or come into contact with hazardous materials. Foreseeing this, local government officials explored the idea of a central specialized shared-training facility with the Hanford Site. The Tri-County Fire Commission and the Benton-Franklin Regional Council requested that DOE conduct a feasibility study of HAMMER through Congressman Sid Morrison.

The DOE subsequently asked Westinghouse Hanford Company (WHC) to evaluate the HAMMER training center proposal. The evaluation, completed in November 1989, found HAMMER to be feasible. This study found that within the United States only a small number of facilities provide integrated technical training in a hands-on environment. This is grossly inadequate to train the thousands of people who require training at Hanford and throughout the Northwest region. (WHC-EP-0319 1990)

Public concern about hazardous material shipments is high and well documented in the Northwest. Recent public surveys showed that the public does not support the transportation of waste to and from the Hanford Site. These surveys found that more than 56% of Washington and Oregon state residents believe that leaving waste at the Hanford Site is safer than transporting it for permanent disposal. The Northwest states are concerned that this perception could hamper the transport of waste out of the Site and impact its cleanup. The public's primary concern is the emergency responders' ability to handle transportation accidents. The states believe HAMMER could solve many of these transportation emergency response concerns. As such, the state representatives actively participate in HAMMER and are members of the HAMMER Steering Committee (Ayre 1993).

Tribal governments are often not prepared to respond to radiation accidents on their reservations, as documented in a 1990 Nuclear Regulatory Commission survey (Vilardo et al. 1990). Tribal emergency response concerns have continually been raised to DOE. In October 1991, the Shoshone-Bannock Tribe blocked a waste shipment from Colorado to the Idaho National Engineering Laboratory. Their primary concern was transport safety and emergency response. HAMMER will address many of the tribal needs for emergency response training (Ayre 1993).

Labor has joined the HAMMER partnership. The Hanford Atomic Metal Trades Council and the Central Washington Building and Construction Council give their undivided support of the training center. On an international level, support has been secured from Sheet Metal Workers International Association, Oil Chemicals and Atomic Workers, and International Union of Operating Engineers. An increasing number of other interested union representatives have become aware of the HAMMER concept and want to share in

the HAMMER core programs, props, and facilities using their own specialized trainers, training programs, and props as valuable adjuncts to the core program (Ayre 1993). Labor has requested that national certification be a component of HAMMER, which is important to both Site workers and emergency responders. Certification would ensure that training is transferable and accepted across DOE sites and eventually across all cleanup sites.

Xavier and Tulane Universities of Louisiana will lead the process of accreditation. Linkages with these universities also will supplement the academic linkages established between Columbia Basin College and HAMMER for the curriculum development.

1.3 PROGRAM AND FACILITY

HAMMER will provide training needed by workers and management involved in hazardous waste cleanup and emergency response. This includes the following:

- Hazardous waste operations (e.g., site worker, management, sampling, and waste designation)
- Hazardous materials responder certification (e.g., awareness, training and orientation for technician, specialist, and on scene incident commander)
- Enhanced hazardous material training (e.g., medical response and inspection practices)
- Emergency incident management
- Radioactive mixed waste management, transportation, and emergency response
- Transportation (e.g., waste and material shipment)
- Live fire training
- Craft, specific skills, and hazards recognition.

HAMMER will provide a centralized regional site dedicated to hazardous materials workers and emergency responders. An 80-acre site near the Southern edge of the Hanford Site, off Horn Rapids Road, has been set aside for HAMMER development by DOE.

A table of existing courses that will be taught at HAMMER Training Center is provided in Appendix A.

Realism for hands-on training will be obtained via simulated hazardous material handling and incident sites. The scenarios will include props, hazardous materials transport and storage equipment mockups, and emergency response equipment to simulate potential incidents given various conditions.

The field training laboratories and props will be multipurpose and flexible. Hazardous materials props include the following:

- Simulated flammable liquids and gases training facilities, and props
- Radiological training props
- Generic hazardous materials holding and transportation props (i.e., petroleum tanks, tank trucks, rail cars, and pipelines)
- Spill containment simulation area
- Laboratory area for chemical compound training and laboratory emergency response training
- Respiratory equipment training facilities
- Equipment familiarization and operation area
- Commercial building interior for emergency response facilities.

Hanford Fire Department and mutual aid fire department training will be incorporated into HAMMER. A new facility is needed to fully and adequately train and test fire department personnel in all aspects of fire suppression, rescue, salvage, and hazardous material incident control and mitigation. The limited training facilities currently available to the Hanford Fire Department are lacking the hands-on training aids that HAMMER can provide, such as (Dohrer 1992):

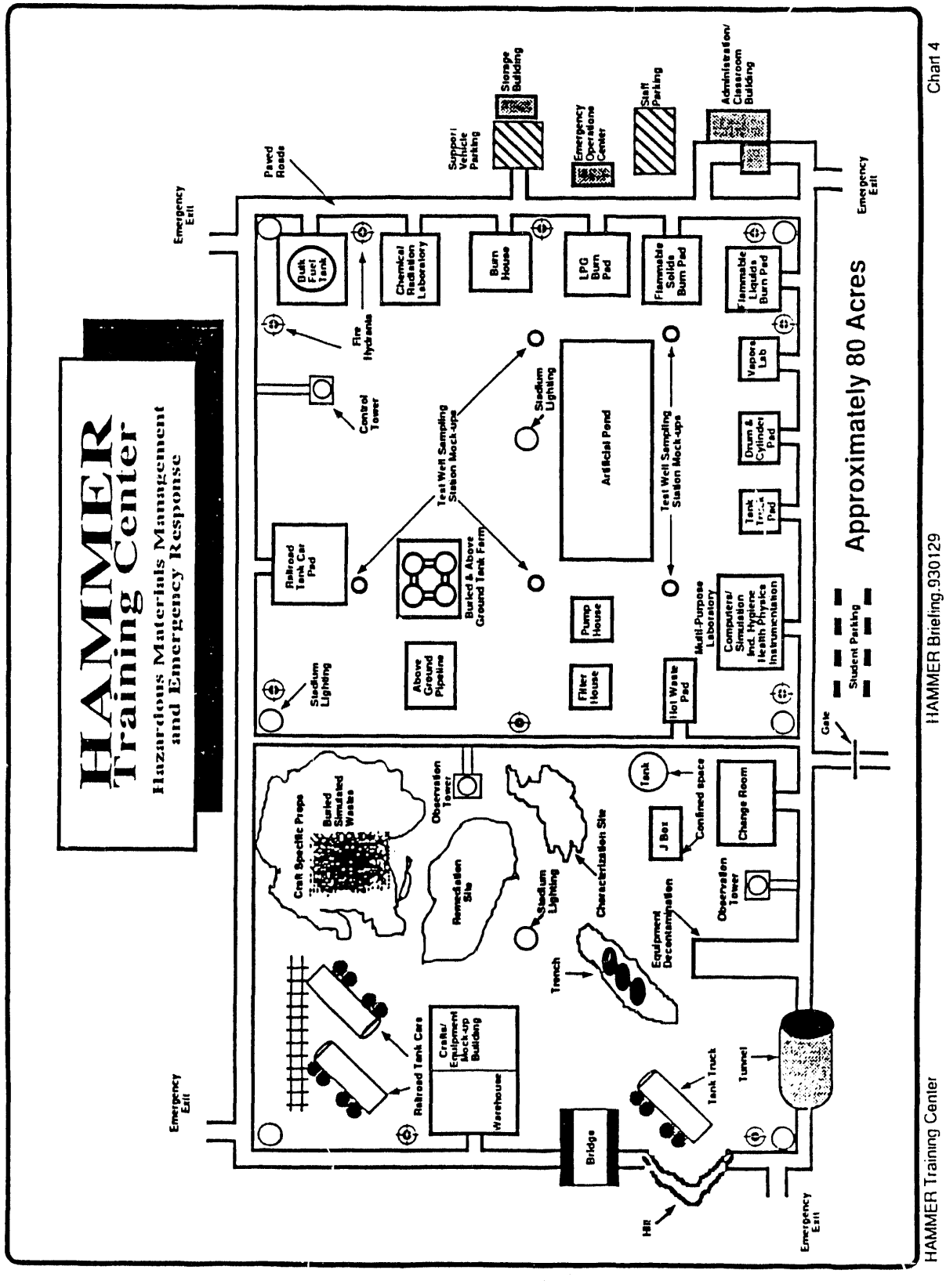
- Flammable solids burn
- A training tower with live fire capability on 1 or 2 floors
- Flammable liquid and gas burn pads
- Simulations of laboratory and process spaces
- Mock-up doors, windows, and roof structures
- Hazardous material spill or leak containment area
- A driver and fire evolution training and testing area.

Practical exercises will allow various entities responsible for management, control, and recovery to work together. The proposed facility will also be sited to allow construction and simulation of tunnel and bridge incidents, which can limit access by responders and complicate control and recovery operations. Figure 1 shows the preliminary plans for HAMMER.

Support facilities are required including ten classrooms, administrative offices, lunchrooms, shower rooms, run-off containment and separation facilities, ample parking space, and appropriate storage areas.

Organized labor has plans and financing for overnight accommodations for students on the City of Richland-owned land across the road from the HAMMER Site.

Figure 1. Training Center Layout.



2.0 DIRECT BENEFITS AND NEED FOR HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE TRAINING

2.1 REGULATORY REQUIREMENTS

In March 1989, Title 29 Code of Federal Regulations Occupational Safety and Health Administration 1910 rules and National Fire Protection Association (NFPA) Standard 472 defined professional requirements for responders to hazardous materials incidents. Two general types of training are addressed for hazardous materials: training for hazardous waste site workers and training for emergency response organizations. Site workers include both workers and managers. Emergency response organizations include fire departments, law enforcement agencies, emergency medical services organizations, and others (WHC-EP-0319 1990).

The law requires training at some level for essentially all persons who may work with or come into contact with hazardous materials. The regulations cover private enterprises and federal, state, and municipal governments. The law went into effect in March 1990 (WHC-EP-0319 1990).

These new requirements are driven by the *Superfund Amendments and Reauthorization Act of 1986* (SARA) Title II rules, which identify far-reaching training requirements for emergency planning, community "right-to-know" education, and emergency response (WHC-EP-0319 1990).

NFPA Codes and Standards are written to ensure that minimum safety and health standards are specified for the organization, training and education, vehicles and equipment, protective clothing and equipment, emergency operations, facility safety, and medical requirements of fire departments. The NFPA standards require fire department facilities comply with all legally applicable health, safety, building and fire requirements. The standards further require that formal training and the demonstration of a variety of skills be accomplished, documented and certified to ensure that fire department personnel will be able to perform their assigned tasks swiftly, safely and with competence. Meeting these training standards, particularly those that have a requirement to demonstrate by actual use, entails the use of facilities ranging from class rooms and administrative space to highly specialized hands-on structures (Dohrer 1992).

On November 16, 1990 the *Hazardous Materials Transportation Uniform Safety Act of 1990* (HMTUSA) of 1990 was signed into law. It has several new provisions for emergency response planning and training, including the following:

- Establishes a $5 M/yr state grant program to develop and implement emergency plans and determine the need for regional response teams
- Establishes a $7.8 M/yr state grant program to states for training public-sector employees to respond to hazardous materials accidents
- Establishes an interagency commission to set a national curriculum for training public-sector emergency response personnel

- Requires the U.S. Department of Transportation (DOT) to set training standards for all workers' transportation activities, including emergency preparedness training

- Requires shippers and carriers of certain hazardous commodities to register and be assessed annual fees to fund training and planning grants.

HAMMER will help comply with the planning and training provisions of the HMTUSA. It will be designed and built to allow flexibility and adaptability to meet the national emergency response curriculum being developed. DOT representatives have indicated they are interested in backing HAMMER as a potential pilot project for HMTUSA.

2.2 THE PROVISION OF HIGH QUALITY TRAINING AND CONTINUOUS IMPROVEMENT

The hands-on props at HAMMER can be justified based on regulatory training requirements, the desire for enhanced safety, and commitment to continuous improvement of training quality. All three elements must be considered because the regulations tend to describe broad goals but lack detailed guidance. The diversity of hazards, settings, and work tasks in environmental clean-up operations and the uncontrolled nature of the pollutants call for more in depth and focused skill training. The comprehensive HAMMER facility will permit the combination of classroom lecture for providing basic knowledge and hands-on skill development and practice with devices and in settings that can provide challenges similar to those in the actual work environment. Thus, HAMMER will address many of the issues identified by the Office of Technology Assessment related to training workers to recognize unexpected dangers and respond safety (Office of Technology).

A high quality of performance on the part of Hanford Site workers and others trained there can be expected as the outcome of the following central characteristics of the training program formula provided by the HAMMER Training Center:

- Focus on the hazards and tasks associated with hazardous and radiological materials management and emergency response pertinent to DOE site cleanup and restoration activities

- Accreditation of training for DOE site cleanup activities that will establish standards

- Hands-on, true-to-the-work-setting experience provided by the HAMMER props.

These three characteristics of the HAMMER Training Center concept serve to ensure that the regulatory standards also will not become "a ceiling as well as a floor" with respect to the training provided to Hanford Site workers and others. This is fitting and proper because of DOE's commitment to continuous improvement in the operation of its sites, and the recognized need to prepare workers as completely as possible for dealing with the known and unknown hazards associated with environmental cleanup and restoration.

A particularly important feature of HAMMER will be its capability to provide high-fidelity training situations using the various props and simulated job-site conditions. The importance of the availability of training props for quality training is supported by the literature on the bases of training effectiveness and high levels of transfer from training to the actual job. Props and simulations can serve to provide the immediate and precise feedback that is important to the speed and retention of learning. Students' motivation to learn is enhanced by access to training that they perceive as relevant and effective. Workers and emergency responders can benefit greatly from tailored hands-on practice opportunities through the creation of both routine and operationally critical and seldom encountered conditions, in conjunction with classroom training, self study, and continuing education.

Also, it is not possible to assume that because a worker has been exposed to a training course that the knowledge or skill has been learned. The opportunity to observe students actually performing skills and tasks allows for a more objective evaluation of the students' learning and their ability to transfer their knowledge and skill to the job. Props and mock-ups of particularly hazardous tasks and work settings for training can reduce not only the risks of on-the-job training but also reduce the amount of time necessary to bring new workers into specific work settings. Access to this type of comprehensive training facility clearly demonstrates to students and instructors alike DOE's commitment to enhancing safety through the application of state-of-the-art training environments and devices for thorough training of site cleanup workers.

2.3 TRAINING OPPORTUNITY FOR A LARGER WORKER POPULATION

The current classroom space for Hanford Site-related training is insufficient. The current principal facility, the Technical Training Center, is housed in a converted warehouse. Besides the facility offering only limited flexibility for creating a variety of instructional settings, some classroom conditions are less than optimal as a result of the building having been retrofitted from another purpose. Even with the Technical Training Center, there is a shortage of classrooms for the training needs at the Hanford Site. This shortage exists in the Northwest region and beyond for emergency response and other hazardous materials training facilities.

HAMMER will address the lack of an adequate training facility for the Hanford workers and the Northwest region. For example, basic use for the facility under full operation has been estimated to be as follows (WHC-EP-0319 1990; Ayre 1990):

- About 1/4 M person-hours of training focused on enhancing safety and productivity in the work place and during emergencies annually
- Training output of about 30,000 person days of training per year (averaging about 100 people each day)
- Offsite visitor training estimated 12,000 person days per year.

Analyses as part of the original feasibility study combined with updated from additional users also indicate that there is considerable demand for a training facility such as the HAMMER Training Center. Estimates of the magnitude of this demand are as follows (WHC-EP-0319 1990; Ayre 1990):

- Potential DOE and contractors' students:

  4,000 Hanford Site workers handling hazardous materials (plus retraining/turnover)

  150 Hanford fire fighters and emergency responders

  250 Mutual Aid responders that respond to Hanford emergencies.

- Other Federal agencies, state, tribal and local workers and responders beyond the Hanford Site work force:

  30,000 Potential hazardous materials workers and fire fighters
  1,800 Hazardous materials responders
  5,000 "Niche" training drawing nationally
  800 Hazardous materials incident commanders.

- Organized labor and others beyond the permanent Hanford Site work force:

  20,000 Organized labor
  1,000 Responders, scientists, and technicians
  10,000 Private, public, and other government sectors.

2.4 ACCREDITATION

Accreditation of the HAMMER training program will enhance, standardize, and reduce the duplication of training. It will ensure that training is transferable and disseminated among the DOE sites and that HAMMER trained workers are accepted for work. This benefits the workers, industry, DOE, and others. An eventual goal that labor has asked HAMMER to undertake is accreditation of HAMMER training at all cleanup sites across the nation to further reduce duplication of compliance training.

Xavier and Tulane Universities of Louisiana will lead the process of national accreditation of HAMMER training. Xavier and Tulane are exceedingly well qualified and have the credibility to establish an Independent Accreditation Board that represents the interests of the HAMMER partners. The Independent Accreditation Board will seek input from labor, management, academia, appropriate governmental agencies, and others as deemed necessary. Broad-based input will lead to a systematic approach that incorporates and represents the various federal agencies having jurisdiction in hazardous materials and worker safety training. Specific agencies will include the U.S. Department of Labor; Occupational Safety and Health Administration; Federal Emergency Management Agency; DOT; U.S. Environmental Protection Agency; and other federal, state, and local agencies.

3.0 INDIRECT BENEFITS OF HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE TRAINING

3.1 PARTNERSHIP WITH STAKEHOLDERS

HAMMER will operate as partnership. Oversight and policy for HAMMER will be at the direction of the HAMMER Steering Committee. The Steering Committee is made up of representatives from Hanford Atomic Metal Workers Trade Council, Building and Construction Trades Council, Oil, Chemical and Atomic Workers Union, International Union of Operating Engineers, Washington and Oregon state, the Confederated Tribes of the Umatilla Indian Reservation, Yakima Indian Nation, Nez Perce Tribe, various local governments, the fire service, and community development.

The WHC's International Environmental Institute's Not-for-Profit (501C6) Foundation will operate the HAMMER Facility at Hanford in partnership with the DOE and its Contractors and the stakeholders. This was a mutual agreement with WHC senior management and the HAMMER Steering Committee. The International Environmental Institute is an organization established to help identify, adapt, apply, and share the best environmental cleanup technologies available and provide necessary training to enhance safety, environmental protection, and emergency response. HAMMER with its established linkages and partnership is the key initiative of the International Environmental Institute.

Labor has a compelling interest and has demonstrated competency in HAMMER-type training. Labor adds valuable expertise and resources including the knowledge from lessons learned and nationally recognized training programs. The participation of Labor also provides economies of scale and broadens the support for the necessary capital and operating funds. Broad-based support has been secured from many individual unions and major labor councils (Ayre 1993). Two International Union Presidents sit on the Steering Committee.

3.2 MULTI AGENCY ALLIANCE

The Federal Emergency Management Agency is interested in using HAMMER as their West Coast National Fire Academy. As such, the Federal Emergency Management agency will bring their courses to HAMMER, which will provide the fire service industry more regional access and relieve the overloading at National Fire Academy in Maryland. Meetings with the U.S. Environmental Protection Agency found a strong need within the Agency for access to a hands-on training center and expressed support for the concept and interest in using HAMMER. The DOT has emergency response training money from the new HMTUSA. Early discussions with the DOT indicate interest in considering the use of the HAMMER facilities as a pilot project for the HMTUSA.

3.3 TRAINING THE LARGE UNDERTRAINED NON-HANFORD LABOR POOL AND OTHER EDUCATIONAL OPPORTUNITIES

Industry needs to find credible, cost-effective means for training individuals to work in hazardous environments. HAMMER will have enormous impact in the Northwest for the U.S. Environmental Protection Agency, U.S. Department of Defense, and other cleanup sites. Unlike Hanford, much of the Northwest has a large labor pool virtually untrained in hazardous and radioactive waste cleanup practices.

HAMMER would provide extraordinary access to potential workers in Oregon and Washington to assist and upgrade technical skills and thereby provide a large labor pool for newly developing hazardous waste enterprises. This would be facilitated through HAMMER's linkages and partnerships with colleges and universities including Columbia Basin College, Xavier and Tulane Universities of Louisiana, and many others through the Partnership in Environmental Technology and Education.

College credit courses qualifying towards degree programs will be developed for workers seeking training and continuing education or degrees, and for professionals at the bachelors, masters, and doctoral levels. Fundamental training programs will be linked to advanced training programs teach the skills required for transferring cutting edge technology in waste management to industry, and vice-versa. Courses will be offered to graduate students in environmentally oriented programs, scientists, and graduate students who are involved in research on hazardous materials and the commercialization of technology.

3.4 POTENTIAL FOR DRAWING HAZARDOUS MATERIALS AND WASTE INDUSTRIES

There are few industries in the nation in which technological change is expected to occur at a rate faster than that of the environmental cleanup. This has and continues to cause a shortage of environmental scientists and engineers at Hanford and across the Northwest.

Commercial firms involved in environmental restoration and waste management are similarly interested in training for management and scientific personnel who must also work in such hazardous environments. Training in a broad spectrum of skills will address industry's common criticism of environmental training programs at universities - programs tend to produce knowledgeable individuals, but ones that are not ready to go to work and deal with the practical, often health-threatening issues involved in the industrial environment.

Hanford must be prepared to transfer technology to the commercial sector at a rapid rate to return the Federal government's investment, to the taxpayers. HAMMER Programs will be developed to train commercial sector workers with pilot testing of, and experimentation on, new safety oriented technologies intended for use in hazardous environments.

3.5 TRAINING IS AN INDUSTRY

HAMMER will last beyond Hanford Site restoration and remediation. As primarily a user facility, labor unions, several federal agencies in addition to DOE, and colleges and universities will train at HAMMER. Unions are very serious about training; it is their best access to the job market and best way to enhance safety for their workers. Labor unions are strong proponents of HAMMER; once the facility is built they will bring workers to Hanford to train at a state-of-art facility (Ayre 1993).

Private industry will use the HAMMER Training Center, which will spread the cost of operating HAMMER. Bringing industry representatives to HAMMER creates opportunities to showcase Hanford expertise, diversification activities, and opportunities for investment.

The 80-acre HAMMER Training Center area has been selected close to the Site boundary, which is an ideal location for Site workers, visiting instructors, and offsite trainees.

The economic benefits associated with training thousands of visitors each year are enormous for the local communities. Direct benefits include increased employment and trade in the service sector, particularly for restaurants and hotels. The workforce is estimated to increase by approximately six new direct HAMMER operating jobs, plus instructors supporting other agencies and organizations and additional secondary jobs. Outside visitors associated with center's activities are expected to pay about $1.2 M/yr in lodging, meals, and incidentals. Indirect benefits include increased positive visibility within the region and enhanced perception of Hanford's commitment to training for safety and environmental protection.

4.0 CONSTRUCTION AND OPERATION COSTS ASSOCIATED WITH HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE TRAINING CENTER

4.1 DIRECT COSTS

The capital construction costs were estimated by the Army Corps of Engineers (see Appendix B) (Army Corp of Engineers 1993). An itemized cost estimate was prepared for 40 items, including building and props; construction management, and planning, engineering and design. The costs are estimated for a compressed construction schedule to implement HAMMER in parallel with DOE's substantial efforts to develop its site training programs and related props and facilities in support of the waste cleanup programs.

Operating costs are estimated at roughly $3 M, of which DOE portion is estimated at $2 M, annually and the remaining will come from other sources. HAMMER will be staffed by a small operating organization assigned to facilitating the use of the training center. Functional areas include management, administration, program control, maintenance of the broad based partnership, and a select group of subject matter experts in worker training and emergency response.

During fiscal year (FY) 1994 operating funds will be used for seed money to formalize the partnership arrangements with labor, states, and local organizations; to identify and pursue additional Federal, state, and private funding mechanisms; to continue the outreach with labor, states, tribal, and local government officials; to operate a temporary facility; to continue the specialized training activities for Northwest responders; and for early planning and development for curriculum and accreditation.

Potential sources for operating funds, in addition to the DOE, include the U.S. Department of Defense, Federal Emergency Management Agency, state, private industry, and labor. Funding from these other potential sources will be explored with the appropriated seed money. Early discussions with DOT have found favorable interest in using HAMMER facilities as pilot project for the Federal Emergency Management Agency. The Federal Emergency Management Agency has stipends to fund the emergency responders to attend training. Funding and support will be explored from managers and commercial shippers of hazardous waste, including low-level waste, and others.

Following are the estimated costs for construction, operations, and accreditation.

FY 1994

$12 M capital for HAMMER Facility at Hanford
$ 2 M seed money for planning and operating costs at Hanford
$ 6 M planning and accreditation costs for Louisiana
$20 M TOTAL FY 1994

FY 1995

$17 M capital for HAMMER Facility at Hanford
$ 2 M operating at Hanford
$ 3 M operating and accreditation costs for Louisiana
$22 M TOTAL FY 1995

FY 1996

$ 2 M operating costs at Hanford
$ 3 M planning and accreditation costs for Louisiana
$ 5 M TOTAL FY 1996

4.2 INCREMENTAL COSTS ASSOCIATED WITH HAMMER

The Hanford Site spends $51 M/yr training its workforce. This training is conducted without adequate props or classroom space. The additional capital cost is $29 M for HAMMER construction or about $1 M/yr annualized over the life of cleanup activities. The total DOE cost per year for HAMMER is $3 M which includes $1 M capital and $2 M/yr for operating. This represents a 6% increase in cost for significant increases in safety associated with state-of-the-art props.

The potential exists for substantial savings of time and money if HAMMER's special needs and contributions are factored in early in design. This includes offsetting costs from building several training centers at Hanford for fire training, emergency response, and hazardous waste worker training as well as additional requirements for classrooms and administrative offices. For example, a shared facility with the Hanford Fire Department will result in cost saving of about $3 M for a small fire training center that would be built as part of an approved DOE project called LO-94.

4.3 INDIRECT COSTS AND COST AVOIDANCE

The indirect costs associated with inadequate training are increased health and safety risks including occupational fatalities as identified by the Office of Technology Assessment. In addition, too many of the safety hazards associated with conventional construction operations such as operation of heavy machinery, electrical hazards, and confined space operations, workers involved in characterization or remediation of toxic waste sites may encounter fire and explosion hazards, as well as, the health threats associated with exposure to toxic chemical and radiation levels. Cleanup workers at DOE facilities will also encounter high-level radioactive waste and mixed waste. It is not known what specific health risk cleanup workers face. Research has demonstrated several ways of reducing workplace injury rates including effective workers health and safety training (Office of Technology).

The deaths of two workers at Hanford in 1992 and 1993 and other fatalities across the DOE complex substantiate the Office of Technology Assessment's conclusions. The potential costs associated with fatalities include settlements to the worker's families amounting to about

$1.0 M per victim, court fees, and investigation expenses sometimes equalling the family settlements. If HAMMER prevents one death per year at Hanford it will easily pay for itself.

The issue addressed here is not whether DOE is meeting existing training rules and requirements but rather what training is actually needed for the Hanford worker and emergency responder to be able to carry out their assignments safely, cost-effectively, and in accordance with prescribed schedules. The depth, breadth, quality, and repetitiveness of training necessary for workers and emergency responders to cleanup and restore the Hanford Site safely and cost effectively is unprecedented in the history of waste management and remediation operations.

Regulations and requirements have been promulgated and enforced for routine cleanup and restoration activities relative to the Environmental Protection Agency's enforcement activities since its inception 12 years ago. Even these rules and requirements have been subjected to widely varying degrees of interpretation and application in the field. Efforts to standardize the interpretation and implementation of the existing statutes and resulting policies and procedures have been active for well over a year with no indication of when such clarifications will be finally issued. Even when these clarifications are issued they primarily address the norm of cleanup and restoration activities and not the extremes like those found at Hanford.

Consequently, DOE finds itself in a situation at Hanford and several other sites where it must provide worker and emergency responder training that not only complies with the most strict interpretations of the existing regulations, but does more. Worker and emergency responder training must also provide DOE with the human resources to carry out its cleanup and restoration mission safely, cost-effectively, and in accordance with its evolving schedules and commitments. HAMMER provides the capability of fulfilling these criteria.

HAMMER training is estimated to provide $10 M in cost avoidance benefits per year because of the following health and safety and productivity improvements resulting from hands-on simulated training compared to existing or more conventional class room training

- 50% reduction in deaths: reduction of 0.215 deaths per year at $0.43 M ($1.0 M in settlements; $1.0 M in accident investigations, legal, and other costs; national 1990 statistics for all industries = 8.6 deaths per 100,000 workers (National Safety Council 1991); 0.43 estimated deaths per year at Hanford performing hazardous material and waste management operations).

- 50% reduction in number and severity of lost time injuries affecting current year's productivity: estimated at $100,000 per year or the equivalent of 2 person-years per year loss of productivity (1.8 M disabling injuries in 1990 for all workers; 73 per year decreasing to 36 per year with the impact on lost time at 2 times national average or 4 person-year per year decreasing to 2 person-year per year).

- Reduced lost time, illness, and disease in years following the year of lost time injury: 2:1 increase in illness and disease because of hazardous materials work reduced to 1:1 estimated at $100,000 per year (national fire fighters union safety officer, Les Murphy, verbally reported a 6:1 increase in injury and disease from fire fighters responding to hazardous materials emergencies versus conventional emergencies).

- 50% reduction in accidents causing work stoppages or stand downs: 2.5 days for Tank Farm equivalent work force or $2.5 M (approximately $1 M per day for 5 days per year).

- 50% reduction in accidental releases of contaminants to the environs: $2 M (estimated at $100 M total over 25 year life of major cleanup and restoration activity).

- 50% reduction in training time to gain nominally acceptable proficiencies: 1,250 person-weeks per year or approximately $1.25 M.

- Increases over nominal proficiency requiring less supervision and increasing worker productivity by 1.25%: 50 person-years per year or $2.5 M (4,000 average number of workers, emergency responders, construction personnel, and supervision affected per year).

- Increases in training retention time reducing re-training frequency and costs: No extra benefit because these benefits are already implicitly included in the above estimates.

- Reduced hiring and start-up costs because of accreditation and certification rather than conventional repetitive, redundant training by different contractors: 750 person-weeks of training saved or $0.75 M (1 in 4 of 1,000 transient workers typically receiving 4 training session per year).

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APPENDIX A

POTENTIAL COURSES FOR HAMMER

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Potential Courses For HAMMER. (2 sheet)

Quality Training Resource Center	Environmental Training	Health and Safety Training	Health Physics Training	Hanford Fire Department	Hanford Patrol Training Academy
031220 40 Hour Hazardous Waste Operations Training	035020 Facility Waste Sampling and Analysis	003035 Lock & Tag Authorized Worker	020001 Radiological Worker II Training - Initial	Firefighter Recruit School	00101 Unusual Occurrence Management
031210 24 Hour Hazardous Waste Operations Training	035030 The Hazard Evaluation Workshop	020130 Confined Spaces Entry - Initial	020003 Radiological Worker II - Retraining	Hazardous Materials	
031110 24 Hour RCRA TSD Hazardous Waste Operations Training	035100 Core Waste Management Training - Initial	020135 Confined Space Entry - Sequal	022120 HPT/RCT Continuing Training Cycle 1	Confined Space Rescue	
031310 8 Hour Mgr/Suprv Hazardous Waste Operations Training	035110 Core Waste Management Training - Refresher		022122 HPT/RCT Continuing Training Cycle 2	Vehicle Extrication	
032030 & 032020 8 Hour Hazardous Waste Refresher w/wo SkePak	035120 Waste Management Admin - Initial		022124 HPT/RCT Continuing Training Cycle 3	Emergency Vehicle Accident Prevention	
020064 Basic DOT HAZ MAT Regulation Awareness	035130 Waste Management Admin - Refresher		022126 HPT/RCT Continuing Training Cycle 4	Live Fire Training	
020059 Basic RAM Shipment Awareness	031220 40 Hour Hazardous Waste Operations Training		022128 HPT/RCT Continuing Training Cycle 5	Training Tower	
020069 Radioactive Material Shipment Certification	031210 24 Hour Hazardous Waste Operations Training		022130 HPT/RCT Continuing Training Cycle 6	Fire Apparatus Area	
Asbestos Worker - Initial/Refresher	031110 24 Hour Resource Conservation and Resource Act of 1976 (RCRA) TSD Hazardous Waste Operations Training			Fire Equipment/ Master Appliances Operations	
Asbestos Supervisor - Initial/Refresher	031310 Waste Mgr/Suprv Hazardous Waste Operations Training				
Introduction to Env Oversight	032030 & 032020 8 Hour Hazardous Waste Refresher w/wo SkePak				

Potential Courses For HAMMER. (2 sheet)

Quality Training Resource Center	Environmental Training	Health and Safety Training	Health Physics Training	Hanford Fire Department	Hanford Patrol Training Academy
Drill Site Training					
Hands on Fire Extinguisher Training					
Practical Application of Env Laws and Regs for DOE Site Facility Reps. (PAELR)					

Note: These courses - although not a part of Hazardous Material, involve many times the lifting/movement of:
040784 Basic Crane & Rigging, 042320 Advanced Crane & Rigging, and 041810 Fork Truck Operator Training

HPT = Health Physicist Technician.
RCT = Radiological Control Technician.
RCRA = Resource Conservation and Recovery Act of 1976.
TSD = Transportation Storage and Disposal.
RAM = Radioactive Materials.
DOT = U.S. Department of Transportation.
DOE = U.S. Department of Energy.

APPENDIX B

HAMMER CONSTRUCTION COST ESTIMATES

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****** EXECUTIVE COST SUMMARY ****** PAGE 1 OF 1

PROJECT: HAMMER Training Center
DISTRICT: DOE-HANFORD, Richland, WA.

Prepared By: CENPW-EN-CB

OCTOBER 1, 1992 PRICE LEVEL

Reviewed and Approved by: LARRY CHENEY

ACCOUNT NUMBER	ITEM DESCRIPTION:	ESTIMATED COST: 1 OCT 92	CONTINGENCY AMOUNT ($)	%	TOTAL EST. COST 1 OCT 92	MID-POINT CONSTRUCTION D (MO-YR)	OMB INFLATION FACTOR (%)	INFLATION TOTAL AMOUNT ($)	CURRENT FULLY FUNDED COST
	HAMMER Training Center - DOE, HANFORD								
	HAMMER Training Center 80 - Acre Layout	$20,838,400	$1,041,920	5.0%	$21,880,320	1Q 95	6.5%	$1,422,680	$23,303,000
30.-.-.-	PLANNING, ENGINEERING & DESIGN	$3,128,100	$156,400	5.0%	$3,284,500	1Q 94	2.5%	$82,500	$3,367,000
	TOTAL ENGINEERING COST =====>	$3,128,100	$156,400	5.0%	$3,284,500			$82,500	$3,367,000
31.-.-.-	CONSTRUCTION MANAGEMENT	$2,083,800	$104,200	5.0%	$2,188,000	4Q 95	6.5%	$142,000	$2,330,000
	TOTAL PROJECT COSTS =====>	$26,050,300	$1,302,520	5.0%	$27,352,820			$1,647,180	$29,000,000
								USE:	$29,000,000

Reviewed and Approved: Larry Cheney
LARRY CHENEY
Chief, Cost Engineering Branch

Date: 11 Mar 93

HAMMER Training Center
DOE - HANFORD, 80-Acre Layout
near Horn Rapids Dam,Richland WA
Price Level 1 Oct. 1993
--- For Official Use Only ---

Designed By: Westinghouse Hanford Co. (WHC)
Estimated By: WHC & COE-NPW

Prepared By: Cost Engineering Branch,
COE - Walla Walla District (NPW)

Date: 03/11/93
Est Construction Time: 365 Days

This cost estimate is for the 80-acre Hazardous Materials Management and Emergency Response Training Center (HAMMER TC) option. New federal laws required extensive and specific personnel training for emergency response to hazardous materials incidents. Washington - Federal and State Legislators support this initiative as a potential business opportunity for the Hanford Site.

The proposed HAMMER facility will provide a centralized site for providing training dedicated especially to HAZMAT emergency response personnel. As its key function, the center will combine realistic field training with thorough and consistent classroom HAZMAT Response Training. Realism will be obtained via simulated HAZMAT incident sites. The incident scenarios will include appropriate training props, hazardous materials transport and storage equipment mockups, and emergency response equipment to simulate various potential incidents under varying conditions.

The initial feasibility study was done by Westinghouse Hanford Contractors (WHC), published March 1990. The estimate was put together by Kaiser Engineering Hanford (KEH). The COE NPW is looking at designing and managing the construction of the facilities. For this current estimate cost derived by KEH were used and indexed up to Oct. 1992 price levels. The building were unit costed, based on the Corps of Engineers. EIRS BULLETIN, dated 31 Dec. 1990 and 1993 Means unit cost books. No detail costs have been estimated, still in preliminary scoping. As of the estimate date there is no preliminary sketches on scope of work.

SUMMARY REPORTS SUMMARY PAGE

DETAILED ESTIMATE DETAIL PAGE

No Backup Reports...

* * * END TABLE OF CONTENTS * * *

		QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A	HAMMER Training Center, 80 Acre								
A-01	Burn House with Propane System	1.00	JOB	1,300,000	0	0	0	1,300,000	1300000.00
A-02	Administration / Classrooms	32700.00	SF	3,858,600	0	0	0	3,858,600	118.00
A-03	Multipurpose Laboratory	12000.00	SF	1,704,000	0	0	0	1,704,000	142.00
A-04	Changing Room	5000.00	SF	415,000	0	0	0	415,000	83.00
A-05	Emergency Operations Facility	3600.00	SF	399,600	0	0	0	399,600	111.00
A-06	Storage Building	2000.00	SF	94,000	0	0	0	94,000	47.00
A-07	Mechanical Systems	80.00	ACR	640,000	0	0	0	640,000	8000.00
A-08	Water Supply			300,000	0	0	0	300,000	
A-09	Electrical Supply			100,000	0	0	0	100,000	
A-10	Site Work - 80 Acre site	80.00	ACR	4,800,000	0	0	0	4,800,000	60000.00
A-11	Chemical/Radiation Lab. Building	2500.00	SF	355,000	0	0	0	355,000	142.00
A-12	Flammable Solids Burn Pad			30,000	0	0	0	30,000	
A-13	Drum & Cylinder Pad			30,000	0	0	0	30,000	
A-14	Tank Truck Pad			50,000	0	0	0	50,000	
A-15	Railroad Tank Car Pad			350,000	0	0	0	350,000	
A-16	LPG Burn Pad			300,000	0	0	0	300,000	
A-17	Flammable Liquids Burn Pad			400,000	0	0	0	400,000	
A-18	HAZMAT Spill/Leak Training Area			450,000	0	0	0	450,000	
A-19	Vapors Lab. Building	1600.00	SF	227,200	0	0	0	227,200	142.00
A-20	Hot Waste Pad			30,000	0	0	0	30,000	
A-21	Buried & Above Ground Tanks			400,000	0	0	0	400,000	
A-22	Well Sampling Stations	5.00	EA	25,000	0	0	0	25,000	5000.00
A-24	Warehouse / Equipment Building	24000.00	SF	1,128,000	0	0	0	1,128,000	47.00
A-25	Transportation Tunnel	4800.00	SF	288,000	0	0	0	288,000	60.00
A-26	Simulated Bridge / Fill	4800.00	SF	384,000	0	0	0	384,000	80.00
A-27	Railroad Tank Cars with Rail			200,000	0	0	0	200,000	
A-28	J-Box with Tank			100,000	0	0	0	100,000	
A-29	Buried Simulated Wastes			150,000	0	0	0	150,000	
A-30	Remediation Site			50,000	0	0	0	50,000	
A-31	Characterization Site			50,000	0	0	0	50,000	
A-32	Trench Site			100,000	0	0	0	100,000	
A-33	Equipment Decontamination Pad			200,000	0	0	0	200,000	
A-34	Observation Tower	2.00	EA	100,000	0	0	0	100,000	50000.00
A-35	Drain Sump with Fence			150,000	0	0	0	150,000	
A-36	Horn Rapids Road Improvement	1.00	MI	150,000	0	0	0	150,000	150000.00
A-37	Fire Station	6000.00	SF	570,000	0	0	0	570,000	95.00
A-38	Miscellaneous Furnishing			400,000	0	0	0	400,000	
A-39	Miscellaneous Field Props			200,000	0	0	0	200,000	
A-40	Miscellaneous Equipment			360,000	0	0	0	360,000	
	HAMMER Training Center, 80 Acre	80.00	ACR	20,838,400	0	0	0	20,838,400	260480.00
	HAMMER Training Center	1.00	EA	20,838,400	0	0	0	20,838,400	20838400.00

Burn House with Propane System	QUANTY	UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST

HAMMER Training Center, 80 Acre

Burn House with Propane System

This facility (45x25 ft.) consists of a 2-1/2 story concrete building to provide realistic fire fighting training for structure fires. One room on both the first and second floors will be burn rooms capable of withstanding high temperatures (of 1,800 Deg. F?). The other two rooms will be smoke rooms for search and rescue practice. One room on the ground floor will be a sealed room and will have a standard sprinkler and fire alarm system panel box. The peaked roof of the building will provide training for roof ladders and roof ventilation. Replaceable wooden ventilation panels on both sides of the roof will provide practice in techniques for using fire axes and saws to ventilate a fire scene. Also includes a Propane Fire system.

Also this includes a training tower (24x24 ft.x 5 stories) to be used for multi floor simulation training. To include exterior stairs, balconies, roof, rappelling and opening variety for entry training.

Estimated costs and square footage by Architect, indexed up to Oct. 92 price level by NPW.

Burn House with Propane System	0		0	0	0	0	1,300,000	1,300,000

Administration / Classrooms

This building houses the administrative functions necessary to support operation of the HAMMER TC. The building provides necessary student training space -- i.e., classrooms, men's and women's restrooms and showers, a lunchroom/cafeteria, and student break areas. The administration offices include office spaces for registration, clerical, and other training program administration functions. The building also includes office space for the training facility Commandant and staff, instructor offices, and storage space for office supplies and educational equipment.

Square Foot break down is as follows:

Classrooms	10 each x	900 sf	=	9,000 sf
Staff Offices	10 each x	192 sf	=	3,240 sf
Cafeteria	1 each x	900 sf	=	900 sf
Auditorium	1 each x	1,000 sf	=	1,000 sf
Miscellaneous Administration			=	500 sf
Lobby / Circ.	1 each x	1,500 sf	=	1,500 sf
Restrooms / Lockers	2 each x	500 sf	=	1,000 sf
Storage				3,000 sf
Subtotal				20,140 sf
Building Circ. @ 30%				6,042 sf
				26,182 sf
Mechanical/Electrical/ Misc. @ 25%				6,518 sf
Total				32,700 sf

Cost estimate: unit square footages costs taken from 1993 Mean's.

Administration / Classrooms	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Administration / Classrooms		0	0	0	0	3,858,600	3,858,600
Multipurpose Laboratory This facility (75x160 ft.) provides student with hand's on chemical and radiation laboratory to handle hazard materials. The facility shall contain laboratory equipment, fume hoods, containers and glassware, bunsen burners, laboratory tables, radiation gloveboxes, radiation detection equipment and storage of laboratory equipment, and hazardous substances. Square Footage break down is not available. Costs estimate: based on Architect square footage of 12,000 sf; and unit square footage costs taken from 1993 Means.							
Multipurpose Laboratory		0	0	0	0	1,704,000	1,704,000
Changing Room This room (50x100 ft.) houses a place for instructors and students to changing into and out of hazard type clothes and preform decontamination functions. The layout of the building varies depending on the particular operation scenario involved. The building provides necessary room for student to change into hazard suits and clothes, decontamination, men and women's restrooms and showers, and storage space for hazard suits and clothes, supplies and educational equipment. Square Footage breakdown is not available. Cost estimate: based on Architect square footage of 5,000 SF; and unit square footages costs taken from 1993 Means.							
Changing Room		0	0	0	0	415,000	415,000

Emergency Operations Facility	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST

Emergency Operations Facility

The purpose of this facility (45x80 ft.) is to provide a training environment where training class participants can obtain practical experience in the operation of an Emergency Operating Center (EOC) during a simulated HAZMAT emergency. The facility serves a dual purpose; it functions both as a classroom and a mock EOC. It includes a main meeting room which can accommodate 16 to 20 people. The room is equipped with tables, chairs, telephones, and workstations. The wall space is designed for showing vital information. A smaller room, adjacent to the conference room, is equipped as a communications center. This room includes a base station radio, a telephone switchboard, TV/VCR equipment, and a computer. The facility also includes provisions for restrooms and some limited kitchen facilities.

Square Foot break down is as follows:

Radio/Communications Room	1 each x	350 sf =	350 sf
Note: one Glass wall half way up.			
Conference Room	1 each x	350 sf =	350 sf
Workstations/Observation Room	1 each x	1,000 sf =	1,000 sf
Kitchen/Luncheon Room	1 each x	100 sf =	100 sf
Reception/Circ.		115 sf	115 sf
Restrooms	2 each x	150 sf =	300 sf
Subtotal			2,215 sf
Building Circ. @ 30 %			665 sf
			2,880 sf
Mechanical/Electrical/Misc. @ 25%			720 sf
Total Square Footage			3,600 sf

Estimated cost: unit cost taken from the US Army COE, EIRS BULLETIN, dated 31 Dec. 90 index up to Oct. 92 price level by NPW.

Emergency Operations Facility	0	0	0	0	0	399,600	399,600

Storage Building

This storage building (40x50 ft.) is needed to store training materials, supplies, and equipment required to support the high level of field training envisioned for the higher-case scenarios. The low-case facility at the 200 Area (Scenario 1) does not require any additional storage space beyond that already provided within the existing Headquarters Fire Station and the new Administration/Classroom Building.

Square Footage break down is not available.

Costs estimate: based on Architect square footage of 2,000 sf; and unit square footage costs taken from 1993 Means.

Storage Building	0	0	0	0	0	94,000	94,000

Mechanical Systems	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Mechanical Systems The Mechanical Systems includes: a.Filter house (?x? ft.), b.?Hp. Pump house (?x? ft.), c.Above ground pipeline ?lf., d.Water tank(?x? ft.), and e. Well & fire hydrants ? each. The water in the tank, artificial pond (?x?x? ft.), and from the pads gets cleaned and re-circulated in a closed system. Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Mechanical Systems		0	0	0	0	640,000	640,000
Water Supply The Water Supply includes the cost to drill a water Well (?lf.). Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Water Supply		0	0	0	0	300,000	300,000
Electrical Supply The Electrical Supply includes get electrical line (? lf) to the site. Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Electrical Supply		0	0	0	0	100,000	100,000
Site Work - 80 Acre site Site work for the 80-acre site includes: roads, parking lots, artificial pond/stream, lighting, landscaping, fencing, grading, utility extensions/hookups. The pads are laid out surrounding the pond, with a road running around the exterior of the site. The admin./storage buildings are off to the east of the training area. Stadium lights are provided for night-time training sessions. The site is completely fenced with only two gate accesses. Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Site Work - 80 Acre site		0	0	0	0	4,800,000	4,800,000
Chemical/Radiation Lab. Building This facility (50x50 ft.) provides unique training for hazmat emergency response personnel. The facility will be a single-story concrete building divided into two rooms with outside exits. The represents a realistic mockup of chemical and radiation laboratory facilities. It includes laboratory equipment, fume hoods, containers and glassware, bunsen burners, lab tables, radiation gloveboxes, and various containers labeled with simulated hazardous substances. There should be sufficient drainage in the building floor to remove water used in suppression techniques and to remove simulated spills. Square Footage break down is not available. Costs estimated by KEH, indexed up to 1 Oct. 92 price level by NPW. Chemical/Radiation Lab. Building		0	0	0	0	355,000	355,000

Flammable Solids Burn Pad	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Flammable Solids Burn Pad This is a 50x50 ft. concrete pad used for practice burns and fire suppression practice on flammable solid materials such as magnesium, sodium, and zirconium. The pads will be constructed with a 4x4x2 ft. stainless steel tray placed in the center of the pad. The pads will have a short retaining wall on all four sides with an opening to allow access at the entrance. Also a propane system to be included.							
Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Flammable Solids Burn Pad	0	0	0	0	0	30,000	30,000
Drum & Cylinder Pad This 50x50 ft. concrete pad will be used as an open storage area for a number of 55-gal drums, several 150 to 250 lb. pressurized tanks, and some 1-ton cylinders. This pad is used to train personnel in the techniques of patching, plugging, and transferring materials from leaking containers. The pad will have a drain system to recycle water and a short retaining wall around the perimeter.							
Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Drum & Cylinder Pad	0	0	0	0	0	30,000	30,000
Tank Truck Pad This 100x100 ft. concrete pad is to be used to simulate a tanker truck rollover. Three different type tanker trailers will be on the pad, complete with normal valving. Water will be used to simulate leakage. The pad has a short retaining wall and a drain to recycle the water.							
Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Tank Truck Pad	0	0	0	0	0	50,000	50,000
Railroad Tank Car Pad This 200x200 ft. concrete pad will be used for simulating three types of railroad tanker spills. Water will be used to simulate leaks. Carriers will be complete with normal valving. The pad will have a short retaining wall and a drain for recycling the water.							
Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. Railroad Tank Car Pad	0	0	0	0	0	350,000	350,000
LPG Burn Pad This pad is a 100x100 ft. concrete pad used for liquid petroleum gas (LPG) fire fighting practice. Situated to the left edge of the pad will be a 500 lb capacity LPG tank. The tank will be piped to a "christmas tree" type burn nozzle arrangement for LPG fire fighting.							
Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW. LPG Burn Pad	0	0	0	0	0	300,000	300,000

Flammable Liquids Burn Pad	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Flammable Liquids Burn Pad This 50x50 ft. concrete pad will be used for flammable liquids fire fighting practice. The burn pit will be approximately 18" deep and 8'x10'. The burn pit will have piping and valving to fill the pit from a separate above-ground storage tank. Estimated cost by KEH, indexed up to 1 Oct. 92 price level by NPW.							
Flammable Liquids Burn Pad		0	0	0	0	400,000	400,000
HAZMAT Spill/Leak Training Area This 200x200 ft. concrete pad will be used for a training area for cleaning up HAZMAT spills and leaks. Assume concrete pad design similar to other pads, including short retaining wall and drainage system for containing simulated leaks. Cost estimated by NPW, based costs for other pads.							
HAZMAT Spill/Leak Training Area		0	0	0	0	450,000	450,000
Vapors Lab. Building This facility (40x40 ft.) provides unique training for hazmat vapors emergency response personnel. The facility will be a single-story concrete building divided into two rooms with outside exits. The represents a realistic mockup of chemical and radiation laboratory facilities. It includes laboratory equipment, fume hoods, containers and glassware, bunsen burners, lab tables, radiation gloveboxes, and various containers labeled with simulated hazardous substances. There should be sufficient drainage in the building floor to remove water used in suppression techniques and to remove simulated spills. Square Footage break down is not available. Costs estimated by KEH, indexed up to 1 Oct. 92 price level by NPW.							
Vapors Lab. Building		0	0	0	0	227,200	227,200
Hot Waste Pad No information given for this Hot Waste Pad area. Used to simulate drum handling. Estimated cost by NPW, indexed up to 1 Oct. 92 price level by NPW.							
Hot Waste Pad		0	0	0	0	30,000	30,000
Buried & Above Ground Tanks No information on this Buried and Above Ground Tanks. NPW estimated its cost to be about $400,000.							
Buried & Above Ground Tanks		*0*	*0*	*0*	*0*	*400,000*	*400,000*
Well Sampling Stations No information on this Well Sampling Stations. NPW estimated its cost to be about $5,000 each.							

Well Sampling Stations	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Well Sampling Stations		0	0	0	0	25,000	25,000
Training Tower Training Tower included with burn house. Training Tower		0	0	0	0	0	0
Warehouse / Equipment Building This Warehouse and Equipment building (120x200 ft.) is needed to store training materials, supplies, and large and heavy equipment required to support training exercises. Also building will house training activities during the cold weather months. Cost estimate: based on Architect square footage 24,000 sf; and unit square footage costs taken from the 1993 Means. Warehouse / Equipment Building		0	0	0	0	1,128,000	1,128,000
Transportation Tunnel This Transportation Tunnel Building (15'high x 35' wide x 120' long) is needed to simulate of traffic accidents in dark enclosed tunnel conditions. NPW estimated its costs to be about $288,000. Transportation Tunnel		0	0	0	0	288,000	288,000
Simulated Bridge / Fill This Simulated Bridge (23'wide x 150'long) is needed to simulate of traffic accidents off Bridge conditions. NPW estimated its costs to be about $384,000. Simulated Bridge / Fill		0	0	0	0	384,000	384,000
Railroad Tank Cars with Rail This Simulated Railroad Tank Cars and Tracks is needed to simulate how to handle railroad accidents. One side of the rail line to be steep sloped. NPW estimated its costs to be about $200,000. Railroad Tank Cars with Rail		0	0	0	0	200,000	200,000
J-Box with Tank No information given for this J-Box W/Tank area. NPW estimated its costs to be about $100,000. J-Box with Tank		0	0	0	0	100,000	100,000
Buried Simulated Wastes No information given for this Buried Simulated Wastes Area. NPW estimated its costs to be about $150,000. Buried Simulated Wastes		0	0	0	0	150,000	150,000
Remediation Site No information given for this Remediation Site Area. NPW estimated its costs to about $50,000. Remediation Site		0	0	0	0	50,000	50,000

Characterization Site	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Characterization Site No information given for this Characterization Site Area. NPW estimated its costs to be about $50,000. Characterization Site		0	0	0	0	50,000	50,000
Trench Site No information given for this Trench Site Area. NPW estimated its costs to be about $100,000. Trench Site		0	0	0	0	100,000	100,000
Equipment Decontamination Pad No information given for this Equipment Decontamination Pad area. NPW estimated its costs to be about $200,000. Equipment Decontamination Pad		0	0	0	0	200,000	200,000
Observation Tower No information on this Observation Tower (15x15 ft.). NPW estimated its costs to be about $50,000 each. Observation Tower		0	0	0	0	100,000	100,000
Drain Sump with Fence No information on this Drain Sump with Fence. NPW estimated that it will costs about $150,000. Drain Sump with Fence		0	0	0	0	150,000	150,000
Horn Rapids Road Improvement Approximately 1 mile of the access road must be improved to handle the a traffic and heavy equipment needed for the training center. NPW estimated that it will costs about $150,000 per mile. Horn Rapids Road Improvement		0	0	0	0	150,000	150,000
Fire Station This fire station building (60x100 ft.) is needed to store fire equipment, materials, supplies, and equipment required to support the field training envisioned. Square Footage break is not available. Cost estimated: based on Architect square footage of 6,000 sf.; and unit square footage cost taken from 1993 Means. Fire Station		0	0	0	0	570,000	570,000
Miscellaneous Furnishing The miscellaneous furnishing is needed to office, classroom and miscellaneous equipment to support the field training envisioned. No information or itemized list on needed furnishing. NPW estimated its costs to be about $500,000. Miscellaneous Furnishing		0	0	0	0	400,000	400,000

Miscellaneous Field Props	QUANTY UOM	MANHOURS	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	TOTAL COST
Miscellaneous Field Props							
No information given for this Miscellaneous Field Props. NPW estimated its cost to be about $200,000.							
Miscellaneous Field Props		0	0	0	0	200,000	200,000
Miscellaneous Equipment							
The miscellaneous equipment to operate and support the field training envisioned. No information or itemized list on the equipment needed. NPW estimated its cost to be about $1,000,000.							
Miscellaneous Equipment		0	0	0	0	360,000	360,000
HAMMER Training Center, 80 Acre		0	0	0	0	20,838,400	20,838,400
HAMMER Training Center		0	0	0	0	20,838,400	20,838,400

No errors detected...

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