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DESIGN AND CONSTRUCTION OF A PESTICIDE STORAGE AND MIXING FACILITY

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DIRECTORATE OF PUBLIC WORKS
Pesticide Storage and Mixing

DESIGN AND CONSTRUCTION OF A PESTICIDE STORAGE AND MIXING FACILITY

1. Purpose. The purpose of this Public Works Technical Bulletin (PWTB) is to provide lessons learned related to the design and construction of pesticide storage and mixing facilities at U.S. Army installations.

2. Applicability. This PWTB applies to all Army Directorate of Public Works activities responsible for pest management.

3. References.

a. AR 420-76, Pest Management, 3 July 1986.

b. Military Handbook (MIL-HDBK) 1028/8A, Design of Pest Management Facilities, 1 November 1991.

c. 40 CFR 165, Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers.

4. Discussion.

a. At most installations, pest (and herbicide) management is the responsibility of the Directorate of Public Works and proper facilities for the storage and handling of pesticides (and herbicides) and related equipment are essential. Because of potential occupational health and safety considerations and environmental concerns associated with pest management activities, the design of these facilities must incorporate various features to minimize health and safety risks to pest management personnel, activities located nearby, and the environment. Design guidance for pest management activities is available in MIL-HDBK-1028/8A.

b. The Ft. Riley, KS Directorate of Public Works (DPW) recently designed and constructed a pesticide storage and mixing facility based upon the currently available design guidance provided in this Military Handbook. The Ft. Riley experience indicated that MIL-HDBK 1028/8A contained adequate design guidance and yet was not so restrictive as to inhibit site-specific creativity. However, since it was not Army specific, it was necessary for Ft. Riley personnel to take the time to research applicable and appropriate Army regulations and design requirements. This would be avoided by having an Army specific manual or handbook.

c. The newly constructed facility incorporated all required features of a pest management facility into its design. It was also completed on time with significant cost savings compared to similar projects. The lessons learned during the design and construction of this facility are summarized herein so that other facilities can be designed as cost effective as possible and yet meet all essential health and safety requirements.

5. Lessons learned.

a. Reduce facility design requirements and costs by establishing specific operational guidelines for the new facility.

(1) Rather than designing and constructing a facility that incorporates components and features to address all possible current and future needs, management should consider various options for eliminating and reducing requirements by implementing specific operational guidelines for the new facility. Factors that should be considered may include: the need to provide storage facilities for both pesticides and herbicides; the quantities of these materials that must be stored at the facility; the need to store certain types of materials at all; and, restricting the mixing of pesticides/herbicides and rinsing of application equipment to interior bays only.

(2) The feasibility and practicality of "roughing-in" plumbing for meeting potential future requirements that could be installed or added at a later date, (if and when they are actually needed) should also be considered.

(3) If there is a relatively limited requirement at the installation for pest control, it may be more feasible to contract such work. Such contracts could specify that the contractor be responsible for providing their own pesticides and for proper disposal of any residuals, thereby reducing or eliminating the need to store and/or mix pesticides at the facility. This could similarly apply to herbicides.

(4) A major factor that determines the quantities (e.g. stockage levels) of pesticides and herbicides that are stored at pest management facilities is the time required to procure these

materials. This directly affects the size of the storage area since the longer it takes to procure a pesticide/herbicide the larger the stockage levels tend to be. It is not uncommon for facilities to maintain a year's supply on hand because procurements could take six months or longer. By being able to procure supplies in a more timely fashion (sometimes within 24 hours), as is possible by using the "credit card" system that has been initiated at many installations, stockage levels, and, hence, storage space requirements can be greatly reduced.

(5) By closely scrutinizing the materials that must actually be stored at the facility it is possible to eliminate materials (e.g., explosive materials or those with a flash point of less than 100°F) that would require a more costly design (e.g. explosion proof). If of very limited use, such materials could be stored at another location or only procured in small "single-use" quantities when needed, rather than incorporating more expensive explosion-proof features into the facility design.

(6) By restricting the preparation of formulations and rinsing of equipment only in the interior bays specifically designed for this purpose and prohibiting such activities from being performed outside, the need to construct an outside hardstand can possibly be eliminated.

(7) Instead of actually installing separate male/female showers, restrooms and change rooms, consideration should be given to ensuring that the design will readily accommodate the addition of facilities when actually necessary. For example, if current pest management personnel are all male and additional staff or changes in staff are not anticipated in the immediate future, it may be feasible to only "rough-in" the plumbing in areas already designed for expansion into separate facilities. Until needed for that purpose, these areas could serve alternative uses such as administrative work areas or "clean" equipment storage.

b. Consider installation-specific circumstances, not only the number of assigned personnel, in sizing the facility.

(1) The number of assigned pest management personnel is generally indicative of the overall workload of the pest management facility and directly affects the amount of space required for certain areas within the facility, particularly the changing room and administrative area. However, space requirements for other areas of the facility are only indirectly related to the number of personnel and are more dependent on other factors.

(2) The amount of space required for pesticide/herbicide storage equipment storage and formulation preparation is primarily dependent on the specific pest management functions that need to be performed and other installation-unique circumstances. The size of the storage area(s) can depend on: whether or not both pesticides and herbicides are routinely being used at the

installation; how large an inventory of these chemicals must be maintained on-hand; and, how much application equipment must be stored at the facility. The extent to which contractors, who generally provide their own supplies and equipment, are used to perform certain pest management related tasks can also affect storage and other space requirements.

c. Resolve potential problems and delays through early interface and coordination between the user, designer/planner, and other interested parties.

(1) By working closely with the users of the facility (Pest Management Personnel) and using the guidance provided in MIL-HDBK 1028/8, designers were able to incorporate site-specific user requirements and considerations early-on in the design. Using this approach, the review and approval of the design was expedited and the need for modifications and related delays during construction reduced. This ultimately reduced the overall cost of the project.

(2) Aesthetic considerations related to the design of the facility can be an important aspect of the design and must also be addressed early-on along with operational requirements. Potential aesthetic concerns can be more readily resolved by early coordination with local historical society/association. At Ft. Riley, concerns that the proposed metal building would not "fit-in" with the nearby buildings (which had a stone facade) were discussed with community representatives and several alternatives were identified. Rather than constructing a stone facade around the proposed steel building, appropriate fencing and landscaping was used instead. This more practical and economical solution to the aesthetic concerns was satisfactory to all parties involved.

d. Capitalize on site-specific circumstances and conditions to maximize cost savings.

(1) During the design and construction of the pest management facility at Ft. Riley, use of a pre-fabricated steel building and siting of the facility in close proximity to existing utilities resulted in significant construction cost savings. Selection of a pre-fabricated steel building not only reduced facility design time, but also met material requirements for pest management facilities (i.e., a non-pervious material), and was less expensive than use of masonry materials.

(2) Although aesthetic and historical considerations had to be addressed early-on, the steel structure was also compatible with other buildings located in the DPW yard. The facility was sited so that it could be placed in close proximity to existing utilities, including a transformer that was also able to meet the new facility's electrical requirements and the sanitary sewer system. By being able to locate near these utilities, it is estimated that $75,000-100,000 was saved in construction costs.

e. Use existing JOC Contracts to reduce costs and expedite construction.

(1) At Ft. Riley an existing JOC contract was selected as the preferred method for designing and constructing the pest management facility. Since the contract was already in place, there was no need to prepare, and solicit bids and negotiate a separate contract. Hence, considerable time was saved and work could begin immediately. The fact that there was a "cap" of $125,000 on any JOC projects and that the negotiated rates for this contract were favorable also helped keep costs down.

(2) When using a JOC contract, however, it needs to be remembered that these contract costs do not reflect any of the costs associated with in-house design and oversight for the project. At Ft. Riley, these costs were estimated to be $15,000-$20,000.

6. Point of Contact. All questions and/or comments regarding this subject, which cannot be resolved at installation or MACOM level, should be directed to the U.S. Army Center for Public Works, CECPW-ES, 7701 Telegraph Road, Alexandria, VA 22315-3862 at (703) 806-5196, DSN 656-5196, or FAX (703) 806-5216.

FOR THE DIRECTOR:

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