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**APPROVED CAMU EQUALS FASTER, BETTER, CHEAPER REMEDIATION AT THE  
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT**

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**ABSTRACT**

A 1,050 acre Corrective Action Management Unit (CAMU) was approved for the Fernald Environmental Management Project (FEMP) by the U.S. Environmental Protection Agency (USEPA) to manage environmental media remediation waste in the Operable Unit 5 Record of Decision, 1995. Debris is also proposed for management as remediation waste under the CAMU Rule in the Operable Unit 3 Remedial Investigation/Feasibility Study (RI/FS) Report, as of December 1995. Application of the CAMU Rule at the FEMP will allow consolidation of low-level mixed waste and hazardous waste that presents minimal threat from these two operable units in an on-property engineered disposal facility without triggering land disposal restrictions (LDRs). The waste acceptance criteria for the on-property disposal facility are based on a combination of site-specific risk-based concentration standards, as opposed to non-site-specific requirements imposed by regulatory classifications.

The designation of the CAMU was proposed because the Department of Energy (DOE) will manage low-level radioactive waste, hazardous substances, hazardous wastes and/or mixed wastes as remediation wastes pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions at this former uranium processing facility. Certain regulations promulgated under the Resource Conservation and Recovery Act (RCRA) were evaluated as applicable or relevant and appropriate requirements (ARARs) for remediation of the FEMP, including the CAMU Rule. Therefore, the CAMU will add a measure of flexibility in order to expedite and improve FEMP remedial actions. Compliance with these ARARs would have increased the cost and time of the remedial projects without providing any additional protective measures.

Specific aspects of remediation will be expedited under the CAMU at the FEMP, based on negotiations with the Ohio Environmental Protection Agency (OEPA) and the USEPA, Region V. Environmental media and other remediation waste that may contain listed hazardous wastes may be managed in the on-property disposal facility that are below the site-specific waste acceptance criteria (WAC). The OEPA, in supporting this concept, has expressed a desire to limit placement of characteristic waste in the on-site disposal facility. Listed waste from any area will not invoke treatment standards because the regulatory status

of the waste will change from "listed" to "remediation" waste. For example, if an area of concern is identified through field monitoring instrumentation, then treatment will only be required if the media affected by a source of released contaminants exhibits toxicity characteristic concentrations.

Temporary units (TUs) and existing facilities will be designated under the CAMU in remedial action work plans when needed to facilitate remediation. These standards will allow for more flexibility in using the minimum technology requirements (MTRs) so that existing structures may be used to facilitate remediation.

## WHY USE A CAMU?

Historically, joint CERCLA-RCRA guidance dictated that hazardous waste could not be treated or moved out of the designated area of contiguous contamination (AOC) without triggering LDRs or MTRs. The Corrective Action Management Unit (CAMU) Final Rule (58 FR 8658, Vol. 58, No. 29), promulgated on February 16, 1993, provides facilities undergoing RCRA corrective action with greater flexibility to move, treat, and dispose of wastes on site without triggering LDRs or MTRs, thereby encouraging application of innovative technologies and more protective remedies.

If on-property disposal is selected as part of the preferred alternative for a CERCLA site, there are three possible options for on-site management, treatment, and disposal:

1. comply with LDRs and possibly request any combination of the following: a no migration petition, a treatability variance, a treatment and storage facility variance, or a delisting petition; or
2. application of the "CAMU Rule"; or
3. request an ARARs waiver under CERCLA.

Management and treatment of low-level mixed waste (LLMW) at the FEMP was proposed using the "CAMU Rule" because the soil and debris containing hazardous waste are remediation wastes. In addition, the other options cited above under option 1 would prove to be more costly to meet treatment requirements and time-consuming to receive approval for variances, waivers, or petitions that do not improve the degree of protection to human health or the environment.

The "CAMU Rule" can be invoked only if the waste to be managed is a remediation waste (i.e., not part of an "as generated" process). A "remediation waste" is defined in 40 CFR §260.10 [58 FR 8683] as:

"all solid and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris, which contain listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under §264.101 and RCRA section 3008(h). For a given facility, remediation wastes may originate only from within the facility boundary, but may include waste managed in implementing RCRA section 3004(v) or 3008(h) for releases beyond the facility boundary."

Disposal of hazardous waste constituents during Superfund actions requires compliance with several potential ARARs under RCRA. Once waste is picked up under the CERCLA area of contamination (AOC), or from the RCRA unit, the requirements for waste disposal are triggered. The LDR treatment standards often cause increased cost and time for remediation. For this reason, many facility owners have historically opted to cap contaminated soil in place and avoid triggering waste placement standards. With the promulgation of the CAMU Rule remediation waste can be managed based on protective site-specific standards and at a lower cost to the remediation project.

Compliance with the LDRs presents the most stringent potential waste placement RCRA ARARs. LDRs can be triggered as applicable requirements by "placement" of restricted RCRA hazardous wastes in land-based units. Land-based units include landfills, surface impoundments, waste piles, and land treatment facilities.

## CAMU RULE CRITERIA

EPA promulgated the "CAMU Rule" under RCRA to promote the most efficient and cost-effective remediation possible. In the absence of the CAMU Rule, LDRs are triggered when "placement" occurs, as described above. In promulgating the "CAMU Rule", the EPA provided a separate regulatory framework to manage remediation waste, judiciously expedite cleanups, and reduce costs. In this respect, CAMUs can *only* be used for management of remediation waste, not for "as generated" hazardous wastes from ongoing production processes or other industrial activities.

The CAMU designation criteria are related to the practical necessities of managing remediation wastes on site during cleanup, rather than to the areal extent and the contiguousness of the contamination prior to cleanup. A CAMU can be designated to include the entire facility, but cannot be extended beyond the facility property boundary even if the contamination release has migrated beyond the facility boundary. However,

remediation wastes, especially environmental media, can be managed within the CAMU even if they are associated with a release that has migrated beyond the facility boundary.

The "CAMU Rule" also created Temporary Unit (TU) provisions [40 CFR §264.553, 58 FR 8684] that can be applied to treatment or storage of remediation wastes during remedial activities. TUs can be located inside or outside the physical boundaries of a CAMU; however, like CAMUs they must be located at the facility. The EPA Regional Administrator determines the requirements for siting, operating, monitoring and closing a TU. Like CAMUs, TUs are also not subject to LDRs and MTRs. There is a one-year time limit on the use of the TU which can only be extended an additional year if the wastes have to remain in the unit due to "unforeseen, temporary, and uncontrollable" circumstances.

According to 40 CFR §264.552(c), seven criteria are to be considered to designate and approve CAMUs for purposes of managing remediation waste:

1. Facilitate the implementation of reliable, effective, protective, and cost-effective remedies.
2. Waste management activities will not create unacceptable risks to humans or to the environment resulting from exposure to hazardous wastes or hazardous constituents.
3. Include uncontaminated areas of the facility, only if including such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility.
4. Wastes that remain in place after "closure" of the CAMU shall be managed and contained so as to minimize future releases, to the extent practicable.
5. Expedite the timing of remedial activity implementation when appropriate and practicable.
6. Use treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after "closure" of the CAMU.
7. To the extent practicable, minimize the land area of the facility upon which wastes will remain in place after "closure" of the CAMU.

## FEMP SITE BACKGROUND

The Fernald Environmental Management Project (FEMP) is a facility owned by the U. S. Department of Energy (DOE). The Fernald facility occupies approximately 1050 acres in a rural area approximately 18 miles northwest of downtown Cincinnati, Ohio. The facility was operated for production of purified uranium metal from 1952 until 1989, when operations were suspended. In July 1986, a Federal Facility Compliance Agreement was jointly signed by the U.S. Environmental Protection Agency (EPA) and the DOE to perform site characterization. In April 1990, the EPA and DOE entered a Consent Agreement for cleanup of Fernald as a Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This agreement has been revised several times, and is now referred to as the Amended Consent Agreement (ACA). In 1988, a Consent Decree was jointly signed by the Ohio Environmental Protection Agency (OEPA) and the DOE, under Clean Water Act and RCRA authorities, that provides for the management of water pollution and hazardous wastes, including closure of hazardous waste management units (HWMUs). This Consent Decree was amended in January 1993, and together they are collectively referred to as the Stipulated Amendments to the Consent Decree.

Several RCRA-regulated hazardous wastes were generated during the production of uranium. Since the shutdown of production operations at the facility, several HWMUs have been identified. Knowledge of releases from the HWMUs will necessitate compliance with RCRA during the remediation of building debris, and soil and groundwater impacted by these releases. All environmental media (soil, groundwater, and sediment) which contain hazardous waste constituents are anticipated to also be low-level mixed waste (LLMW) due to pervasive low-level radioactive contamination at the FEMP. These remediation wastes will be managed under the provisions set forth by DOE, EPA, and OEPA to designate the CAMU at the FEMP.

The ACA divided the site into the following five operable units (OUs) based upon their location or the potential for similar response actions:

- OU1 Waste Pit Area — Waste Pits 1 - 6, Burn Pit, Clearwell
- OU2 Other Waste Units — Solid Waste Landfill, Southfield Disposal Areas, Flyash Piles, Lime Sludge Ponds
- OU3 Former Production Area — production area and production-associated facilities and equipment
- OU4 Silos 1 - 4

## OU5 Environmental Media — soil, groundwater, surface water and sediments, flora and fauna

In accordance with their signed Records of Decision (RODs), OUs 1 and 2 will ship their RCRA-regulated remediation wastes off-site, which will require complying with the RCRA LDRs for acceptance at the off-site disposal facility. In contrast, OU5 will to dispose of material containing hazardous waste constituents in an on-property engineered waste disposal facility, and OU3, in its RI/FS Report, is considering on-site disposal for its material.

### IMPLEMENTATION OF THE CAMU AT THE FEMP

The boundaries of the CAMU are designated in the OU5 ROD to coincide with the 1,050 acres of land within the FEMP property boundaries, such that remediation waste from the entire site (CERCLA's definition of "site") can be managed within the CAMU. The CAMU is also designated to include the on-property disposal facility, provided those wastes meet site-specific waste acceptance criteria that are protective of human health and the environment. A map of the Fernald site (Figure 1) shows the area of excavation, which was determined by the lateral extent of uranium that exceeds the site-specific, risk-based, cleanup level. The cleanup level is based on an  $1 \times 10^{-5}$  incremental lifetime cancer risk for an undeveloped park, as described in the OU5 Proposed Plan and ROD. The Production Area on Figure 1 represents the anticipated areas containing potential hazardous wastes. The on-property disposal facility will also function as part of the CAMU. Existing structures to be closed during remediation, and TUs under the CAMU Rule, as needed for on-property disposal, will be designated in the appropriate remedial action work plans.

The seven criteria described above will be met through the selected remedies described in the OU5 and OU3 RODs, respectively. Each criterion above is referenced below in parentheses where each one is addressed. The on-property disposal facility will serve as a reliable method of containment, which will be designed to be effective for 1,000 years [40 CFR Part 192] (Criteria 1 and 4). In addition, the on-property disposal facility will minimize the land area for wastes that remain on-property (Criterion 7). The use of concentration-based WAC for on-property disposal of LLMW constituents will ensure protection to the sole-source aquifer beneath the site, which are determined through site-specific extensive remedial investigations, risk-based calculations and modelling (Criterion 2). Therefore, on-property disposal will be more cost-effective than shipping large volumes of LLMW off-site for disposal (Criterion 1). In addition, the statutory preference for treatment (Criterion 6) will be met through treatment of those excavated volumes that are statistically indicated to be characteristically hazardous.

The CAMU will expedite remediation by minimizing segregation, analytical testing, and handling time that otherwise would be needed to meet the specific LDR treatment requirements for individual hazardous wastes (Criterion 1).

The use of existing interim status HWMUs and TUs under the "CAMU Rule" during remediation will also expedite remediation because the need for construction of new storage or treatment facilities will be minimized. In addition, the use of these existing facilities and TUs will not cause any additional impact on the environment where soil and groundwater contamination already exist. Application of MTRs, intended to prevent contamination of soil and groundwater, would not be logical for existing facilities/units since the very situation which they are intended to prevent already exists at the site. If TUs are used for the Fernald site, initial analysis within the OU5 Feasibility Study (FS) indicates they might be needed for the duration for soil remediation.

Remediation costs will be considerably reduced by the application of the "CAMU Rule" at the FEMP. OU5 contains an estimated minimum volume of 28,000 cubic yards of soil containing RCRA-regulated constituents. Most of this soil contains constituents that *may* be from listed wastes, but which are not anticipated to exceed the WAC for the on-property engineered disposal facility. Only small volumes of soil may be statistically representative of characteristically hazardous waste.

OU3 (the former production facilities) activities currently involve decontamination and dismantlement of the structures under a Record of Decision for Interim Remedial Action (IROD); up to 10% of the material removed under the IROD can be disposed at an off-site location. It is anticipated that this will typically consist of radioactively-contaminated building materials which will be handled as low-level waste (LLW). Other wastes are currently being managed in accordance with approved removal actions. Final disposition of the material removed in building dismantling will be addressed in a combined Remedial Investigation/ Feasibility Study (RI/FS) Report and Proposed Plan currently in preparation, leading to a final ROD. The OU3 RI/FS is analyzing three alternatives: (1) no further action (indefinite storage); (2) disposal in an on-site engineered disposal facility; and (3) off-site disposal.

Although some of the resultant OU3 remediation waste material will likely be classified as mixed waste, the implementation of the "CAMU Rule" will impact the level of treatment that will be required for disposal in an on-site disposal facility. The constituents in the material are not expected to exceed the WAC for the on-site disposal facility. If they do, however, the remediation waste material will either have to be treated to meet the on-site WAC, or be treated in accordance with LDR requirements and be disposed of off-site at a permitted/licensed mixed waste disposal facility at a significantly greater cost.

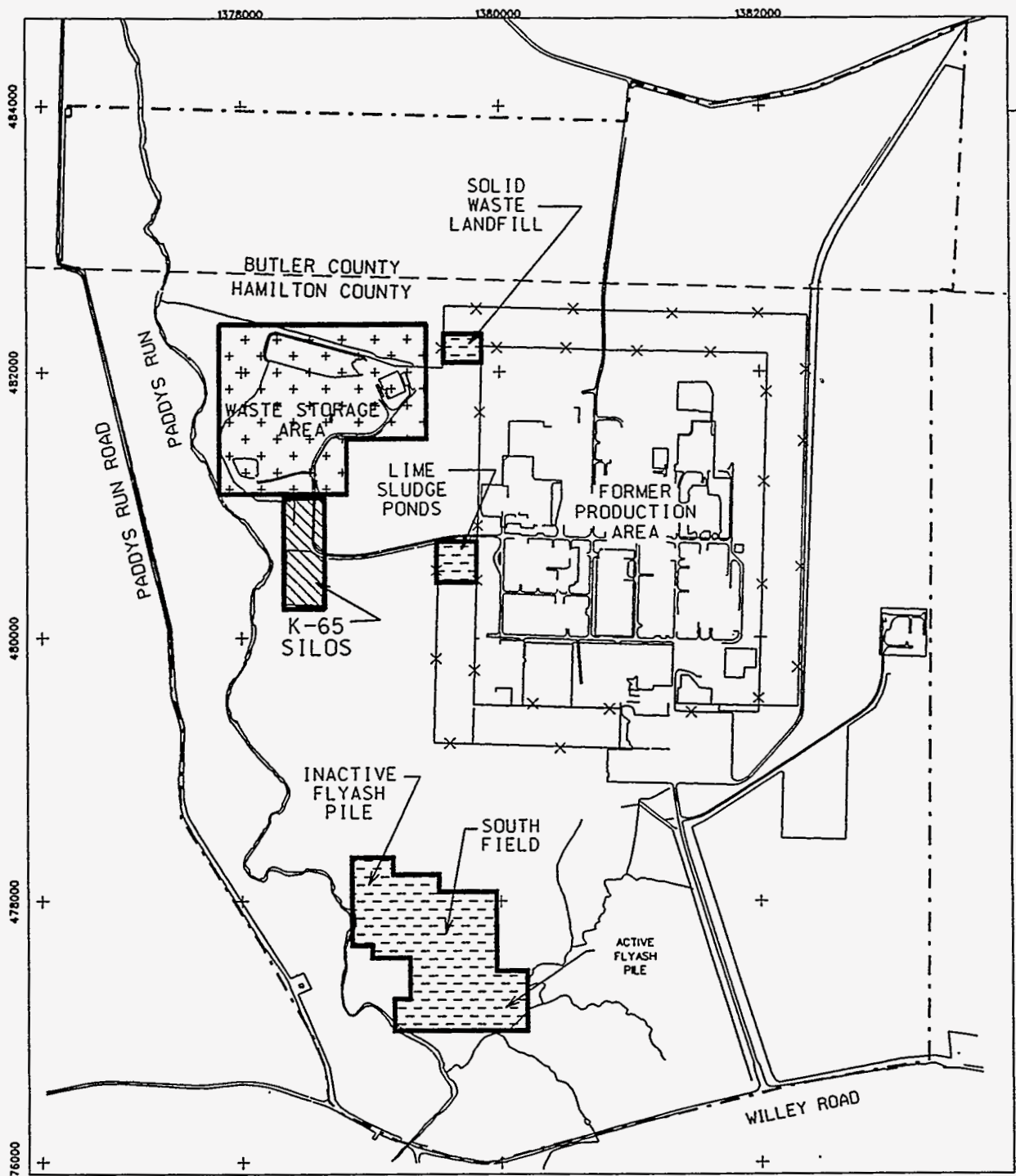


## IS THE CAMU FOR YOU?

EPA's intent in promulgating the CAMU Rule was to allow sensible cleanup solutions for existing contamination problems while attaining the statutory standard to protect human health and the environment. Therefore, any site in the process of developing a cleanup strategy for existing contamination should consider using the CAMU Rule as a tool for implementing a potentially more cost-effective remedy. Attributes of a site that might influence a decision to designate a CAMU include the presence of contaminants at a site that would be regulated under RCRA and/or CERCLA, and where corrective action or remedial action is indicated. In addition, the use of a CAMU would be most appropriate for sites that plan to treat waste on-site so that staging areas, treatment units and existing facilities could be designated for remediation purposes, and especially if the remediation waste may be managed permanently in an on-property disposal facility.

## SUMMARY






The use of the CAMU at Fernald is approved by the regulatory agencies via OEPA concurrence and EPA's signature of the OU5 ROD (January 1996). A similar approach is anticipated for OU3's ROD (projected for EPA signature in late 1996). The CAMU Rule is the most appropriate method for compliance during remediation of soil and debris at the FEMP because the substantive requirements under Subtitle C will be met for providing long-term, cost-effective, practical and protective remediation. In this respect, application of the CAMU should be considered at other sites undergoing environmental restoration, regardless of whether it is being conducted as a CERCLA response action (removal action or remedial action) or RCRA corrective action.



**NOTE:**

Operable Unit 3 includes all buildings, pipelines, and aboveground structures in the former production area. Operable Unit 5 includes groundwater, surface water, soil, sediment, flora and fauna within the regional area as well as the former production area.

**LEGEND:**

-  Operable Unit 1
-  Operable Unit 2
-  Operable Unit 4
-  FEMP Boundary (CAMU Boundary)
-  County line



1200 600 0 1200 FEET

Figure 1. FEMP Site showing operable units and CAMU boundaries