

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OCTOBER 25, 1991

MEMORANDUM

SUBJECT: Managing the Corrective Action Program  
for Environmental Results: The RCRA Facility  
Stabilization Effort

FROM: Sylvia K. Lowrance, Director  
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TO: Regions I-X RCRA Waste Management Division Directors

The purpose of this memo is two-fold. First, we are transmitting to you some important guidance documents that have been developed to ease the implementation of the RCRA facility stabilization effort. Second, and perhaps more importantly, we wanted to take this opportunity to ask for your help and personal involvement in making the stabilization effort a reality. Fully embracing this effort means adjusting our Program's philosophy by placing increased emphasis on taking actions at many facilities to prevent situations from getting worse. We need your help in transmitting this message down through the ranks and in identifying and overcoming obstacles to success.

When the RCRA Implementation Study (RIS) was issued in July, 1990, it suggested that the RCRA Corrective Action Program needed to adjust its longtime program emphasis. In essence, the RIS recommended that we adopt as our program strategy more frequent use of interim actions to achieve near term environmental results at facilities with the most serious problems. While final cleanup is still the long-term goal for the corrective action program, this strategy emphasizes the importance of controlling releases and stabilizing sites to prevent the further spread of contamination as the first phase of corrective action. Stabilization of RCRA facilities means that we take whatever action is necessary at as many facilities as possible to address actual exposures (imminent risks) and to prevent the further spread of contamination. Although we recognize that stabilization actions will not always be appropriate or possible, we should demonstrate a "bias" for stabilization actions in the way we manage corrective action at RCRA facilities. We need your full support and dedication to this effort for it to be successful.

Over the course of the past year, Headquarters and the Regions have worked hard to take this recommendation and pave the road to implementation. The FY92 RCRA Implementation Plan (RIP) identifies stabilization activities as an area of national program emphasis and outlines the STARS measures associated with evaluating facilities for stabilization actions, and with implementing those measures. Further, this memo includes as attachments several guidance documents and a proposed checklist for completing stabilization actions. We hope that you will find this guidance, which was developed with a great deal of regional involvement, helpful as you begin implementing this important initiative.

Thank you for your efforts and your continuing support.

## **RCRA STABILIZATION STRATEGY**

### **Goals**

One of the major recommendations of the RCRA Implementation Study (RIS) calls for the RCRA corrective action program to adopt as a program management goal the "stabilization" of RCRA facilities as soon as possible. Over the next several years, the Agency and the States will begin implementing a major initiative to achieve this goal. This strategy paper is intended to:

- Explain the concept of facility stabilization; and
- Discuss the basic data needs to make decisions concerning facility stabilization and future guidance development in this area.

The overall goal of stabilization is to, as situations warrant, control or abate threats to human health and/or the environment from releases at RCRA facilities, and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued.

Implementing the stabilization strategy will yield substantial benefits for the corrective action program. Focusing resources in the near term on stabilizing environmental problems, rather than pursuing final, comprehensive remedies at all facilities, should enable the Agency and States to control the most serious environmental problems at a larger number of facilities, more quickly. Furthermore, by imposing such expeditious controls the extent and incidence of continued environmental degradation from existing releases should be significantly reduced. However, if a stabilization measure is found to be inconsistent with the final remedy or the waste or site conditions, it should be modified or not be imposed.

### **Process**

To a large extent, this stabilization effort builds on work that has been ongoing in EPA Regions and States. Although stabilization is a new RCRA strategy, it will not create a new regulatory or administrative process. Stabilization measures will be implemented through the existing process described in the proposed RCRA corrective action rule, and in the RCRA Interim Measures Guidance Document. Interim measures are the corrective action activities used to achieve the goal of stabilization. Regions have already required a large number of facility owners/operators to undertake interim measures to address obvious environmental problems, particularly where actual or imminent exposure of human or environmental populations has been identified.

Interim measures, as discussed in the proposed corrective action rule and in the RCRA Interim Measures Guidance, may be conducted at a facility whenever the Agency determines that a release, or threat of a release, poses a threat to human health or the environment. These releases may be actual, imminent, or potential, and pose a threat to such receptors as human populations, animals, ecosystems, and/or drinking water.

Along with interim measures, other RCRA remedial approaches (e.g., conditional remedies and voluntary actions by owner/operators) will also be used to achieve stabilization. These remedial approaches are intended to phase-in over time and, therefore, may include stabilization activities to control the migration of wastes on-site and to expedite cleanup of releases that have migrated beyond the facility boundary. Voluntary corrective actions may be conducted at RCRA facilities that wish to initiate stabilization activities rather than wait for EPA to begin actively pursuing corrective action at the facility. Voluntary activities, however, do not release owners/operators from RCRA liability or exempt them from future Agency action, if necessary.

While this stabilization effort builds upon ongoing activities, the significant change is that the national program is adopting the philosophy that overall there are increased environmental benefits associated with taking stabilization actions at more facilities in the near to mid-term, prior to pursuing final, comprehensive remedies at most facilities. However, RCRA Facility Investigations (RFIs) will continue, albeit at a slower pace, at many facilities since they are necessary for the ultimate cleanup of a facility.

By implementing stabilization measures at a facility, the Agency may be able to limit active oversight of the facility while addressing other high priority facilities; in other circumstances, stabilization could simply be a milestone within a continuing remediation process. There may also be cases where a stabilization measure could be technically effective enough to serve as a final remedy for a particular release (e.g., when stabilization achieves final clean-up levels). Consideration of the stabilization measure as a final remedy would be based upon evaluation of performance monitoring data collected after the measure was implemented. In addition, public participation should be a part of any stabilization action that is viewed as the potential final remedy for the facility.

Procedurally, it is expected that stabilization will typically involve an evaluation of RCRA Facility Assessment (RFA) information to identify the need for stabilization techniques. Subsequent information gathering during the RFI should be focused to support technical decisions regarding the stabilization approach chosen, and implementing the technical "fix." Although public participation should be a part of a stabilization action that serves as the final remedy, interim measures that are part of a permit or order do not necessarily have to be public noticed at the time the measure is implemented.

The initiation of the stabilization "process" will be primarily a function of the overall priority of the facility, as determined by the national corrective action prioritization protocol. The Agency will assign the highest priority to those facilities that are determined to pose actual or imminent exposure threats to human populations or environmental receptors. Regions and States can also impose stabilization measures at middle and low priority facilities after appropriate actions have been taken to stabilize releases at high priority facilities.

## **Technical Considerations**

Stabilization is a new program philosophy and should not be confused with measures that were historically considered stabilization technologies. Many of the stabilization technologies had the goals of immobilizing wastes and included solidification, vitrification, and other immobilization techniques. Although these technologies may be effective as stabilization measures in certain situations, this effort is broader and includes other source control measures along with measures that will mitigate the further spread of contamination. Measures to stabilize releases or other environmental problems could include the installation of a large scale pump and treat system combined with treatment and/or containment-based source control actions. In addition, exposure controls, such as fences, other access controls, or provision of alternative water supplies, may also be required to mitigate actual or imminent exposure to health threats.

Stabilization may be appropriate for a facility under any of the following conditions:

- There are releases at the facility which pose actual or imminent exposure threats to humans or ecosystems at levels of concern;
- There are releases that, if not addressed expeditiously, will result in further significant contamination of environmental media in the near to mid-term (e.g., 5-10 years); or
- The site characteristics suggest that the site may be amenable to measures designed to control or abate imminent threats or prevent or minimize the further spread of contamination.

Information needed to answer these questions may be available after the RFA has been completed, especially data on imminent threats. However, in many situations data on the fate and transport of hazardous constituents will not be available until the RFI is underway or completed. Given that the selection of an appropriate stabilization measure is dependent upon the collection of sufficient site/unit characterization data, the Agency suggests that data needed to make decisions on stabilization be gathered up-front in the RFI process. Figure 1 briefly outlines some key decision points for selecting stabilization measures.

Stabilization measures should be applied to address releases to all environmental media. Technical limitations of remedial efforts (such as restoring contaminated ground water to drinking water quality), and lack of detailed information on contaminants and releases (such as with air releases), further underline the need to focus remedial efforts on preventing the further spread of existing contamination problems, as well as preventing new contamination from occurring.

The timing, process, and technical approach to stabilizing facilities will vary widely, and will be highly dependent on a variety of site-specific factors. These factors could include:

- Environmental significance (i.e., priority) of the facility;
- Immediacy of exposure threats;

- Types of contaminants and volumes of releases;
- Technical complexity of remediation;
- Site hydrogeology, characteristics; and

decisions for stabilization will also vary greatly. Obvious removal-type situations might often be done more or less immediately, without extensive studies; while ground-water contamination in a complex hydrogeologic setting could require extensive investigations before an effective stabilization remedy could be chosen.

The Office of Solid Waste and Emergency Response (OSWER) is developing guidance that specifies the types of environmental problems which should be the focus of stabilization actions. The guidance will specify technical approaches to accelerate data gathering to support decisions on appropriate stabilization measures, and describe phasing the RFI process to gather the necessary data to make decisions regarding stabilization. Draft guidance should be available in the fall, 1991.

The OSWER is also working closely with the Office of Research and Development, Center for Environmental Research Information (ORD-CERI) to produce guidance on stabilization technologies and case studies of successful implementation of stabilization technologies. Several actual examples of stabilization technologies that have been implemented at RCRA facilities will be used as case studies for discussing the appropriateness of certain technologies. In addition, the technical guidance document will cover data needs, performance criteria, and environmental conditions. This document should also be available in the fall, 1991.

## **INTRODUCTION TO THE CORRECTIVE ACTION STABILIZATION QUESTIONNAIRE**

### **Decision Strategy**

The question of whether to implement stabilization measures at a RCRA facility undergoing some phase of corrective action should be answered based upon a series of policy and technical judgments. Many of these individual judgments are difficult to quantify and, therefore, must be based upon the professional judgment of Federal and State environmental regulators responsible for implementing the RCRA corrective action program. These judgments, as a group, should form a basis upon which the relative benefits to be gained through stabilization at a particular facility are weighed. The types of benefits envisioned through facility stabilization include limited contaminant migration, reduced volume of contaminated media, and lowered risk to human health and the environment.

The attached questionnaire attempts to prompt the decision making process by asking both policy and technical questions regarding stabilization of a facility. For each question, a short discussion of the importance and relevance of the answer is provided below. It may be useful to refer to these short discussions as the questionnaire is completed.

### **Background Facility Information**

Question 1                      Is this checklist being completed for one solid waste management unit (SWMU), several SWMUs, or the entire facility? Explain.

A strategy for stabilization may be considered or implemented for either an entire facility, a specific SWMU, or a group of SWMUs. Stabilization activities, while addressing releases from one or more SWMUs, are likely to concentrate on a specific environmental medium, such as ground water, surface water, air, or soil. The SWMU(s) and media being considered for stabilization should be recorded in the spaces provided.

### **Status of Corrective Action Activities at the Facility**

Question 2                      What is the current status of HSWA corrective action activities at the facility?

The current status of HSWA corrective action activities is a major factor for consideration when deciding whether and when to implement a stabilization strategy at a particular facility. Stabilization should be considered an option at a facility up until the point where it becomes more expedient and cost-effective to implement the final corrective measures. Generally, the immediate implementation of final corrective measures, rather than stabilization measures, becomes more efficient after the Corrective Measures Study (CMS) is completed, because the effort and resources that might be used to plan, design, and construct stabilization structures may be more effectively spent on Corrective Measures Implementation (CMI).

Interim measures may be implemented at any point in the corrective action process and if they have been implemented, they should be noted on the questionnaire in addition to the other activities listed.

Question 3                      If corrective action activities have been initiated, are they being carried out under a permit or an enforcement order?

Corrective action activities are usually carried out under the authority of either a RCRA operating or post-closure permit, or under a RCRA §3008(h) administrative order. The authority used for an ongoing corrective action project at a particular facility will affect the ease with which a stabilization strategy can be incorporated into an existing compliance schedule. The extra time needed for public comment, State concurrence, and other administrative requirements associated with modifying or revising either a permit or an order (to incorporate stabilization) should be taken into account when considering whether stabilization is appropriate for a given facility because as the time required to address procedural requirements increases, the benefits potentially derived from stabilization decrease.

Question 4                      Have interim measures, if required or completed [See Question 2], been successful in preventing the further spread of contamination at the facility?

If interim measures have been implemented at a facility and they have been successful in preventing the further spread of contamination from all significant releases, stabilization has, in effect, been accomplished. In this case, additional stabilization measures should not be required. Conversely, if interim measures have not been carried out, or if they have not been successful in limiting the spread of contamination, stabilization measures should eventually be considered for this facility.

*EPA is currently evaluating facilities for stabilization based upon the priority ranking a facility receives under the RCRA National Corrective Action Prioritization System. At this time, the Agency is only evaluating those facilities that have been ranked as "high" priorities. Therefore, the attached questionnaire need only be completed when evaluating those facilities ranked as high priorities and where interim actions are not yet under way or have been unsuccessful in preventing the further spread of contamination at the facility.*

## **Facility Releases and Exposure Concerns**

Question 5                      To what media have contaminant releases from the facility occurred or been suspected of occurring?

Releases of hazardous materials to any environmental media are a serious concern. Stabilization measures are generally technically feasible for any of the four environmental media (ground water,



surface water, air, or soils), and stabilization should be considered wherever this type of action could limit the further spread of contaminant migration.

Question 6                    Are contaminant releases migrating off-site?

Off-site migration of contaminants generally indicates the need for some stabilization measure to limit contaminant movement until final corrective measures can be implemented.

Questions 7a and 7b    Are humans currently being exposed to contaminants released from the facility?

Is there a potential for human exposure to the contaminants released from the facility over the next five to 10 years?

The actual occurrence, or the near- to mid-term (i.e., within five to 10 years) potential, of human exposure to released contaminants is a factor supporting the implementation of stabilization measures. The type of exposure that has occurred is an important consideration in determining the type of stabilization measure employed for a facility or SWMU. The stabilization measure considered should eliminate or significantly reduce the human exposure levels at and near the facility.

The make-up of the exposed population (e.g., facility employees, nearby home owners, school children, nursing home residents) and the duration of exposure are factors that should be considered when determining the type of stabilization or corrective measure to be implemented. Exposure of high-risk populations, such as children, may require the implementation of “real-time” stabilization measures, perhaps even emergency measures, to immediately reduce the contaminant levels near that population sooner than may be possible with final corrective measures.

The potential short term and long-term effects of human exposure to released contaminants should be considered when determining the need for stabilization measures. Any significant exposure concern is a factor in favor of implementing stabilization measures.

Questions 8a and 8b    Are environmental receptors currently being exposed to contaminants released from the facility?

Is there a potential that environmental receptors could be exposed to the contaminants released from the facility over the next five to 10 years?

The existence of potential threats to the environment from the release of hazardous constituents is to be considered a factor in favor of implementing stabilization measures. Environmental receptors include terrestrial and aquatic organisms, food chain plants and animals, vital ecology or potential natural resources, and Class I or other aquifers. The time frame over which these threats may materialize (i.e., will the threat materialize before final corrective measures can be implemented) should be used to determine the immediacy of the need for stabilization measures.

## **Anticipated Final Corrective Measures**

Question 9                    If already identified or planned, would final corrective measures be able to be implemented in time to adequately address any existing or short-term threat to human health and the environment?

Final corrective measures, which sometimes can be identified early in the RFI, should always be designed to reduce or eliminate, to the degree practicable, both short-term and long-term risks posed by the release of hazardous constituents. If final corrective measures are currently being planned or constructed, it is unlikely that any relatively new stabilization measures could be implemented fast enough to be more effective in reducing short-term threats to human health and the environment. Therefore, if final corrective measures have reached the planning stages, it should be considered a factor against the implementation of stabilization measures.

Questions 10 and 11        Could a stabilization initiative at this facility reduce the present or near-term (e.g., less than two years) risks to human health and the environment?

If a stabilization activity were not begun, would the threat to human health and the environment significantly increase before final corrective measures could be implemented?

If it can be determined that a “fast-track,” or quickly implementable, stabilization measure could significantly reduce the present or near-future risks to human health and the environment, stabilization measures should be favorably considered. Similarly, if it can be determined that the absence of stabilization measures would result in a significantly greater risk to human health and the environment, stabilization measures should be favorably considered.

## **Technical Ability to Implement Stabilization Activities**

Question 12                    In what phase does the contaminant exist under ambient site conditions?

The physical phase of a contaminant will affect the technical practicability of stabilization. See Attachment A for a preliminary analysis of types of waste constituents that may be stabilized by various remediation technologies.

Question 13                    Are one or more of the following major chemical groupings of concern at the facility?

Some contaminants are more amenable to stabilization techniques than others. See Attachment A for a preliminary analysis of types of waste constituents that may be stabilized by various remediation technologies.

Question 14                    Are appropriate stabilization technologies available to prevent the further spread of contamination, based on contaminant characteristics and the facility's environmental setting? [See Attachment A for a listing of potential stabilization technologies.]

The implementation of stabilization measures is, of course, dependent upon the availability of appropriate technologies and techniques. Attachment A lists a series of hazardous waste site remediation technologies and techniques that have potential applicability for stabilization of certain wastes under certain conditions. If there are no identified technologies appropriate for stabilizing contamination at this facility, this evaluation is complete and the rest of this questionnaire need not be completed.

Question 15                    Has the RFI, or another environmental investigation, provided the site characterization and waste release data needed to design and implement a stabilization activity? If No, can these data be obtained faster than the data needed to implement the final corrective measures?

Stabilization measures should not be considered for implementation until adequate site characterization and waste release data are available. Gathering data specifically for stabilization is not a worthwhile endeavor if the data for a final corrective measure are more readily available or quicker to obtain.

### **Timing and Other Procedural Issues Associated with Stabilization**

Question 16                    Can stabilization activities be implemented more quickly than the final corrective measures?

Generally, stabilization measures should not be implemented unless they can be put in place more quickly and/or more efficiently, or will be effective significantly sooner than final corrective measures.

Question 17                    Can stabilization activities be incorporated into the final corrective measures at some point in the future?

Stabilization measures should generally be amenable to incorporation into the final corrective action project. Measures that cannot be successfully integrated into the overall site remediation should be able to significantly and predictably reduce threats to human health or the environment, or produce some other beneficial effects deemed important by the Administrator.

### **Conclusion**

Question 18

Is this facility an appropriate candidate for stabilization activities?

The decision of whether or not to implement stabilization measures at a facility is a professional judgment that should be based upon a careful weighing of factors such as those described above. There may also be other site-specific factors that enter into the decision, and these factors and their consequences should be documented in an appropriate manner.

In most cases, stabilization should only be implemented if it offers some clear advantages (in terms of protecting human health and the environment) over waiting for the implementation of final corrective measures. The stabilization measure used at a facility should be at least a part of the final corrective measure, with changes in timing and short-term goals (limiting contaminant movement versus contaminant cleanup) being the major points setting it apart from the final measures.

--Copy of the original survey.