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**TITLE:**

Advancing the Use of Treatment Technologies for Superfund Remedies

**APPROVAL DATE:** 2/21/89

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B- Pending AA-OSWER approval  
C- For review &/or comment  
D- In development or circulating  
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# OSWER Directive Initiation Request

1. Directive Number

9355.0-26

## 2. Originator Information

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## 3. Title

Advancing the Use of Treatment Technologies for Superfund Remedies

## 4. Summary of Directive (include brief statement of purpose)

Affirms the use of treatment technologies at Superfund sites and summarizes guidance documents and activities that encourage and support the use of innovative treatment technologies.

5. Keywords Superfund, CERCLA, SARA

## 6a. Does This Directive Supersede Previous Directive(s)?

No

Yes

What directive (number, title)

## b. Does It Supplement Previous Directive(s)?

No

Yes

What directive (number, title)

## 7. Draft Level

A - Signed by AA/DAA

B - Signed by Office Director

C - For Review & Comment

D - In Development

8. Document to be distributed to States by Headquarters?

Yes

No

This Request Meets OSWER Directives System Format Standards.

## 9. Signature of Lead Office Directives Coordinator

Betti VanEpps

Date

2/21/89

## 10. Name and Title of Approving Official

Henry L. Longest, Director, OERR & Bruce Diamond, Director OERD

Date

2/21/89

EPA Form 1315-17 (Rev. 5-87) Previous editions are obsolete.

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

FEB 21 1989

OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE  
OSWER Directive No. 9355.0-26

MEMORANDUM

SUBJECT: Advancing the Use of Treatment Technologies for  
Superfund Remedies

FROM: Henry L. Longest, Director  
Office of Emergency and Remedial Response

Bruce Diamond, Director  
Office of Waste Programs Enforcement

TO: Addressees

Purpose

To reaffirm the use of treatment technologies at Superfund sites and summarize guidance documents and activities that encourage and support the use of innovative treatment technologies.

Background

The CERCLA amendments emphasize achieving protection that will endure over long periods of time by mandating the use of permanent solutions to the maximum extent practicable. Fundamental to achieving this goal is the aggressive use of treatment technologies that reduce the intrinsic threats posed by hazardous waste. To assist in determining the appropriate extent to which treatment should be used, the proposed National Contingency Plan lays out the following expectations which should be used when developing and evaluating site alternatives, and in remedy selection:

1. The objective is to select remedies that provide reliable, effective response over the long term (i.e. permanent remedies).
2. Although protection of human health and the environment may be fulfilled through a variety of means, the range of alternatives should demonstrate a strong preference to use treatment to address the principal threats posed by a site, wherever practicable.
3. The highest priority for treatment will be given to liquids, other highly mobile materials, and highly concentrated toxic compounds.

4. Treatment is less likely to be appropriate for low-concentrations of immobile wastes which pose a relatively low long-term threat. Engineering measures that control exposure, such as containment, may be more appropriate for these sites.
5. Containment may also be appropriate for large scale sites where treatment is infeasible or clearly impracticable.
6. Often, a combination of treatment and containment will be the most appropriate remedy.
7. Institutional controls (e.g. deed restrictions, prohibitions of well construction) should be used to supplement engineering controls for short- and long-term management and prevent exposure during the implementation of treatment alternatives such as ground water restoration.
8. Ground waters will be restored to their beneficial uses within reasonable periods of time, wherever practicable.

These expectations should lead to an aggressive but realistic use of treatment in the Superfund program. This memorandum highlights provisions of key guidances that address the use of treatment technologies and describes a number of activities underway which will promote a greater use of new and innovative treatment technologies.

### Objective

The objective of this guidance is advancing the use of treatment technologies to ensure compliance with the mandates in the CERCLA amendments and the expectations delineated in the proposed National Contingency Plan (NCP). Also, it is intended to encourage greater use of new and innovative technologies.

### Implementation

Each Regional program should develop a strategy for advancing the use of treatment technologies and emphasizing new and innovative technologies. The plan should take into account the summary information provided below.

### NATIONAL CONTINGENCY PLAN - THE NCP ADVOCATES THE USE OF TREATMENT TECHNOLOGIES

The proposed NCP emphasizes the use of treatment technologies in selection of remedial actions in several ways. First, in deference to the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume, the NCP

directs that alternatives in this range would vary from those that remove or destroy contaminants to the maximum extent feasible to those that at least treat the principal threats at a site. Second, by statute all remedial actions must utilize alternative treatment technologies to the maximum extent practicable. The NCP makes this statutory mandate a driving factor in balancing a number of other factors such as long and short-term effectiveness, implementability, and cost. In this context, the NCP gives clear expectations for the role of treatment in remedy selection: it will be used most often for highly toxic, highly mobile waste, whereas containment is generally reserved for low concentrations of toxic materials or relatively immobile wastes. The NCP encourages development of alternatives using technologies that have not yet been proven in practice in order to promote the development and use of new treatment methods for hazardous substances.

New and innovative technologies fall into this category and the NCP requires the development of one or more innovative technologies for further consideration if the technology offers potential for better treatment or lower cost for similar performance than demonstrated treatment technologies.

#### DIVERSITY OF TECHNOLOGIES - THE AGENCY NEEDS TO PROMOTE USE OF TECHNOLOGIES IN ADDITION TO THERMAL DESTRUCTION AND SOLIDIFICATION

A review of the FY 87 RODs indicated that treatment technologies for source control remedies were selected 48% of the time and of those technologies selected, thermal destruction and solidification were selected 63% of the time. In FY 88, treatment technologies were selected in 67% of the RODs with thermal treatment and solidification accounting for 54% of the treatment technologies. Other technologies such as soil aeration, soil washing, biodegradation, and vacuum extraction were selected less often with few, if any, in the chemical treatment category.

In the recent OSWER publication Technology Screening Guide for Treatment of CERCLA Soils and Sludge a number of promising technologies for soil and sludge treatment are identified. Those promising technologies suitable for the waste in question should be considered during the technology screening and alternative analysis phases of the feasibility study. Examples of innovative technologies that should be considered include chemical extraction, glycolate dechlorination, in-situ vitrification and chemical reduction oxidation. The Superfund program needs to continuously search for new technologies that can achieve greater performance at lower cost. Innovative technologies can be considered as the primary treatment mechanism for a site or as a pretreatment unit process in a more comprehensive treatment train.

RI/FS GUIDANCE - THE GUIDANCE CONTAINS PROVISIONS  
THAT EMPHASIZE SELECTION OF  
INNOVATIVE TREATMENT TECHNOLOGIES.

The interim final RI/FS guidance indicates that innovative technologies would be carried through the technology screening phase if there is potential that the innovative technology would offer significant advantages including better treatment or lower cost. The new or innovative technology would be evaluated against the nine evaluation criteria taking into account its potential. The advantages in performance or cost as compared with more demonstrated technologies should be discussed in the comparative analysis step. This evaluation would be documented in the Proposed Plan and ROD together with any uncertainties associated with the technology.

TREATABILITY STUDIES - TREATABILITY STUDIES SHOULD BE  
UNDERTAKEN DURING THE RI/FS,  
AND RI/FS COST/SCHEDULE GOALS ARE  
NOT A DETERRENT.

Treatability studies and where appropriate, pilot-scale testing of a technology should be conducted during the RI/FS. This is especially true for new and innovative technologies in order to better understand the expected advantages and to assist with the nine criteria evaluation. It should be noted that the cost for these studies and the timing for completing them are over and beyond the target RI/FS cost of \$750K and 18 month schedule. However, these program management goals should not be viewed as a deterrent to the evaluation and use of new technologies. Sources of funds for treatability studies include the RI/FS budget and savings based on PRP settlements. Large scale pilot studies might necessitate possible reprogramming from the RA budget.

ROD GUIDANCE - BOTH INNOVATIVE AND PROVEN TREATMENT TECHNOLOGIES  
CAN BE SELECTED IN A RECORD OF DECISION

The draft ROD guidance has been revised to take into account the unique circumstances surrounding the selection of innovative technologies. The guidance states that an innovative treatment technology may be selected even though it has not achieved remedial objectives in practice at any other facility or site. The innovative technology should provide advantages similar to those provided by other technologies evaluated, with respect to the nine evaluation criteria. Where there are uncertainties associated with a technology and a pilot scale test is proposed during design, a proven treatment technology could be included in the Proposed Plan and ROD as a contingent remedy. If two different innovative technologies appear to be equivalent with respect to the evaluation criteria, these comparable treatment

technologies may be included as a selected remedy and a contingent remedy, respectively, in the Proposed Plan and ROD. Information contemplated by the ROD but developed after it may prompt the lead Agency to select the contingent remedy.

**ENFORCEMENT - NEGOTIATIONS AND COST RECOVERY ARE IMPACTED BY  
INNOVATIVE TECHNOLOGY RODS**

Innovative technology RODs may facilitate the Agency's negotiating position when the PRPs have agreed to the approach, and make negotiation difficult when they do not. Difficult negotiations are most likely where innovative technologies are proposed for sites where containment remedies are consistent with CERCLA mandates. PRP concerns generally focus on continued liability in the event of remedy failure, implementability problems, and cost. If a treatment remedy fails or if costs are relatively high compared to other arguably effective remedies, PRPs will attempt to argue that the U.S.EPA is not entitled to full cost recovery. For the smooth operation of the program, it is important to conduct treatability studies during the RI/FS.

Contingent RODs can improve or detract from the Agency's negotiating position, depending on the contingencies involved. The conditions for implementation of the remedy may have a greater effect than the contingent remedies selected. The expected performance levels for the innovative technology must be clearly stated in the ROD, or negotiation delays will result.

An example of a positive impact is when a ROD specifies two innovative technologies as the selected and contingent remedies, respectively. The PRPs may find more incentive to perform the RD/RA since there is an opportunity to generate design-specific data related to the performance of these technologies prior to final specification of the technology that will be implemented. This may allow them to achieve performance requirements without necessarily being required to implement the most expensive remedy. An example of a negative impact is when costs associated with the innovative technology tested, but not selected, are challenged in a cost recovery action.

**REMOVAL PROGRAM - USE OF TREATMENT TECHNOLOGIES IS  
STRONGLY ENCOURAGED IN THE REMOVAL  
PROGRAM**

The removal program's draft guidance on treatment technology encourages its use even where the cost exceeds that of land disposal. On-Scene Coordinators may use the guidance to determine, justify, and document the selection of an alternative to land disposal, and plan procurement of the selected alternative. The guidance is limited to those procedures for

classic emergencies where immediate response is needed, and other time-critical actions where response must be initiated within six months of the determination that a removal is appropriate. Included are guidelines for categorizing waste, classifying technologies according to their developmental status, and analyzing and selecting treatment technologies.

COMMUNITY RELATIONS - COMMUNITIES MUST BE INVOLVED EARLY  
IF TREATMENT TECHNOLOGIES ARE BEING  
CONSIDERED

The interim final RI/FS guidance indicates that emphasis must be placed on ensuring that the community is informed of the alternatives including new and innovative technologies and given reasonable opportunity to provide input during the detailed analysis step. Community input specifically as it relates to new technologies should not be put off until the formal public comment period, since more time may be needed to understand the advantages of the technology. Additionally, any uncertainties and short-term impacts including mitigating measures should be presented to the community. On-site, pilot scale treatability studies should be coordinated with the community prior to initiating the work. Also, as time permits given the exigencies of the circumstances, the communities should be involved early when selecting treatment technologies for removal actions.

SITE PROGRAM - SITE PROGRAM ACCOMPLISHMENTS AND  
INFORMATION CLEARINGHOUSE

The Superfund Innovative Technology Evaluation (SITE) program has completed seven field demonstrations for new treatment technologies, including infrared incineration, solidification, in-situ vacuum extraction, oxygen-enhanced incineration and solvent extraction. The SITE program has developed an information clearinghouse to collect, synthesize, and disseminate technology performance data. The clearinghouse includes a hotline, electronic bulletin board and a collection of reports in the Agency Library's Hazardous Waste Collection. This information should be used when developing the initial list of technologies and during the selection of remedy evaluations. Further information can be obtained from John Kingscott at (FTS) 382-4362.

INFORMATION TRANSFER - OERR INFORMATION TRANSFER PROGRAM  
FY 89

OERR is continuing its information transfer program and has scheduled a number of conferences and meetings to present information on technologies, policy, and guidance documents to the Regions, States, ARCS/REM contractors, and hazardous waste



consulting firms. The following is a list of planned meetings and conferences:

- o ARCS/REM/TES Technical Information Forum, Feb 22-23, 1989, Wash., DC
- o EPA/HWAC Policy Seminar, June 7-8, 1989, St. Louis
- o Forum on Innovative Hazardous Waste Treatment Technologies: Domestic and International Conference, June 19-21, 1989, Atlanta

#### FURTHER GUIDANCE

This memorandum only highlights some of the key guidance provisions that strengthen the use of new and innovative technologies in the removal, remedial and enforcement programs. Additional guidance will be developed which focuses specifically on selection of new and innovative technologies. The goal of this initiative is to develop a diversity of technologies that will meet the CERCLA expectations and result in more cost-effective remedies.

#### ADDRESSEES

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Director, Waste Management Division  
Regions I, IV, V, VII, VIII

Director, Emergency and Remedial Response Division  
Region II

Director, Hazardous Waste Management Division  
Regions III, VI

Director, Toxic and Waste Management Division  
Region IX

Director, Hazardous Waste Division, Region X

Regional Superfund Branch Chiefs  
Regions I - X

cc: Betti Van Epps (OERR Directives Coordinator)