



**DIRECTIVE NUMBER:** 9380.0-17

**TITLE:** Furthering the Use of Innovative Treatment  
Technologies in OSWER Programs

**APPROVAL DATE:** June 10, 1991

**EFFECTIVE DATE:**

**ORIGINATING OFFICE:** TIO

☒ **FINAL**

☐ **DRAFT**

**LEVEL OF DRAFT**

☒ **A — Signed by AA or DAA**

☐ **B — Signed by Office Director**

☐ **C — Review & Comment**

**REFERENCE (other documents):**

---

**SWER      OSWER      OSWER**  
**DIRECTIVE   DIRECTIVE   DI**

---



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

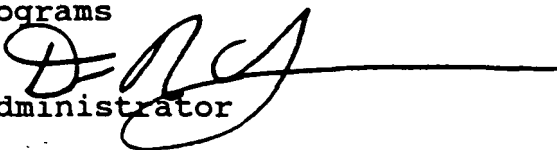
JUN 10 1991

OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE

**OSWER Directive**  
**9380.0-17**

**MEMORANDUM**

**SUBJECT:** Furthering the Use of Innovative Treatment Technologies  
in OSWER Programs

**FROM:** Don R. Clay   
Assistant Administrator

**TO:** Director, Waste Management Division,  
Regions I, IV, V, VII, and VIII  
Director, Environmental Services Division,  
Regions I, VI, and VII  
Director, Emergency and Remedial Response Division,  
Region II  
Director, Hazardous Waste Management Division,  
Regions III, VI and IX  
Director, Hazardous Waste Division, Region X  
Director, Water Management Division, Regions IV and X

I want to exercise further leadership in the use of innovative technologies--by creating additional incentives for affected groups such as potentially responsible parties, facility owners/operators, consulting engineers, technology vendors and the public and by using tools currently at our disposal. EPA and responsible parties or facility owners/operators, should be exploring and promoting more effective and less costly technologies to solve the considerable problems we face. Consulting engineers and new technology vendors are essential partners in this process as well.

While I believe our clean-up partners can and will promote the implementation of innovative technology, we need to inject a sense of responsible urgency to prevent the expenditure of dollars in pursuing less effective or more costly remedies. We have made some important progress to date, and now is the time to broaden our efforts and expand into additional program areas. Furthermore, we have a responsibility to provide technological leadership to the other major environmental clean-up programs society will be pursuing beyond those administered by OSWER. This leadership will not only improve the quality and efficiency of cleanups, but will also help make U.S. firms leaders in the international marketplace for waste treatment and site remediation.



Each of the affected groups sees some risk tied to an effort to "push on the envelope" of technology application. However, these risks are directly related to potential benefits -- both short-term at a particular site and long-term benefits which will accrue from knowledge gained by our experiences. Only if some of us are willing to work constructively with our uncertainty is there reason to expect significant progress toward more applications of technologies that are truly innovative.

I understand innovation requires a sense of creativity and may be accompanied by false starts, second attempts, intensively re-engineered solutions, and (despite best efforts) some equipment failures. I recognize that while most will agree with the need for new and better approaches, the inherent risks associated with early technology use serve as very serious impediments. The extensive review and criticism of our programs from both outside and inside the Agency may have tended to make us averse to unnecessary risks. It should be recognized that however well-designed and carefully planned our efforts may be, they may not meet contract specifications on many first attempts and may need refinement before routine application can be expected. Indeed, information gained from a first-time application that fails to perform as designed may be viewed as a form of success.

In addition, this definition of innovation needs to be recognized by EPA regional and headquarters managers. Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs) must have support from their managers if an innovative technology does not work as expected. The program should recognize and assume the risks inherent in using new technologies. The challenges these projects present will usually require great efforts from our most competent and experienced RPMs and OSCs. They should view these challenges as career opportunities rather than as career risks.

Innovative treatment technologies should be routinely considered as an option in engineering studies where treatment is appropriate. They should not be eliminated from consideration solely because of uncertainties in their performance and cost. These technologies may be found to be cost-effective, despite the fact the their costs are greater than conventional options, after consideration of potential benefits which could include increased protection, superior performance, and greater community acceptance. In addition, future sites will benefit by information gained from the field experience.

The attached directive is designed to increase field applications of innovative technologies for cleaning up contaminated sites. It also encourages expanded application of existing OSWER policies and emphasizes the value of existing support activities in this area. It is intended to sharpen the focus and level of attention by EPA staff and managers on their mission to provide technological leadership by implementing existing authorities under the Superfund, Resource Conservation and Recovery Act (RCRA), Underground Storage Tank (UST), and Oil

Pollution Act programs. Furthermore, this guidance is intended to integrate the continual search for improved remedies with the use of new technologies and to make this objective a permanent feature of EPA's clean-up programs. It is intended to create an atmosphere which recognizes that reasonable risk-taking, which is protective of human health and the environment, is necessary to achieve this end.

The statement consists of seven major initiatives. The first four initiatives concern the Superfund program. The first one addresses some impediments to the full-scale use of new equipment and encourages expedited funding of remedial design and construction projects. This initiative also provides contract flexibility in the start-up phase of selected remedial and removal actions to assist vendors in establishing a pattern of reliable operation in order to satisfy contract performance standards. The second initiative is intended to ensure that innovative alternatives are thoroughly evaluated for PRP-lead sites that are early in the planning process. This provision encourages EPA regions to fund treatability studies and engineering analyses for promising treatment technologies that might otherwise be considered unproven by the PRPs and too early in the development process. The third initiative provides a capability to rapidly evaluate the efficacy of a PRP-proposed innovative remedy that is offered in addition to the primary one approved in the Record of Decision (ROD). This provision entails direct technical support to evaluate innovative remedies, while moving the remediation process forward. The fourth initiative seeks to utilize the potential of the removal program for expanding our experience with the field application of new technologies. The directive clarifies OSWER's position that the removal program is an important and viable means for furthering the use of these treatment alternatives.

Another provision in the guidance is designed to encourage studies on the potential use of new technologies for RCRA corrective action. Regions should consider promoting the pilot testing of promising innovative technologies at a limited number of sites. In the past, land ban considerations have sometimes discouraged owners/operators or regions from pursuing such approaches. This guidance encourages the use of soil and debris treatability variances, where necessary, to allow innovative technology studies to proceed. This authority was recently delegated to the regions.

The sixth initiative recognizes unique opportunities presented by Federal facilities. We are exploring the potential use of these facilities for developing and applying new technologies, and regional offices are encouraged to work with Federal facility managers to further this objective.

The final provision encourages expanded use of the Federal Technology Transfer Act as an opportunity for joint technology assessments with industry. PRPs and owners/operators may sign cooperative agreements with EPA for services to support innovative

technology treatability or pilot studies. This procedure offers the prospect of non-adversarial engagement, outside the regulatory context, to allow the development of third-party data on remediation technologies.

I know there is a tension created by the desire to promote new technology developments within existing management tracking systems and program commitments and goals. I recognize that these goals may also be statutory in origin. Issues are certain to arise concerning the selection and use of new treatment technologies because of the rapid pace of development in this area. These issues cannot be resolved by this guidance and must be addressed through common sense and judgement on a case-by-case basis. There may be circumstances where program goals and commitments must be adjusted in order to achieve better clean-up solutions.

Although not specifically discussed in the attached guidance, EPA is also strongly committed to using innovative technologies in cleaning up oil spills under the Oil Pollution Act. We have embarked on an aggressive research program with other Federal agencies and the private sector to examine clean-up technologies and remediation techniques. We anticipate this work will lead to new and improved technologies in this area as well.

This directive is a call for your attention to exploring and exploiting opportunities for using innovative remediation technologies. It reflects my personal commitment and belief that we must invest the necessary resources and take the risks now to develop the technologies necessary to fulfill the long-term needs of our hazardous waste clean-up programs.

**GUIDANCE  
FOR INCREASING THE APPLICATION OF  
INNOVATIVE TREATMENT TECHNOLOGIES FOR  
CONTAMINATED SOIL AND GROUND WATER**

**INTRODUCTION**

The Office of Solid Waste and Emergency Response (OSWER) is seeking to further the use of innovative treatment technologies in order to (1) better pursue its statutory and regulatory mandates to promote treatment to the maximum extent practicable, (2) speed the availability of performance data regarding newly developed treatment technologies to many constituencies facing mandates to clean contaminated sites, (3) broaden the inventory of accepted treatment-based solutions, and (4) increase the likelihood that remediation costs can be lowered in the near term through the demonstration of a larger number of engineering options to solve site remediation problems.

Both SARA and HSWA give us the framework to consider treatment as an essential element in our clean-up decisionmaking. Our record of accomplishment since SARA in selecting treatment technologies for Superfund remedial and removal projects is very good. However, our experience in implementing remedies is limited, and we face a large future obligation to cleanup sites in the RCRA and UST programs. For example, the large number of cleanups expected under the RCRA corrective action program may encompass up to 4,000 facilities and 64,000 waste management units.

Section 121(b) of CERCLA requires EPA to select remedies that "utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable" and to prefer remedial actions in which treatment "permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, and contaminants as a principal element." This objective of permanent treatment-based remedies should be applied to RCRA and UST cleanups, within their respective legislative contexts. To achieve this goal, EPA must encourage new or innovative treatment technologies that are capable of treating contaminated soils/sludges and ground water more effectively, less expensively, and in a manner more acceptable to the public than existing conventional methods.

Innovative treatment technologies are newly developed technologies whose lack of sufficient full-scale application blocks routine consideration for site remediation. They may be new technologies, or may be available and in use for various industrial applications other than hazardous waste remediation. As such, innovative technologies are not part of standard engineering

practice or the competitive market process where available alternatives are routinely presented to the government and private sector. In functional terms, we define as "innovative" those treatment technologies for source control other than incineration and solidification/stabilization and pumping with conventional treatment for ground water. Innovative technologies inherently require extra effort to gather information and analyze options and extra engineering and financial risk in adapting them for specific site applications. In addition, there is extra uncertainty for people developing such solutions who work in organizations focused on performance outcomes with high levels of certainty and known costs.

Existing directives and guidance contain a number of references that encourage the consideration of innovative technologies. Policy for the Superfund program was originally outlined in a February 21, 1989 memorandum on "Advancing the Use of Treatment Technologies for Superfund Remedies." This memorandum reaffirmed the use of treatment technologies and summarized guidance documents and activities that supported the use of innovative technologies. It cited the need to search for new technologies that can improve performance and reduce cost. The importance of innovative technologies was further emphasized in the Superfund Management Review (90-Day Study) which primarily contained recommendations concerning technical support and research. More recently, the National Contingency Plan expects that treatment will be used for highly toxic and highly mobile waste and encourages the consideration of innovative methods.

As a result of SARA and this guidance, the selection of innovative technologies in the remedial program has increased dramatically. For the last three fiscal years, almost half of the selected treatment technologies for source control have been innovative. However, few full-scale innovative remedies have actually been implemented. As a result, we are not benefiting from actual clean-up experience or developing the equipment necessary to fulfill long-term program needs. This directive seeks to preserve our momentum with the selection of these technologies, to expedite their use in remedial actions, to expand the application of new technologies to other OSWER programs, and to realize the potential for development and technology application at Federal facilities.

This directive sets forth several initiatives and new procedures that will help provide incentives for broader use of innovative technology. Some of these initiatives are directed toward potential responsible parties and owners/operators, since they will be assuming a larger share of the remedial projects in the future. Other new initiatives are intended to remove impediments to the first-time use of new equipment. The directive also encourages wider application of available resources and tools. In addition, Attachment A highlights some important ongoing program efforts that deserve mentioning.

## STATEMENT OF INTENT

Innovative treatment technologies are to be routinely considered as an option in feasibility studies for remedial sites and engineering evaluations for removals in the Superfund program, where treatment is appropriate commensurate with the National Contingency Plan (NCP) expectations. In addition, innovative treatment-based remedies should be pursued to the extent practicable for cleanup of RCRA and UST units that pose significant health and environmental threats similar to those at Superfund sites. EPA should exercise leadership with state UST programs to encourage similar approaches for underground tanks. Innovative technologies considered in the remedy selection process for Superfund, RCRA, and UST should not be eliminated solely on the grounds that an absence of full-scale experience or treatability study data makes their operational performance and cost less certain than other forms of remediation.

When assessing innovative technologies, it is important to fully account for their benefits. Despite the fact that their costs may be greater than conventional options, innovative technologies may be found to be cost-effective, after accounting for such factors as increased protection, superior performance, and greater community acceptance. In addition, experience gained from the application of these solutions will help realize their potential benefits at other sites with similar contaminants.

## NEW INITIATIVES

This directive prescribes six new initiatives affecting Superfund and RCRA programs to encourage and further enable the field application of innovative technologies and their evaluation for potential further use. It also affirms the use of a relatively little-used opportunity for joint EPA work with PRPs and owners/operators to evaluate new technologies.

### 1. Superfund Innovative Technology Start-Up Initiative.

Designed for Fund-lead projects, this initiative consists of two efforts to assist the early application of new technology. First, we need to encourage the expedited funding of remedial design and construction projects that involve innovative treatment technologies. OERR will be revising its Remedial Action funding priority-setting procedures to give more consideration to innovative technologies. Earlier funding of these projects will help achieve the technology development goals of the Superfund program and will provide EPA with significant data to support future Records of Decisions (RODs).



Second, this initiative provides contract flexibility in the start-up phase of selected remedial and removal actions to assist vendors in establishing a pattern of reliable operation that satisfies performance standards. This is intended to address some of the impediments to the use of new full-scale equipment; it will support initial start-up and shake-down costs and modifications necessary to effectively evaluate whether the selected technology can perform to specifications prior to beginning actual remediation. In the remedial program, the Corps of Engineers (COE) will provide separate contract provisions that will aid in the commencement of operations of a unit process or integrated set of processes and will be available only for some proportion of the whole site remedy (e.g., processing the first 1,000 cu. yds. of a 30,000 cu. yd. site). Funds are not targeted at making the technology work at any cost, but to aid in clearly establishing the likely performance adequacy of the technology prior to the onset of the contracted clean-up effort. Contracting strategies are being considered to compensate vendors, regardless of whether they successfully achieve performance limits. Further implementation guidance for the remedial and removal programs will be issued later this year.

## 2. Dual Track RI/FS Initiative (Superfund)

This initiative is designed for PRP-lead sites that are early in the planning process where there is an opportunity to conduct engineering evaluations of remedies through the RI/FS process. This initiative is intended to ensure that innovative technologies are thoroughly evaluated and that needed treatability studies are conducted for potential remedies. This provision should help encourage EPA to take risks (when faced with reluctant PRPs) that it would not otherwise take by encouraging a comprehensive evaluation of technologies. EPA regions may fund additional treatability studies and engineering analyses for promising treatment technologies that would otherwise be considered unproven and too early in the development process. The purpose of this initiative is to encourage treatability studies to ensure that alternative remedies that the government believes may have merit are thoroughly evaluated and considered in the ROD. Data from EPA treatability studies and the evaluation of additional innovative technologies have intrinsic value to the Agency. Therefore, even if, in a particular case, there may be some doubt as to EPA's ability to cost recover for these additional studies (although, in general, the Agency would expect such costs to be subject to cost recovery), these studies should be pursued based on their value to the overall program.

### 3. Tandem ROD Evaluation Initiative (Superfund)

As in the previous initiative, this provision is primarily designed for PRP-lead sites, although it may also be applicable for some Fund-financed situations. *This program will provide a capability to rapidly evaluate the efficacy of a PRP-proposed innovative remedy that is offered in tandem with the primary one approved in the ROD.* Both of the remedies would be part of the proposed plan. Typically, such an alternate solution would be approved on a contingent basis in the ROD based on acceptable treatability studies, but it would need further development and pilot testing during the design period for the primary technology. Tandem RODs (or contingent RODS based on formal evaluation) are a decision vehicle designed to move the process of cleanup toward expeditious closure, while leaving room for PRPs with a decided interest in innovative technologies to pursue additional pilot tests to demonstrate an alternate approach that is both innovative and potentially cost-effective. This program is based on direct technical support for regional project management teams to help resolve technical issues posed by alternate approaches; it is designed to lift the burden from the regional project manager of bearing the risks of evaluating and trying something "new."

Technical support will be provided for focused evaluation of the PRP work so as to support expedient regional decisions about the acceptability of the alternate technology. The work will be carried out with and through the appropriate OSWER/ORD Technical Support Centers or the SITE demonstration program and will be conducted as a mini-evaluation of the proposed alternative so that the data will be available for future applications. When considering whether to proceed with a tandem ROD, regions should first consult with ORD concerning the scope of effort required for the evaluation.

In the case in which the secondary innovative technology is chosen for implementation (after the completion of pilot testing) but significant delays to the original schedule have occurred, the region may consider the engineering problems of making the full-scale unit operational in assessing stipulated penalties. That is, in limited cases, stipulated penalties should not be imposed if the delays are the unavoidable result of being innovative.

### 4. Removal Program Initiative (Superfund)

The removal program represents an important and viable means for expediting the field application of innovative technologies. The relatively small volumes frequently requiring response and streamlined contracting procedures provide an opportunity to complete clean-up projects and

provide documentation on lessons learned relatively quickly. Smaller waste volumes at some sites may also allow the use of pilot-scale technologies under some circumstances.

Although there have been more innovative projects actually constructed through the removal program than the remedial program, its potential has not been fully realized. This is because time constraints often favor excavation and off-site disposal or treatment and also because of the absence of clear legislated goals regarding the use of new technology. This subject was one of the issues addressed in a 1988 audit report by the Inspector General of Region IV removal sites. The report has had the undesirable effect of discouraging OSCs from using these technologies.

This directive is meant to clarify EPA's position on this issue. It is OSWER policy to further the use of innovative technologies through the removal program. This includes all actions, including time-critical actions, where feasible. These projects are expected to fulfill an important role in adding to our knowledge base on promising new technologies. Further guidance will be included in an upcoming document, "Administrative Guidance for Removal Program Use of Alternatives to Land Disposal" (OSWER Directive 9380.2-1), which provides guidelines promoting the use of alternatives to land disposal.

5. RCRA Corrective Action and Closure Innovative Technology Initiative

We are currently engaged in efforts to develop best demonstrated available technology (BDAT) treatment standards for contaminated soil and debris at CERCLA and RCRA corrective action and closure sites. These sites present unique treatment problems that were not generally considered in developing the current BDAT standards, which were based on data from the treatment of industrial process wastes. There is general agreement that wide scale use of incineration is not appropriate for soil and debris, and there is a need to explore alternative approaches. The current schedule is to promulgate a rule for debris in May 1992 and soil in April 1993. Prior to publication of these final rules, a site-specific treatability variance process (40 CFR 268.44 (h)) is available for contaminated soil and debris to establish an alternative standard for specified waste at individual sites. The variance process, along with applicable guidance treatment levels, is described in Superfund LDR Guide #6A (OSWER Directive: 9347.3-06FS, July 1989), and is intended to be used as an interim approach until final standards are established.

This initiative encourages the regions to use treatability variances at corrective action and closure sites

to conduct treatability or technology demonstration studies to gain additional information on the use of innovative treatment for contaminated soil and debris. The regions should select appropriate pilot-scale projects with cooperative owners/operators that can provide data on the capability of technologies and the treatability of different wastes. The information from this work should help to expedite corrective action and closures after the final BDAT rule is published for soils. It is also possible that early data from this effort could be available for consideration in the final rule.

Projects should be carefully selected to maximize the utility of data and likelihood of success. Regional corrective action staff and regional Superfund staff should communicate regarding the history of use of treatability variances in the Superfund program to identify site factors that require consideration when selecting an appropriate site.

Authority for issuing site-specific variances for contaminated soil and debris has recently been delegated to the regions (Decision Memorandum: "Delegation of Authority to Grant Treatability Variances," from Charles L. Grizzle to the Administrator, April 12, 1991). The facility and EPA, in collaboration with the state, can implement variances for on-site demonstrations through two mechanisms: temporary authorization under the Permit Modification Rule, or 3008(h) orders for interim-status facilities.

6. Demonstration Projects at Federal Facilities (Superfund, RCRA, and UST)

Federal facilities offer unique opportunities for both developing and applying innovative approaches to hazardous waste remediation. Desirable attributes include their often sizable areas and isolated locations, controlled access, numerous contamination problems, and increasingly active environmental restoration programs.

EPA headquarters is exploring the use of Federal facilities for both site-specific technology demonstrations and as test locations for evaluation of more widely applicable technologies. Equally important is the establishment of mechanisms to ensure timely sharing of information. Regions are encouraged to suggest innovative approaches and to be receptive to proposals for innovation from Federal facility managers, e.g., by building timing and performance flexibility into compliance agreements in acknowledgment of current uncertainties associated with innovation.

The Office of Federal Facilities Enforcement (OFFE) will work with the regions to identify locations for sponsoring potential test and evaluation activities. With assistance

from the Technology Innovation Office, OFFE will develop necessary policies and guidance to ensure that support for innovation is congruent with other program and environmental objectives.

7. Joint Technology Assessment Opportunities with Industry under the Federal Technology Transfer Act

During the clean-up planning and implementation process, PRPs or owners/operators should be reminded of the opportunity to engage EPA in evaluation studies and other arrangements at their expense to determine whether innovative technology concepts would be operative in the situation they are facing or other similar situations. Under the Federal Technology Transfer Act (FTTA) of 1986 and Executive Order 12591, cooperative agreements related to research, development, and technology transfer can be expeditiously executed (i.e., in less than 60 days) between industry and government. In this case, such arrangements would allow the PRP to reimburse EPA for facilities, support services, and staff time spent in joint evaluation of early technology treatability or pilot studies. As projects progress into the later planning stages, careful judgement needs to be exercised to avoid new work that will result in unproductive delay, while remaining sensitive to important new technology developments.

Since this program is conducted in the research and development arena, it offers the prospects of non-adversarial engagement, outside the regulatory context, to allow the joint development of credible data about remediation technologies. This opportunity should be especially advantageous to (1) PRPs and owners/operators capable of early planning for technology options at a few sites and desirous of early EPA input, as well as (2) PRPs and owners/operators faced with a number of similar waste sites in the future-- under Superfund, RCRA Corrective Action, and the UST program--who want to develop more uniform, cost-effective technology proposals for such sites. Basic information about the FTTA is described further in Attachment B.

## IMPLEMENTATION

The first six initiatives involve field testing new technologies that may benefit by technical assistance from the Office of Research and Development (ORD). ORD represents an objective third party that can be easily accessed through the existing OSWER/ORD support structure. This structure consists of five laboratories, which constitute the Technical Support Centers (both for Superfund and newly established for RCRA), the Superfund Technical Assistance Response Team (START) program, the Bioremediation Field Initiative, and the Superfund Innovative

Technology Evaluation (SITE) program. Several of these programs are discussed later in this memorandum, and Regional offices are encouraged to use them. OSWER has asked ORD to give priority to requests for technical assistance under this directive, and we will use our existing priority-setting systems to accommodate needs articulated pursuant to this directive.

#### **BROADER APPLICATION OF AVAILABLE RESOURCES AND TOOLS**

In addition to these new initiatives, the application of other important existing policies and efforts should be broadened.

##### **o Furthering Innovative Remediation at Leaking UST Sites**

State and local UST programs have identified 100,000 confirmed leaks, and this number may triple in the next several years. The majority of sites currently undergoing corrective action are being remediated through pumping and treating ground water and excavation and off-site disposal of contaminated soil. The national UST program has established corrective action streamlining as one of its top priorities. The program's strategy includes promoting the use of improved technologies that will produce better and faster cleanups at lower cost than traditional methods.

The UST/LUST program has worked closely with the Office of Research and Development and private companies to foster the development of innovative site assessment and cleanup technologies, such as field measurement techniques, soil vapor surveying, vacuum-enhanced free-product recovery, active and passive bioremediation, and vacuum extraction. These technologies now must be moved from demonstrations to routine use in the field. Regional offices should increase their efforts to make state and local managers and staff, as well as cleanup consultants and contractors, more familiar with these non-traditional but proven technologies. Headquarters will continue fostering the development of even newer tools and techniques and should increase its support of regional efforts to achieve broader use of improved technologies.

##### **o Further Enabling State Innovative Technology Leadership**

First, the CERCLA core funding program provides an opportunity to assist states in establishing innovative technology advocates. Core program cooperative agreements help support state response programs to ensure involvement in CERCLA implementation activities. This may be a vehicle for promoting new technologies where the state and region agree it is appropriate. This approach is currently being utilized with success in Minnesota. The advocates can serve an important role of promoting the development and use of

innovative technologies in the state CERCLA programs, with obvious spinoff benefits for their RCRA and UST programs. Some states have shown a strong interest in new technologies, and we should do everything possible to support their efforts and encourage initiatives at the state level.

Second, last year's RCRA Implementation Study highlighted the opportunity to empower a few states interested in furthering technology development. Regions should be open and encouraging of state applications for authority for RCRA R&D permitting, permit modification, treatability exclusion, and Subpart X permitting. States not authorized for RD&D permitting may consider a cooperative effort with the region for issuing these permits. The RD&D activities could involve treatability studies for a site or activities to help develop and commercialize a technology. This package of authorities will allow new technology developers and users to flourish in selected states.

In addition to the Federal Facilities Initiative above, states may want to work directly with Federal facilities in developing pilot sites for innovative technology. These activities do not have to be limited to final remedies, but may also include treatability tests, site stabilization, and demonstrations. Federal facilities under both CERCLA and RCRA authority may be particularly well suited for integrating clean-up activities with innovative treatment technologies.

- o Model RI/FS Work Plan and PRP Notice Letter Demand for Innovative Options

Some regions have issued special notices containing a Statement of Work and administrative order language requiring the responsible party to evaluate the use of innovative technologies at a particular site. This procedure should receive broader use at Superfund sites where alternatives for remediation are being considered for analysis in the RI/FS and where prerequisite treatability studies are required. This requirement in the special or general notice letters will help facilitate the development and use of innovative treatment technologies by the private sector. Specific language for this approach could be developed from OWPE's guidance document titled "Model Statement of Work for RI/FSs conducted by PRPs" (OSWER Directive 9835.8).

- o Advocacy and Funding of Treatability Studies

Superfund program policy (Directive 9380.3-02FS, Treatability Studies Under CERCLA: An Overview, December 1989) requires that treatability studies should be conducted to generate data needed to support the implementation of treatment technologies. For sites where an innovative

technology is being considered, these studies will help provide performance information that should assist in the engineering evaluations. Funds are budgeted annually in the SCAP based on expected need for conducting treatability studies. Data and reports from these studies should be forwarded to Glen Shaul at ORD's Risk Reduction Engineering Lab. The appropriate protocol and format for these reports can be found in the "Guide for Conducting Treatability Studies Under CERCLA" (EPA/540/2-89/058). Information contained in these reports will be available through the Alternative Treatment Technology Information Center (ATTIC).

Every effort should be made to conduct or, as appropriate, to evaluate the PRP's treatability study. In planning for this activity, oversight funding should be requested through the SCAP budget process. Oversight of PRP-lead treatability studies may be funded through the enforcement budget. In situations where PRPs recommend use of innovative treatment technologies at a site, but where treatability study data are insufficient, EPA policy allows the Agency to fund and conduct technology-specific treatability studies. The costs associated with the conduct of these treatability studies are recoverable under Section 107 of CERCLA.

o Tracking and Expediting SITE Demonstrations

A recent Inspector General audit of the SITE program focused on delays in matching Superfund sites with technologies. This has contributed to overall delays in completing demonstration projects and technology assessments. In response, *OSWER is encouraging greater participation in the SITE program* and will begin tracking regional site nominations as a reporting measure in STARS (see "Implementation of an OSWER Recommendation from the Office of Inspector General Audit Report on the Superfund Innovative Technology Evaluation (SITE) Program"--memorandum dated January 2, 1991). OSWER will support the designation of additional regional FTE for support of SITE program demonstrations and recognizes the potential for time delays in RI/FSS at sites with demonstration projects. ORD management has also agreed that SITE demonstration projects must be more responsive to regional needs for treatability data.

Recently, ORD completed an internal management review of the SITE program. The purpose of the review was to evaluate the program's impact on Superfund remediation activities and to identify any changes needed to improve the program. Several changes already adopted are directed at making the program a more integral component of regional office Superfund site activities. *The SITE program will make the design of technology evaluations sufficiently flexible to meet the*



*regional offices' needs for treatability studies before remedy selection is made. SITE demonstration data will be presented to the RPM or OSC on a fast turnaround basis so that the data are available to be factored into the remedy selection decision. The SITE program will take advantage of ongoing remediation activities as a source of technology evaluations and technology transfer where possible. In addition, the program will use sites that are being evaluated under the START program and projects that are identified pursuant to this directive, as potential test locations for SITE evaluations.*

## **ATTACHMENT A**

### **Existing Program Efforts to Further Innovative Technologies**

OSWER has several other ongoing efforts directed toward furthering the application of innovative alternatives through the acquisition and efficient use of data, reduction of technical uncertainties, and elimination of contracting impediments. These programs represent important resources that should continue to be used. The first two resources, that are of interest to the UST, RCRA, and Superfund Programs, concern the collection and use of data:

#### **o Technical Support and Information Management**

Readily accessible information on innovative technologies is a major priority of the Superfund program. This objective is being met through the utilization of on-line computer systems, direct expert technical assistance, and support for field activities to evaluate the performance of a given technology. Currently, EPA maintains several computer databases that may be accessed for information on treatment technologies. These databases include the Alternative Treatment Technology Information Center (ATTIC), the OSWER Bulletin Board (CLU-IN), the ROD Database, the Hazardous Waste Collection Database, and the Computerized On-line Information System (COLIS). These systems include information on the application of innovative technologies and may be used to aid networking among OSCs and RPMs. Due to the general shortage of cost and performance data on new technologies, use of these databases is important to provide the most current information available.

Technical assistance is available to Superfund and RCRA staff through ORD's Technical Support Centers and the Environmental Response Branch, OERR. Part of this effort involves networking among project managers through the engineering and ground water forums. In addition, as part of an initiative to provide direct technical support to OSCs and RPMs, the Superfund Technical Assistance Response Team (START) has been established to help evaluate the potential use of technologies. Currently, technical experts from EPA's Office of Research and Development are providing long-term consultation and support at 35 sites with complex treatment technologies issues. In addition, ORD is assisting the Superfund program in developing protocols for conducting treatability studies, so technologies can be evaluated using standardized parameters. ORD is also providing a staff person in each Regional office to serve as a liaison with their engineers and scientists.

- o Bioremediation Field Initiative

Begun in the 4th quarter of FY 90, this program is intended to provide more real-time information on the field application of biotechnology for treating hazardous waste. Currently, over 131 CERCLA, RCRA, and UST sites have been identified as considering, planning, or operating full-scale biotreatment systems. The major focus of this initiative is to furnish direct support in evaluating full-scale cleanup operations and technical assistance for conducting treatability and pilot-scale studies. Several sites have already been selected for participation in the program. Performance, cost, and reliability information generated from these bioremediation studies will be used to further develop a treatability study database that will be made available to regional staff.

- o Procurements for Innovative Technologies

Over the past several months, OSWER has been working with the Procurement and Contracts Management Division (PCMD) to address particular issues associated with the procurement of innovative technologies. As these issues are resolved, regions are encouraged to use the new provisions to the extent possible. The first issue concerns the contracting for treatability studies. Under the Federal Acquisition Regulations (FAR), firms are restricted from performing both the design and construction of a project. EPA has determined that this prohibition applies only to the prime contractor responsible for the overall design, and not to subcontractors performing treatability studies. The EPA Acquisition Regulations are being amended to clarify this point and to allow possible exceptions for contractors to work on both design and construction on a case-by-case basis.

A second issue concerns constraints on contractors working for both EPA and later working for a potentially responsible party (PRP) at the same site. This constraint was originally imposed on contractors to avoid conflicts of interest. Innovative technology is a special exception within these general guidelines. Rather than automatically assuming a contractor should first be precluded from working for a PRP after working for EPA, it is EPA's intent and commitment to first permit contractors and/or subcontractors performing evaluations of innovative technologies for the Agency to later work for the PRPs in as many instances as possible. Only in rare instances would EPA envision not permitting such work to be performed for the PRP. EPA and PRPs often work together in the spirit of cooperation and site work may be divided accordingly. The Agency has therefore determined not to preclude PRPs from using EPA contractors to perform such work as treatability studies. In addition, we want to ensure that

vendors who perform treatability studies for EPA may also remain eligible to support PRP-lead design or construction work. This position is reflected in the final conflict of interest provisions for Superfund contracts which are currently being prepared and were initially published in the Federal Register as a proposed rule.

United States  
Environmental Protection  
Agency

Office of Research and  
Development  
Washington, DC 20460

EPA/600/9-90/050  
November 1990



## Opportunities for Cooperative R&D with EPA: The Federal Technology Transfer Act

Both the U.S. Environmental Protection Agency (EPA) and private industry seek new, cost-effective technologies to prevent and control pollution. In the past, however, legal and institutional barriers have prevented government and industry from collaborating in developing and marketing these technologies. Also, the efforts of many companies to develop new technologies have been stymied by a lack of resources, such as scientific experts in particular fields or highly specialized equipment. The Federal Technology Transfer Act of 1986 (FTTA) removes some of these barriers to the development of commercial pollution control technologies.

The FTTA makes possible cooperative research and development agreements (CRDAs) between federal laboratories, industry, and academic institutions. CRDAs set forth the terms of government/industry collaboration to develop and commercialize new technologies. According to the Act, these agreements will foster the technological and industrial innovation that is "central to the economic, environmental, and social well-being of citizens of the United States."

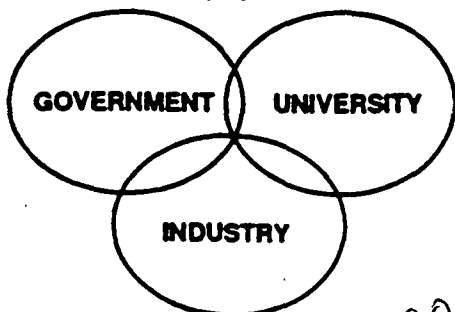
### *What Can Industry Gain from Signing a CRDA with EPA?*

#### **Access to High-Quality Science**

EPA's 12 research laboratories employ over 600 scientists and engineers. Many of these laboratories combine world-class expertise with state-of-the-art equipment and fully permitted testing facilities. Certain types of environmental research, such as development of innovative technologies for treating hazardous wastes, require the collaboration of experts in many different fields. This type of interaction is easily adapted at EPA laboratories, because they are inter-disciplinary in nature.

#### **Expanded Communication Channels Between Government and the Private Sector**

CRDAs build working relationships between the government and the private sector. All parties benefit from the different perspectives that government and private sector scientists bring to an R&D project.



### **Exclusive Agreements for Developing New Technologies**

Until recently, industry had little incentive to cooperate with federal laboratories because any technologies developed during joint research remained in the public domain for all to use. Now, under some CRDAs, companies are given exclusive rights to market and commercialize new technologies that result from the collaboration.

### *Licensing and Research Agreements: How Do They Work?*

The procedure for setting up a cooperative R&D or licensing agreement under the FTTA is designed to encourage collaboration between industry and EPA laboratories. For industry, the key advantage of the process is the speed and ease with which the agreements can be negotiated and signed. CRDAs are not subject to federal contracting or grant requirements. In addition, each laboratory director has the authority to establish CRDAs for that particular lab, and this decentralization of the decision-making process reduces the administrative procedures involved.

Another important advantage is that CRDAs are flexible enough to fit the goals of many different sizes and types of companies. For example, under the FTTA, a company can support applied research at an EPA laboratory while reserving first rights to involvement in any technology that results. Or, if the scientific mechanism that makes a company's product work is unknown, the company can cooperate with an EPA laboratory to identify this mechanism. A company can also share space and equipment with EPA in a combined effort to develop an innovative technology.

### *Interested?*

Several companies already have CRDAs with EPA, including Exxon, Shell Oil, Ford Motor Company, Dow-Coming, Hewlett-Packard, and CH<sub>2</sub>M Hill, as well as several small businesses.

For further information about this program please write to:

Mr. Larry Fradkin, FTTA Coordinator  
Office of Technology Transfer and Regulatory Support  
Office of Research and Development  
U.S. Environmental Protection Agency  
26 West Martin Luther King Drive  
Cincinnati, OH 45268.