



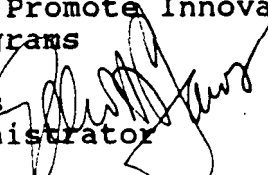
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

APR 29 1996

OFFICE OF  
SOLID WASTE AND EMERGENCY  
RESPONSE  
**OSWER DIRECTIVE**  
9380.0-25

**MEMORANDUM**

**SUBJECT:** Initiatives to Promote Innovative Technology in Waste Management Programs

**FROM:** Elliott P. Laws   
Assistant Administrator

**TO:** Superfund, RCRA, UST and CEPP National Policy Managers  
Federal Facilities Leadership Council  
Brownfields Coordinators

Environmental technology development and commercialization are a top national priority for this Administration. I want to add my personal commitment to this goal, and stress its importance for the long-term hazardous waste remediation challenge that lies ahead. This directive describes several initiatives to facilitate the testing, demonstration, and use of innovative cleanup and field measurement technologies.

While we are in a time of uncertainty regarding ultimate changes to the Superfund law, all parties share an urgent need to improve the performance as well as lower the cost of site cleanup. In addition, cleanups continue (and are increasing in pace) in our other programs as well as the many emerging voluntary state and local programs.

We have made considerable progress using new technologies in the Superfund, RCRA, and Underground Storage Tank programs. In the Superfund program better than half of the recent remedial cleanup decisions for source control call for technologies which were not available when the law was reauthorized in 1986. The UST program has seen tremendous growth in the application of alternatives to pump and treat or landfilling of petroleum contaminated media. Tens of thousands of UST sites are employing approaches such as bioremediation, soil vapor extraction, air sparging and natural attenuation either in combination with traditional technologies or as the sole method of cleanup. The large remaining cleanup needs in EPA programs, as well as the formidable future requirements for state and other federal agencies, provide a continuing impetus to find less expensive and more effective solutions.



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These initiatives recognize that the state of remediation science today requires us to take experimental approaches. They are based on cooperation with other government and private entities that share our interest in developing the next generation of remediation technologies. They envision partnerships with agencies, states, and the private sector to jointly develop and apply solutions which will allow us to protect public health and the environment more efficiently. While these initiatives are directed primarily to programs we implement, many states are actively pursuing innovative approaches and may find these initiatives to be of value. I look forward to your proposals and efforts to promote the development and implementation of these potentially high payoff solutions.

The following initiatives apply, as appropriate, to UST cleanups, RCRA Corrective Action, Superfund Fund lead, Responsible Party Lead, and Federal Facility Lead removal and remedial sites.

ATTACHMENT

## OSWER POLICY DIRECTIVE 9380.0-25

### Promotion of Innovative Technologies in Waste Management Programs

#### *Place a Higher Priority on Innovative Treatment and Characterization Technologies*

#### **1. Routinely Consider Innovative Treatment Technologies Where Treatment Is Appropriate**

OSWER encourages reasonable risk-taking in selecting innovative technologies for treating contaminated soils, sludges, and groundwater. EPA regional and headquarters managers should support Remedial Project Managers, On-Scene Coordinators, and other remedial action decision-makers in using new technologies.

A recent analysis of Superfund Feasibility Studies found cases where innovative technologies were eliminated from consideration because they required testing to determine their applicability at a particular site. Promising new technologies should not be eliminated from consideration solely because of uncertainties in their performance and cost, particularly when a timely treatability study could resolve those uncertainties.

There is potential tension between our commitment to site cleanup targets and advancing innovative technology. When an innovative technology has potential site-specific and/or program-wide benefits, do not be risk averse toward adopting it despite possible impacts on the schedule for project completion. TIO is prepared to assist Regions in evaluation of the potential programmatic benefits of innovative approaches and adjustment, as appropriate, of regional commitments. Regions may wish to consider using performance management and award systems to foster risk taking by project managers.

Headquarters will ensure that Presumptive Remedy revisions incorporate new technologies in a timely fashion. Furthermore, we will expand interagency efforts to gather cost and performance information for completed full-scale innovative cleanups.

In the RCRA context, EPA has revised its Treatability Study Sample Exclusion regulations (40 CFR 261.4(e)-(f)) to allow treatability studies on up to 10,000 kg. of media (soil, debris, sediment and ground water) contaminated with non-acute hazardous waste without the requirement for permitting and manifesting. This revision should help make treatability studies easier to implement.

For actions under RCRA, regulatory staff will be in a position of reviewing proposals from owner/operators, and possibly discussing options with their state counterparts. Program managers should encourage owner/operators to consider innovative approaches and, where appropriate, direct parties to sources of assistance and information.

#### **2. Encourage Evaluation and Use of New Field Measurement/Monitoring Methods**

Traditional approaches to on-site sampling and reliance on off-site analysis have been time consuming and expensive. This has had an adverse effect on site characterization and remedy implementation efforts. New field sampling and analytical approaches offer the potential for

considerable time and cost savings compared to conventional monitoring and measurement procedures.

I would like to recognize and accelerate the trend toward greater use of appropriate field methods. EPA's Brownfields Initiative—with the objective of encouraging productive reuse of the land—provides a new and unique opportunity to try approaches that make sense from a practical engineering perspective. EPA technical assistance resources can be made available to assist Brownfield site managers who wish to consider innovative approaches to site characterization and monitoring.

EPA should support the use of new site assessment methods where they are appropriate as either a complement or alternative to conventional sampling and off-site analysis techniques in Superfund, RCRA and UST actions. The ultimate objective is to provide a flexible investigative posture involving a mix of field screening and analytical approaches combined with traditional sampling and off-site laboratory analysis, where appropriate and necessary.

A number of these new approaches appear able to consistently provide data of known quality and thus may be able to meet established Data Quality Objectives (DQOs). Nevertheless, in specific cases, re-examination of DQOs may be appropriate so that we do not unnecessarily exclude cost-effective methods because of overly stringent requirements.

OSWER headquarters and the Office of Research and Development (ORD) have begun several supporting efforts:

- A new data base of on-site methods - Vendor FACTS - is now available.
- The Consortium for Site Characterization Technology, a cooperative public-private venture, is conducting consensus performance evaluations of field screening technologies. Region III and X managers represent EPA users' interests on the Board of Advisors of this venture.
- In cooperation with OERR and ORD, TIO is preparing a status report on successful field screening usage by EPA and other federal agencies to serve as a reference and referral guide.
- A number of State UST programs are actively promoting field sampling and analysis to characterize leaking UST sites, in at least one case requiring that field analytical methods be used if the responsible parties expect reimbursement from the state Fund. OUST is developing a new manual to help regulators oversee expedited site characterization.
- We have significantly shortened the time frame for including new methods in SW-846. Furthermore, a number of new immuno-assay and other cost saving techniques for qualitative site characterization will be included in the forthcoming update of SW-846.

### **3. Support the Use of Innovative Approaches for Groundwater Remediation**

We have made substantial progress in implementing innovative technologies for source control. However, we are not making the same progress with groundwater remediation technologies. Most existing groundwater remedies involve pumping water to the surface, where it is treated by conventional methods (“pump and treat”). In the Superfund program, fewer than six percent of selected groundwater remedies involve in situ methods. The longer lead-time for results from groundwater projects causes additional delays in bringing new approaches into widespread use.

Regions should be mindful of the potential of new in-situ processes such as permeable barrier treatment walls and dual-phase extraction wells to speed cleanups and provide cost savings. The number of opportunities provided for responsible evaluation of new approaches is an appropriate measure of program success. Sites which are currently stabilized—i.e., by providing plume control through pump and treat—are excellent candidate ‘test beds’ for promising alternatives. Cooperation with other federal agencies, states, and private interests to jointly demonstrate and evaluate promising in-situ groundwater technologies is encouraged.

Some states may have restrictions on the re-injection of treated ground water as well as the injection of amendments to enhance degradation or flushing. Regions should look for opportunities to work with states for at least limited variances to allow the demonstration and use of promising new technologies.

‘Pump and Treat’ is no longer the dominant remediation method for leaking UST sites with contaminated groundwater (It is now used at 29% of UST groundwater sites.). Natural Attenuation has been deemed acceptable at 47% of the groundwater sites, followed by air sparging, bioremediation, and dual phase extraction.

To help coordinate work in this area, we have established a Ground Water Remediation Technologies Analysis Center (GWRTAC) at the National Environmental Technologies Applications Center (NETAC) in association with the University of Pittsburgh. The Center will collect and distribute information on trends in research, development and application activities; perform technology transfer; and conduct meetings with stakeholders to foster technology improvement. The Center will serve as a technical resource complementary to the ORD laboratories. GWRTAC’s toll free number is 800-373-1973, and the World-Wide Web home page is <http://www.chmr.gwrtac>.

#### ***Reduce Impediments to Innovative Technology Development and Use Regulatory Impediments***

### **4. Streamline RCRA Permits and Orders for Innovative Treatment Technology Development and Use**

Regions are encouraged to use the flexibility already provided by existing statutes and regulations to bring promising new technologies into the field. We need to work more as team members, rather than traditional regulators, to coordinate with EPA laboratories, other federal agencies, states and the private sector in pursuit of our common interest of furthering new processes. We need to identify opportunities for streamlining our requirements while still fulfilling our responsibility to protect public health and the environment. Additionally, we need to set our

technical priorities so limited resources can be directed to projects with the greatest potential benefits.

#### **a. Consider Alternatives to Conventional Permits**

While issues related to RCRA permitting may be addressed in the future (through the Hazardous Waste Identification Rule(HWIR), the Permit Improvements Team, and RCRA reauthorization), Regions should consider the application of existing alternatives to conventional RCRA Corrective Action, Research, Development and Demonstration (RD&D), and Subpart X permits for pilot and full-scale applications of new technology.

As you know, RCRA permits are not required at petroleum UST and Superfund sites. At CERCLA sites and RCRA interim status facilities, enforcement orders may be used to enable testing and use of new technologies. At permitted facilities, Regions should encourage authorized states to consider using the flexibility provided in temporary authorizations of the permit modifications rule and the flexible standards for temporary units. For non-Superfund, non-RCRA, and non-UST sites, it is possible that state orders may be used in lieu of permit requirements.

#### **b. Avoid Unnecessary Regulatory Control**

When considering new technology applications, we need to ask ourselves whether prior assurance that cleanup standards will be met is necessary. For treatability studies and demonstration projects, seeking assurance of success as a precondition to testing makes little sense since this is the purpose of the investigation itself.

For full-scale remediation, ex-situ processes are often required to demonstrate compliance as part of start-up activities. Furthermore, responsible parties and owners/ operators remain ultimately responsible for site cleanup and adherence to standards.

For RCRA corrective action, the ability to attain media cleanup standards is one of four General Standards for Remedies. Since owner/operators continue to be responsible for meeting cleanup standards, it is appropriate that proposed remedies be evaluated on the basis of reasonable likelihood, subject as appropriate to verification testing and performance monitoring. To the extent possible, we should avoid being overly prescriptive regarding technical design and operation when we consider new technology applications.

Risks of cross-media transfer and worker exposure depend on site specific conditions in addition to the technology under consideration. For some contaminants, technologies such as bioremediation and soil washing present particularly minor risk, and an appropriate level of regulatory control should be applied.

#### **c. Recognize the Special Needs of In-situ Processes**

Although the recently-revised treatability study rule will help to ease many of the testing restrictions currently inhibiting new technology development, there will still be situations where testing on larger quantities of waste may be needed, particularly for in-situ approaches. While there

may be specific exceptions, in-situ testing generally poses minimal exposure risk. Concerns about spreading contamination should be viewed in light of the scale of the project and weighed against the benefits which will accrue from the field experience and associated lessons learned. Sites with existing containment systems, such as slurry walls, may provide locations which are particularly well-suited for testing new processes.

As previously mentioned, the development of new in-situ groundwater technologies is a particular OSWER priority. Due to the lead times required to get results, we should work to get these projects into the field as soon as possible.

#### **5. Encourage State Adoption of and Streamline EPA Authorization to Administer the Treatability Study Sample Exclusion Rule**

As mentioned earlier, we recently amended regulations that facilitate the development and evaluation of hazardous waste remediation technologies by increasing the quantity of contaminated material that may undergo treatability testing while remaining conditionally exempt from regulation under RCRA (e.g., manifesting and permitting). The regulation allows treatability studies on up to 10,000 kg of media (soil, debris, sediment and groundwater) contaminated with non-acute hazardous waste and allows up to two years studies involving bioremediation.

While lessening regulatory impediments, the rule retains notification, record-keeping, and reporting requirements. Since the rule is an optional provision, full effectiveness depends on adoption by states with delegated RCRA programs.

EPA is currently evaluating changes to its regulations that will expedite the revision of authorized state programs. During the time this regulatory effort is moving forward, EPA strongly encourages Regions to act promptly on requests for authorization for the revised Treatability Study Sample Exclusion Rule. 40 CFR 270.21 provides considerable flexibility in the amount of information EPA requires for state program revision.

Because this rule is not complex and is less stringent than the current provisions, a minimum amount of information can be required. States should apply for authorization for this rule by simply sending a letter to the appropriate Regional office, certifying that equivalent provisions have been adopted. The state should also submit a copy of its final regulations or other authorities.

#### **6. Utilize Federal Facilities as Sites for Conducting Technology Development and Demonstrations**

An EPA Policy for Innovative Environmental Technologies at Federal Facilities, signed by Administrator Browner in August 1994, documents EPA's commitment to promote the use of Federal facilities as demonstration and testing centers for innovative environmental technologies. Federal facilities offer unique opportunities for the development and application of both field site characterization and cleanup technologies. Regions are encouraged to work with states, as co-regulators to ensure acceptance, and with other federal agencies to promote testing and use of new approaches. Cooperative efforts are needed to develop permit conditions which do not unreasonably restrict technology demonstrations at Federal facilities.

The policy “encourages the incorporation of innovative technology conditions in appropriate EPA/Federal agency cleanup and compliance agreements...” As appropriate, Regions should be flexible in setting cleanup milestones and make adjustments where appropriate.

OECA’s Federal Facilities Enforcement Office will implement a pilot program through the Environmental Technology Initiative. The pilot will seek opportunities to utilize the flexibility that enforcement mechanisms may offer.

### ***Informational Impediments***

#### **7. Build an Institutional Knowledge Base of Remediation Technology Experience**

We are finally reaching the point where a meaningful number of cleanups involving innovative technologies are being completed. It is important that the often hard-won experience from these early applications be readily available to assist other remedial action decision makers. In cooperation with other federal agencies through the Federal Remediation Technologies Roundtable, OSWER has developed a *Guide to Documenting Cost and Performance for Remediation Projects* (EPA-542-B-95-002/Mar 95).

TIO has taken the lead in working with Regions and the Departments of Defense and Energy to prepare an initial set of project reports and is working on a second round. Thirty-seven reports are currently available in three volumes and will be available on the World Wide Web in 1996. This work is an important follow-on to technology demonstration reports prepared by the Superfund Innovative Technology Evaluation (SITE) program.

It is time to transition to a posture of preparing completed project reports as a normal part of the site remediation effort. OERR recently issued guidance regarding tasking our contractors to prepare reports in a specified format. TIO will continue to provide assistance in completing these reports and will develop additional means of ensuring widest possible dissemination of this valuable information.

Since approximately 70% of Superfund sites are Responsible Party lead, cooperation with the private sector is an important component of obtaining remedy implementation information. We will work with OECA and Regions to develop mechanisms to elicit remedy cost and performance information from RPs at selected RP lead cleanups.

Region 1 has volunteered to work with headquarters staff and states in Region 1 on a short pilot effort to refine the mechanics of implementing this initiative.

### ***Share Risk of Using Innovative Treatment Technologies***

#### **8. EPA Will Share the Risk of Implementing Innovative Technology With Responsible Parties at Superfund Sites**

The prospect of paying twice if a remedy fails discourages innovation. As a Superfund reform initiative, EPA has agreed to share the risk for a limited number of approved projects by “underwriting” the use of certain promising innovative approaches. If the innovative remedy fails



to perform as required, EPA will contribute up to 50% of the cost of the failed remedy if additional remedial action is required, up to a specified maximum amount.

This initiative will encourage PRPs to assume a more active role in technology development. Projects will include leading-edge environmental technologies and early application of units with significant potential for lowering costs or improving performance.

Guidelines to implement this program, announced in concept as a Superfund Reform, are being revised based on regional comments. To date, one project has been approved. We plan to approve a limited number of pilot projects this fiscal year.

## **9. Indemnify Innovative Technology Response Action Contractors**

The Superfund Response Action Contractor Indemnification Final Guidelines, published on January 25, 1993, provide that EPA may offer indemnification to Innovative Technology (IT) subcontractors. Prime contractors have informed EPA that the prospect of being responsible and accountable for the actions of the IT subcontractor and not being indemnified has inhibited prime contractors from fully utilizing innovative technologies.

To encourage prime contractors to use innovative technologies, EPA will provide indemnification to both the prime contractor and to its IT subcontractor. The indemnification agreements with the prime contractor and the IT subcontractor will have identical deductibles, limits and terms.

I would also like to clarify that prime contractors are not required to solicit IT subcontracts using the competition factor outlined in the Final Guidelines for new response action contract solicitations. Prime contractors should request permission to include indemnification provisions from the EPA Administrative Contracting Officer prior to releasing the solicitation.