



Procuring Innovative Technologies at Remedial Sites: Q's and A's and Case Studies

Technology Innovation Office

Background - An innovative technology is a treatment technology for which cost or performance information is incomplete, thus hindering routine use at hazardous waste sites. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Contingency Plan (NCP) encourage the use of innovative treatment technology remedies if such remedies can be used: (1) at less cost; (2) with less adverse impact; or, (3) to treat a site more effectively than other methods. Contracting for such innovative treatment technologies can be difficult due to the government and industry's lack of experience. These technologies are relatively new and have often not been applied to large clean-up projects. Therefore, special considerations are needed in scoping the procurement of innovative technologies.

Purpose - This fact sheet is designed to assist EPA Remedial Project Managers (RPMs) and Contracting Officers (COs) with the procurement of innovative treatment technologies. RPMs, COs, and U.S. Army Corps of Engineers (COE) personnel were interviewed to obtain information on their experiences in procuring innovative technologies. EPA's Technology Innovation Office (TIO) has documented case histories of experiences with acquiring innovative technologies in the Superfund program. Remedial sites chosen for inclusion in this review were Fund-lead sites that had started or completed the procurement of an innovative technology, including bioremediation, thermal desorption, vacuum extraction, chemical treatment, chemical extraction, and in situ soil flushing. The results of these interviews are presented in a question and answer format. In addition, specific detailed information on each site is presented in tabular form.

Q1. Why Do Innovative Technologies Need Special Consideration During Procurement?

A1. Innovative technologies are new treatment methods that have not been applied full scale under a variety of site conditions. Even though innovative technologies may be well designed and carefully planned, they may not meet contract specifications on initial attempts and may require some modification and reengineering. Equipment failures and waste processing problems are not unusual for first time use. The Superfund Start-Up Initiative (OSWER Directive 9380.0-17) encourages regions to allow contract flexibility for selected remedial and removal actions to assist vendors in establishing a pattern of reliable operation that satisfies performance standards.

Q2. What Types Of Contracts Have Been Used To Procure Innovative Technologies?

A2. Fixed price contracts have been used most often to procure innovative technologies. Fixed price contracts can include lump sums and/or fixed unit prices. A lump sum contract sets out the total price for completing the work, while fixed unit prices determine the price paid for individual items procured under the same fixed price contracting vehicle. In order to incorporate flexibility into the fixed priced contracts

used to procure innovative technologies, performance specifications and/or a combination of lump sums and fixed unit prices for work that was still undetermined were written into the contracts. Unit prices were used for such items as excavation, cleaning, backfilling, well installation and treatment. Excavation and treatment were most often based on cubic yards and not on weight due to problems in weighing soil. As noted in the sidebar on pages 2 and 3, there are other types of contracts that can be used to procure an innovative technology.

Q3. Do Construction Contracts Have To Be Used To Procure Innovative Technologies?

A3. Although construction contracts have been used to procure innovative technologies, much of the remedial action treatment work done using innovative technologies is service oriented and a service contract could be considered. The Davis-Bacon Act and the Service Contract Act require that all work be analyzed to determine which elements are construction and which are service. The contract is then awarded based on the preponderance of the work. A service contract procures the time and effort of a contractor whose primary purpose is to perform an identifiable task. A construction contract is a contract for the construction, alteration, or repair (including dredging, excavation and painting) of buildings, structures, or other real property.



Q4. How Do Bonding Requirements Differ Between Service And Construction Contracts?

A4. Bonds are written instruments that ensure that the contractor's obligations are met or that compensation is awarded if the obligations are not met. There are different types of bonds and related documents. The most commonly used bonds for construction work are bid, performance and payment bonds. A bid bond assures that the bidder will not withdraw a bid within the period specified for acceptance, and will furnish required bonds within the time specified in the bid. A performance bond secures the work that the contractor has agreed to execute. A payment bond assures payment to all persons supplying labor or material in the performance of the work provided by the contract. It is important to discuss bonding requirements with the Contracting Officer before the contract award so that bonding issues will not delay remedial construction. For example, if the contractor pledges private assets in lieu of obtaining a bond from a bonding company, each asset must be evaluated, which will lengthen the procurement process. However, contractors cannot be required to obtain bonds from bonding companies, and are allowed to pledge private assets to meet contractual bonding requirements. Although the contractor is not required to pledge bonds through a surety, the actual amount and means of pledging the bond must be acceptable to the CO prior to the award of the contract.

For service contracts, or any contracts other than construction contracts, performance and payment bonds are generally not required. However, if it is determined by the CO that a service contract contains elements of construction activity that are substantial enough to be segregated from the overall contract, two separate contracts must be awarded -- one for the service work and one for the construction work. If the construction activity exceeds \$25,000, the Miller Act applies to the construction contract, and the CO must make a determination as to the required level of bonding. For further information, please refer to "Superfund Guidance on the Applicability and Incorporation of the Davis Bacon Act/Service Contract Act and Related Bonding."

Contracting and Solicitation Options/ Considerations

Solicitation Options: Contracts may be procured by soliciting from more than one contractor (competitive) or from a sole source. A sole source solicitation may be used if the property or services needed by EPA are available from only one responsible source and no other type of property or service will satisfy the needs of the Agency. If the procurement is under \$25,000, a small purchase procurement may be used. If the procurement is over \$25,000, a Justification for Other than Full and Open Competition and a price or cost analysis must be completed.

If the procurement is competitive, there are three solicitation options:

- 1) Request for Proposals (RFP) if the procurement can be negotiated
- 2) Invitation for Bid (IFB) if sealed bids are accepted (procurement cannot be negotiated)
- 3) Two Step IFB if bidders are prequalified with an invitation for a sealed bid following the prequalification.

Types of Contracts: The different types of contracts that can be used for remedial actions are:

- 1) Firm Fixed Price Contracts- the government pays a fixed price for a specified product which is established before the award. Fixed price contracts are usually used when the design or performance specifications are reasonably definite.
- 2) Indefinite Delivery/ Indefinite Quantity Contracts- the government places orders for supplies and/or services against the contract after the award. These types of contracts are used when the exact time or place of delivery, or quantity required, is not known at the time of contract award.

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SITE INFORMATION**Site:**

Old Inger Oil Refinery
Louisiana
Region 6

Contact:

Mr. Paul Sieminski
RPM
(214) 655-6710
(FTS) 655-6710

Ms. Sandra Greenwich
State of Louisiana
(504) 765-0487

Technology:

Bioremediation
(Land Treatment)

CONTRACT INFORMATION

Procurement Lead: State of Louisiana under EPA cooperative agreement

Contractor(s): Westinghouse -- HAZTECH

Procurement Started/Completed: Construction of land treatment unit: 9/88-1/89 (5 months)

Operation of land treatment unit: Planned start December 1991

Number of Bids: 5

Phase of Procurement: Procurement for construction phase is completed; procurement for operation of land treatment unit is in presolicitation phase

Method of Solicitation: Sealed bid for construction; undecided for operation

Type of Contract: Combination of fixed price and lump sum. Lump sums used for mobilization, demobilization, and construction. Unit prices were used per cubic yard for excavation.

Protests/Claims: None

Change Orders: Differing site conditions raised the contractor's prices from the initial estimate.

Special Clauses Used in RFP/IFB/Contract: None

Bonding Requirements: Bonding required for construction

Patent Issues: None

Prequalified Bidders: No

Type of Specifications: Design specifications for construction; performance specifications for operation

Sole Source Issues: Not applicable, competitive procurement

Treatability Studies: Completed as part of the design

A-1

EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> Amount of time it took the contractor to provide cost documentation was problematic. Old Inger was one of the first sites at which land treatment was attempted. It was not realized that a no migration petition needed to be completed until after the design was completed. 	<ul style="list-style-type: none"> Waiting for the cost documentation slowed down the procurement. Completing the no migration petition also slowed down the procurement. 	<ul style="list-style-type: none"> Where there are uncertainties in the extent of contamination, it works well to use unit prices per cubic yard.

Old Inger Oil Refinery

A bioremediation (land treatment) technology is being procured at the Old Inger Oil Refinery remedial site (EPA Region 6) under an EPA cooperative agreement with the State of Louisiana. The procurement for construction of the land treatment unit began in November 1988 and was completed five months later in January 1989. The procurement for the operation of the land treatment unit was planned to begin in December 1991.

Westinghouse -- HAZTECH is the contractor constructing the land treatment unit. The contract for the land treatment unit was procured through sealed bids. A fixed price contract was used, which included both lump sums for mobilization, demobilization, and construction; and, fixed unit prices (per cubic yard) for excavation. Design specifications were used in the construction contract, and performance specifications will be used in the contract for operation of the land treatment unit.

Differing site conditions raised the contractor's price from the initial estimate. Initially, it took the contractor an unanticipated amount of time to provide cost documentation, which slowed the procurement. Using unit prices per cubic yard worked well at this site, since there was uncertainty as to the extent of the contamination, and unit prices could be applied to the new volumes.

In addition, Old Inger was one of the first sites at which land treatment was attempted. It was not realized that a no migration petition needed to be completed until after the design was completed. A no migration variance allows land disposal of restricted wastes not meeting the land disposal restrictions treatment standards in a specific unit. Completing the no migration petition also slowed down the procurement, because to obtain a no migration variance, site managers must demonstrate to a reasonable degree of certainty that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the waste remains hazardous.

SITE INFORMATION**Site:**

Lipari Landfill
(Operable Unit 3)
New Jersey
Region 2

Contact:

Mr. Thomas Graff (COE)
Project Manager
(816) 426-5832

Ms. Joanne Chapman
(COE)
Contract Specialist
(816) 426-5832

Technology:

Thermal Desorption
(Low Temperature)

CONTRACT INFORMATION

Procurement Lead: U.S. Army Corps of Engineers

Contractor(s): Contractor(s) not yet selected

Procurement Started/Completed: A six month procurement time frame is anticipated

Number of Bids: Not applicable, in presolicitation phase

Phase of Procurement: Presolicitation

Method of Solicitation: Competitive 2-step invitation for bid is anticipated

Type of Contract: Fixed unit price and lump sum; construction and service

Protests/Claims: Not applicable, in presolicitation phase

Change Orders: Not applicable, in presolicitation phase

Technical Requirements in RFP/IFB/Contract: Anticipate requiring: (1) minimum daily production rate; (2) temperature constraints to maintain "low temperature"; (3) type of treatment and equipment to be used; (4) length of availability of equipment; (5) due to limited space on site, will specify equipment size.

Bonding Requirements: Will require bonding on portion of work that is under a construction contract. Service contract work will not need full bonding.

Patent Issues: While some thermal desorption technologies are patented, no patent issues are anticipated

Prequalified Bidders: Not applicable, in presolicitation phase

Type of Specifications: Performance

Sole Source Issues: Not applicable, competitive procurement

A-3

EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • Potential problem with not allowing bidders to conduct bench scale studies. • When ROD was written, it specified that rotary kiln thermal treatment should be used and indicated the temperature constraints associated with the rotary kiln technology. Since the ROD was written, the thermal treatment technology has further developed, and the ROD is constraining the potential number of bidders. 	<ul style="list-style-type: none"> • COE is doing a bench scale study through a research company, and will release the results to potential bidders. • EPA is writing an Explanation of Significant Differences to allow bids on any type of thermal treatment, and to expand the temperature range. 	<ul style="list-style-type: none"> • For thermal desorption, state in the ROD the generic term for the technology. Do not be specific in order to encourage as many vendors as possible to bid on the contract. • Use performance specifications in contracts for innovative technologies in order to give contractors flexibility. • Use unit prices for cost per ton of treating soil and for cost per cubic yard of excavation and restoration.

Lipari Landfill

Remediation services for Operable Unit 3 (OU3) of the Lipari Landfill cleanup in New Jersey (EPA Region 2) will be competitively procured by the U.S. Army Corps of Engineers (COE). OU3, which is in remedial design, will involve the use of low temperature thermal desorption to process soil that will be excavated from a contaminated marsh. The COE is developing a contract acquisition plan that will outline the appropriate contracting mechanism and justification. The COE anticipates issuing a Two-Step Invitation for Bid (IFB) in February 1992. The procurement is scheduled to be completed within six months or by July 1992.

When the ROD was written in July 1988, it specified that a specific type of thermal treatment known as rotary kiln would be used and noted the corresponding temperature constraints. However, since the ROD was written, thermal desorption technology has developed further and the original temperature constraints and limitation to a specific type of thermal treatment are no longer applicable. To correct this situation, EPA is writing an Explanation of Significant Differences to permit bids on any type of thermal treatment, and to expand temperature constraints.

COE is anticipating problems with the procurement of the thermal desorption technology. The cleanup criteria allow the contractor to specify the specific type of thermal desorption treatment to be used on the site. However, logistical, legal, and timing concerns will prevent samples from being released for bench scale testing. Bench scale tests are being conducted through a research company who will release the results of this test to potential bidders. The bidders will not be able to conduct their own treatability studies.

In an effort to avoid additional potential problems, COE intends to use performance specifications, which will give the contractor the flexibility to make equipment adjustments to meet cleanup goals. COE plans to use unit prices for the cost per ton of treating the soil through thermal desorption, and cost per cubic yard for the cost of excavation and restoration and analytical services. The remainder of the work will be paid for on a lump sum basis.

SITE INFORMATION**Site:**

Verona Well Field
Michigan
Region 5

Contact:

Ms. Margaret Guerriero
RPM
(312) 886-0399
(FTS) 886-0399

Technology:

Vacuum Extraction
(Soil Vapor Extraction)

CONTRACT INFORMATION

Procurement Lead: Subcontract through REM contract

Contractor(s): ARCS: CH2M HILL; Subcontract: Terra Vac

Procurement Started/Completed: 3/87-9/87 (7 months)

Number of Bids: 4 bids received on initial procurement; sole source justification when REM switched to ARCS

Phase of Procurement: Contract Administration

Method of Solicitation: Competitive, 2-Step IFB; sole source when REM IV switched to ARCS

Type of Contract: Fixed unit price and lump sum

Protests/Claims: None

Change Orders: (Information unavailable)

Special Clauses Used in RFP/IFB/Contract: None

Bonding Requirements: Performance bond

Patent Issues: Terra Vac holds patent on vacuum extraction

Prequalified Bidders: Yes (informally)

Type of Specifications: Both performance and design

Sole Source Issues: Not applicable, competitive procurement

A-5

EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • After the contract was awarded and work had begun, the contracting vehicle for site remediation changed from REM IV to ARCS. This required the subcontract to be renegotiated. • Terra Vac did not have the necessary insurance to perform soil vapor extraction on the site. • After the IFB was released, the community and the State became concerned that soil vapor extraction would not be effective. This concern delayed the procurement for three months. 	<ul style="list-style-type: none"> • When the subcontract was rebid, the prime contractor wrote a sole source justification for Terra Vac to continue work. • EPA gave Terra Vac a special case indemnification. • EPA performed extra sampling to ensure effectiveness of technology. 	<ul style="list-style-type: none"> • Use a unit price contract with extra year options. This will eliminate the need for future procurements if the clean-up takes longer than anticipated. • In the IFB, require that bidders demonstrate that the technology will be effective at the site. • Use design specifications for construction and excavation, and use performance specifications for the vacuum extraction treatment. Performance specifications are especially good to use when a technology or components of a technology are considered proprietary by a contractor.

Verona Well Field

Procurement of vacuum extraction (soil vapor extraction) at the Verona Well Field site in Michigan (EPA Region 5) began in March of 1987 and ended seven months later in September. CH2M Hill was the ARCS prime contractor who subcontracted with Terra Vac for the vacuum extraction technology. This technology was competitively procured through a Two-Step IFB.

The contract took three months longer to be awarded than originally anticipated because the State of Michigan and the community were hesitant about using soil vapor extraction on the site. The community preferred incineration; however, due to the high levels of contamination on the site, incineration was not a feasible option. Although the community initially supported using soil vapor extraction, after the IFB was released, the community pulled back its support for the use of this technology and EPA had to negotiate for several months. Once EPA agreed to perform extensive sampling to ensure that the technology would work, the community was persuaded to allow the use of soil vapor extraction on the site. It was learned that it is important to identify a contingent remedy in the ROD when an innovative technology is selected as the remedy in the ROD so that the community will know the option available if the selected remedy is unsuccessful.

The IFB required a demonstration that the technology would be effective at the site. In order to meet this requirement, Terra Vac did a pilot study after the contract was awarded. This avoided future problems because the technology was proven to work on a small scale before it was implemented on a large scale.

Both performance and design specifications were used in the contract. Design specifications were used for construction, excavation, and tank removal. Performance specifications were used for the cleanup goals which Terra Vac had to reach in using the soil vapor extraction technology--design specifications could not be used for the innovative technology since a lot of Terra Vac's design work is proprietary. It was learned that performance specifications are especially good to use when a technology or components of a technology are considered proprietary by a contractor.

Another problem encountered in the procurement process involved indemnification. Terra Vac did not have the insurance that it needed to perform the soil vapor extraction technology on the site. Eventually, EPA gave Terra Vac a special case indemnification which allowed them to do the work.

Terra Vac had difficulty acquiring a performance bond which they were required to submit. After a lengthy period of time they were able to obtain a letter of credit from a bank.

In September of 1990, the contract was switched from a Remedial Planning (REM) IV contract to an Alternative Remedial Contracting Strategy (ARCS) contract. Since there are different requirements under ARCS, CH2M Hill rebid the subcontract. When the subcontract was rebid under ARCS, CH2M Hill wrote a sole source justification for Terra Vac to continue the work. This transition from a REM IV to an ARCS contract proceeded smoothly since CH2M had anticipated the change.

The contract pays on the basis of the amount of work performed through unit prices, and the contract also provides for optional years to anticipate the need for further procurements in the future. This has enabled EPA to easily negotiate additional work, and has afforded protection from price escalation.

SITE INFORMATION

Site:

Commencement Bay,
South Tacoma Channel,
Well 12-A
Washington
Region 10

Contact:

Mr. Kevin Rohlin
RPM
(206) 553-2106
(FTS) 553-2106

Technology:

Vacuum Extraction

CONTRACT INFORMATION

Procurement Lead: U.S. Army Corps of Engineers (COE) preplaced contract

Contractor(s): COE Preplaced Contractor: Hunter ES&E; Subcontract: AWD

Procurement Started/Completed: 11/88-12/88 (1 month)

Number of Bids: 3

Phase of Procurement: Contract Administration

Method of Solicitation: Competitive -- sealed bid to preplaced COE contractors

Type of Contract: Fixed unit price and lump sum

Protests/Claims: None so far

Change Orders: (Information unavailable)

Special Clauses Used in RFP/IFB/Contract: A patent infringement clause was included in the IFB stating that the Federal government would bear the liability for patent infringement

Bonding Requirements: Contractor had to obtain a \$1 million bond, and show proof of effectiveness

Patent Issues: Terra Vac's patent requires 15% of all site-related payments. COE patent attorney is currently negotiating nationwide patent rights with Terra Vac on behalf of EPA.

Prequalified Bidders: Bids were solicited from a pool of prequalified contractors under a COE preplaced contract

Type of Specifications: Design

Sole Source Issues: Not applicable, competitive procurement

A-7

EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • A fixed price, lump sum contract does not work well because of changes involved in implementing the remedial action. • The design took longer than anticipated to complete because the first design that was solicited was inadequate to clean up the site. • Although the procurement took only one month, several month elapsed between EPA's procurement request and the release of the solicitation. 	<ul style="list-style-type: none"> • Using fixed unit prices in the contract (since the total amount of material to be treated was unknown) helped alleviate some of the uncertainties. • Second design relied on a pilot study. 	<ul style="list-style-type: none"> • COE preplaced contracts facilitate procurement of innovative technologies and keep non-qualified bidders out of the competition; however, bids are more costly. • Unit prices are useful when the total amount of material to be treated is unknown.

Commencement Bay, Well 12-A

At the Commencement Bay, South Tacoma Channel, Well 12-A, Operable Unit One site in Oregon (EPA Region 10), a vacuum extraction technology was procured through the U.S. Army Corps of Engineers (COE). The COE used a preplaced contract to acquire this technology, and the procurement began in November 1988 and ended one month later in December 1988 (see Chapter II for a discussion of preplaced contracts). For this procurement, three sealed bids were received from the pool of prequalified contractors who only needed to submit a one page bid which indicated their price for the work to be done at the site. The COE preplaced contractor who won the contract was Hunter-ES&E (Gainesville), and the subcontractor was AWD. Preplaced contracts worked well for procuring vacuum extraction; however, they are more labor intensive than contracts which are not procured through the preplaced prequalification process. The labor intensive nature of these contracts raises COE's contract administration costs. Prequalification reduces the probability of receiving bids from nonqualified bidders. Although the procurement took only one month, several months elapsed between EPA's procurement request and the release of the solicitation.

The most significant difficulty encountered in acquiring the vacuum extraction technology at this site related to patent rights. The patent is held by the President of Terra Vac. Terra Vac is fully licensed under the patent to use and market vacuum extraction; most other companies using the technology, including AWD, are not licensed. The company holding the patent on vacuum extraction (Terra Vac) claimed that it is entitled to 15 percent of all site-related payments. However, the site costs which are most directly related to the vacuum extraction technology are those associated with the remedial action construction payments. Moreover, the cost effectiveness of using vacuum extraction is quickly lost if 15 percent of all site-related payments are paid to the patent holder.

In order to avoid limiting the competition as a result of the patent claim, the IFB included a patent infringement clause which informed the bidders that the Government would bear the liability for patent infringement at this site. This prompted an effort by EPA to negotiate patent rights to Terra Vac's process, since this issue affects all sites interested in procuring a vacuum extraction technology. A COE attorney is negotiating with Terra Vac on behalf of EPA. EPA is currently in the process of compiling a proposal to send to Terra Vac which would give Terra Vac 15 percent of all remedial action construction payments as opposed to 15 percent of all site-related payments.

SITE INFORMATION	CONTRACT INFORMATION
<p>Site: Wide Beach Development New York Region 2</p> <p>Contact: Mr. Herb King RPM (212) 264-1129 (FTS) 264-1129</p> <p>Technology: Chemical Treatment (APEG Dechlorination)</p>	<p>Procurement Lead: U.S. Army Corps of Engineers Contractor(s): Kimmins; Subcontract: Soil Tech Procurement Started/Completed: 5/89-10/89 (6 months) Number of Bids: Two bids, one of which was unresponsive Phase of Procurement: Contract administration Method of Solicitation: Initially procured as a sealed bid, then negotiated cost with sole responsive bidder Type of Contract: Fixed price/lump sum Protests/Claims: None Change Orders: Approximately 25 Special Clauses Used in RFP/IFB/Contract: KPEG as the technology to be used at this site Bonding Requirements: Kimmins pledged private assets Patent Issues: Many different dechlorination processes are patented technologies Prequalified Bidders: No Type of Specifications: Design Sole Source Issues: Not applicable, competitive procurement</p>

6-9

EXPERIENCES ENCOUNTERED	RESOLUTION/OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • After the award of the contract, Kimmins could not reach an agreement with subcontractor (Galson) specified in their proposal for the KPEG treatment. Kimmins submitted a value engineering study to have another contractor (Soil Tech) use APEG treatment instead. • When private assets are used for bonding, each asset has to be evaluated by the awarding Agency. 	<ul style="list-style-type: none"> • Since the contract award was based on original contractor's success with KPEG, EPA required that a successful demonstration be run before accepting Kimmins' value engineering submission. EPA paid for a successful demonstration. However, after full-scale implementation, unanticipated changes occurred in the soil structure due to the high heat involved in the substituted process. The soil was not able to be used as backfill on-site. • The COE had to spend considerable time completing this process for the contract award. 	<ul style="list-style-type: none"> • The original design was based around a patented technology. When the contractor could not obtain the services of the subcontractor in the proposal, an alternate dechlorination process had to be substituted and the original design was not used. If performance specifications had been used in the contract, it would have been easier to make this substitution. • Allowing for wider competition or substitution among dechlorination processes may not be suitable unless full-scale demonstrations are performed first. • Fixed price, lump sum contracts lead to a lot of change orders if there are differing site conditions.

Wide Beach Development

At the Wide Beach Development remedial site in New York (EPA Region 2), an APEG dechlorination technology was competitively procured through sealed bids by the COE as a subcontract through a prime contract. The procurement began in May 1989 and was completed six months later in October 1989.

The ROD for this site specified that KPEG, a form of the APEG dechlorination technology, would be used to treat and process contaminated soil at the site. The remedy selected in the ROD was based on the results of a treatability study performed by Galson Remediation, the company which holds a patent on the KPEG process, during the remedial design. The prime contractor who won the contract for the remedial action (Kimmins) had indicated in their bid that Galson would be the subcontractor for the KPEG treatment. However, after the award of the contract, Kimmins could not reach an agreement with Galson, and submitted a value engineering proposal to have another subcontractor (Soil Tech) use the more generic chemical treatment, APEG, on the site.

Since both the remedial design and the award of the contract to Kimmins were based on Galson's success in treating the soil using KPEG in the treatability study, EPA required Soil Tech to run a demonstration before the value engineering proposal would be accepted. EPA would pay for the demonstration only if the demonstration was successful. Soil Tech ran a successful demonstration on the site, and the proposal was accepted. However, since the APEG technology uses a much higher temperature to treat the soil than the KPEG treatment, the structural characteristics of the soil have been altered, and the soil can no longer be used to support a road as originally planned. It was learned that it is important to look not only at how the contaminants are affected, but also at how the soil is affected by the treatment process. It was also learned that it is important to do everything possible during the procurement process to determine whether the prime contractor has reached agreement with the subcontractor(s) bid in their original proposal.

Specifying KPEG in the IFB reduced the number of bidders. Two bids were received in response to the IFB; however, one was determined to be unresponsive, since the vendor did not have the necessary experience with the KPEG technology. Therefore, the COE wound up negotiating the price of the work with the sole responsive bidder (Kimmins). These negotiations were difficult because limited data on the technology existed which could be compared against the subcontractor's cost and pricing estimates. The COE did complete their own estimates which were used as a basis for comparison with the subcontractor's estimates. However, the COE's estimates and the subcontractor's estimates were substantially different, and the subcontractor was required to provide data to back up their estimates.

The subcontract for the KPEG technology was a fixed price, lump sum contract. However, using this type of contract has led to the submission of approximately 25 change orders since the subcontractor claims that site conditions are different than assumed in the proposal. If the change orders are approved, they would double the cost of the work since the initial award of the contract. EPA is evaluating these change orders.

The subcontract used design specifications which were based on the Galson KPEG process; if performance specifications had been used, it would have been easier to make the transition from the KPEG to the APEG process, and time would not have been lost completing design specifications that were not used.

Bonding issues were also problematic at this site, in that Kimmins had pledged private assets for the bond, and the COE was required to go through the time consuming process of evaluating each asset after the contract was awarded. It was learned that bonding requirements should be discussed with the contractor before the award is made so that bonding issues will not hold up the remedial construction.

SITE INFORMATION

Site:

United Creosoting
Texas
Region 6

Contact:

Ms. Deborah Griswold
RPM
(214) 655-6715
(FTS) 255-6715

Technology:

Critical Fluid
Extraction
(Solvent Extraction)

CONTRACT INFORMATION

Procurement Lead: State lead under EPA cooperative agreement

Contractor(s): CF Systems

Procurement Started/Completed: 4/91-present (sole source negotiations)

Number of Bids: Not yet determined

Phase of Procurement: Presolicitation

Method of Solicitation: Innovative technology procured through sole source arrangement while rest of project will be procured competitively (planned)

Type of Contract: Anticipate using fixed unit prices

Protests/Claims: None foreseen at this time

Change Orders: Not yet determined

Special Clauses Used in RFP/IFB/Contract: Not yet determined

Bonding Requirements: Not yet determined

Patent Issues: CF Systems holds a patent on their chemical extraction technology

Prequalified Bidders: No

Type of Specifications: Design

Sole Source Issues: ROD specified both the vendor and the technology

A-11

EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • State-lead procurements appear to take more time due to a number of factors, including State administration. • State commissioners have to authorize funds for the contract. 	<ul style="list-style-type: none"> • State-lead procurements are advantageous in that States do not have to follow the FAR. 	<ul style="list-style-type: none"> • Pilot study was done at the site using CF Systems' solvent extraction and therefore it was specified by name in the ROD. Being specific when a technology is <u>known</u> to work at a site makes it easier to perform a sole source procurement. • Sole source procurements must go through a price analysis to ensure that the government is not overcharged. • It is anticipated that total work at site will be done through two separate procurements. One will be sole source to CF Systems, and the other will be a competitive bid for construction work to be done at the site.

Case Studies

United Creosoting

A solvent extraction technology is currently being procured at the United Creosoting site in Texas (EPA Region 6) through an EPA cooperative agreement with the State of Texas. The State began the procurement negotiations in April 1991, and is proceeding with a sole source procurement for the innovative technology. Two separate procurements are being used -- one for the innovative technology, and one for the remainder of the site work. The non-innovative technology portion of the work on the site will be competitively bid.

The ROD at this site specified the vendor (CF Systems) for the innovative technology portion of the work as well as the technology (critical fluid extraction). This facilitated the procurement since it was previously demonstrated through a pilot study that this technology would work on the site, and that CF Systems was the only vendor who could provide the technology. The ROD specificity avoided opening up the procurement to other vendors when it was known that other vendors may not be able to successfully perform the work. However, the RPM at this site stated that it is important to make the remedy in the ROD general if a treatability study has not been completed, if a patent is under question, or if there is uncertainty as to whether the technology will work on the site.

In general, State-lead procurements take longer to complete. The State does not have to follow the Federal Acquisition Regulations (FAR), and there is less paperwork and approvals that are required. Instead, States must follow 40 Code of Federal Regulations Part 35 for procurements under EPA cooperative agreements and their own State procurement requirements. Since at this site, there is only one vendor who can provide the needed service, the State is not required to write a sole source justification.

Patent issues are not expected to arise since CF Systems holds the patent on the specific type of chemical extraction to be used on this site. Problems would arise only if other vendors wanted to use this technology. Furthermore, the Government does not expect to pay royalties since the patent holder is the contractor.

SITE INFORMATION**Site:**

Pinette's Salvage Yard
Maine
Region 1

Contact:

Mr. Ross Gilleland
RPM
(617) 573-5766
(FTS) 883-5766

Technology:

Chemical Extraction
(Solvent Extraction)

CONTRACT INFORMATION

Procurement Lead: Subcontract through ARCS contract

Contractor(s): ARCS: EBASCO; Subcontractor: Severson Environmental Services; Subcontractor/vendor to Severson for solvent extraction: initially CET Sanivan Group, now Terra Kleen

Procurement Started/Completed: Severson (Sanivan): 4/90-10/90 (6 months); Severson (Terra Kleen): 1/92-5/92 (4 months)

Number of Bids: 2

Phase of Procurement: Contract Administration

Method of Solicitation: Competitive, negotiated

Type of Contract: Fixed unit price and lump sum

Protests/Claims: None

Change Orders: Several due to changing site quantities and conditions

Special Clauses Used in RFP/IFB/Contract: TSCA identification number and treatability variance were required in RFP

Bonding Requirements: Yes

Patent Issues: None, although Sanivan claims its solvents are proprietary and was reluctant to release necessary information to EPA (some types of solvent extraction are patented)

Prequalified Bidders: No

Type of Specifications: Both performance and design

Sole Source Issues: Not applicable, competitive procurement

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EXPERIENCES ENCOUNTERED	RESOLUTION/OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> Bid package required bidders to produce at pre-bid conference a TSCA ID number and a treatability variance. Only two bidders were aware that they needed to provide a treatability variance at pre-bid conference. EPA required release of proprietary information on the solvents used in the process in order to ensure that the treated waste did not become a RCRA hazardous waste. Sanivan was bought out and stopped work. 	<ul style="list-style-type: none"> Only two companies came with letters and were eligible to bid. Contract award was made dependent on the release and Sanivan provided the information. Terra Kleen emerged as a new solvent extraction technology vendor and a new subcontract is being negotiated. 	<ul style="list-style-type: none"> Contract for site layout work used design specifications. All other work was performance based. Use performance specifications in order to hold contractors to meeting the cleanup goals outlined in the ROD. Do not specify brand of technology in ROD if treatability studies have not been completed, but do not be so general that you do not obtain desired technology. As part of the proposal process, bidders to be considered responsive had to demonstrate that their technology could meet EPA cleanup levels at the site. To meet this requirement, some bidders performed treatability tests on soil samples provided by EPA at their own expense. Used unit prices on excavation.

Pinette's Salvage Yard

At the Pinette's Salvage Yard site in Maine (EPA Region 1), a solvent extraction technology was competitively procured as a subcontract through the ARCS contractor (EBASCO). The initial procurement began in April 1990 and was completed six months later in October 1990. Severson Environmental Services is the subcontractor and CET Sanivan Group was the vendor Severson initially contracted with to perform the solvent extraction. The subcontract for the solvent extraction technology used a combination of fixed unit prices and lump sums, and a combination of design and performance specifications. Fixed unit prices worked well on the site, as more soil was excavated and incinerated than originally expected.

The ROD for this site specified that solvent extraction would be used to treat and process soil at the site. EBASCO wanted to broaden the technology to be procured in the RFP specifications, so that bids on soil washing could also be received. However, they were precluded from doing so due to the specificity of the ROD language. While specificity in the language of the ROD did limit the solicitation process, the goals of the ROD were achieved.

The major procurement problem at this site occurred because the solicitation package indicated that at the pre-bid conference, bidders were required to provide EPA with their Toxic Substances Control Act (TSCA) identification number and a treatability variance. Only two companies came to the pre-bid conference with the necessary letter, making them the only two companies that were eligible to bid on the contract.

As part of the proposal process, the bidders were required to demonstrate that their technology could meet EPA clean-up levels at the site. In order to demonstrate that the technology would be effective at the site, some bidders conducted treatability studies at their own expense with soil samples provided by EPA, and provided the results of the studies to EPA. This demonstration enabled EPA to select a vendor that was capable of doing solvent extraction, and have confidence in the technology at the bench scale level.

In procuring this technology, Sanivan claimed that the solvents they use are proprietary. Sanivan did not, however, have a patent on these solvents. This claim hampered the contract negotiations because Sanivan did not want to release information on these solvents, and EPA needed to ensure that the treated waste which resulted from the solvent extraction procedure was not a RCRA hazardous waste. Sanivan provided the necessary information only when the contract award was dependent upon the release of this information.

However, Sanivan was bought out by another company soon after starting work on the site, and stopped work on the site in October 1991. In January 1992, Terra Kleen emerged as a new vendor able to provide the solvent extraction technology, and Severson is currently in the process of reviewing Terra Kleen's subcontract proposal. It is projected that Terra Kleen's contract will be finalized by May 1992, and that mobilization will begin in May. Terra Kleen is also required to demonstrate that their technology can meet EPA clean-up levels at the site.

SITE INFORMATION

Site:

United Chrome
Products
Oregon
Region 10

Contact:

Mr. Loren McPhillips
RPM
(206) 553-4903
(FTS) 399-4903

Technology:

In Situ Soil Flushing

CONTRACT INFORMATION

Procurement Lead: Subcontract through ARCS contract

Contractor(s): ARCS: CH2M HILL; Subcontracts: Wastewater Treatment Systems (WTS) and Riedel; Operation and Maintenance: Responsible Parties

Procurement Started/Completed: Riedel contract: 9/87-12/87 (4 months); WTS contract: 10/87-2/88 (5 months)

Number of Bids: 7

Phase of Procurement: Contract Administration

Method of Solicitation: Competitive, sealed bid

Type of Contract: Fixed unit price and lump sum

Protests/Claims: None

Change Orders: 6

Special Clauses Used in RFP/IFB/Contract: Required corporate health and safety program; required small business participation; required technical proposal for WTS

Bonding Requirements: Performance and payment bonds

Patent Issues: None

Prequalified Bidders: No

Type of Specifications: Riedel contract: design; WTS contract: performance

Sole Source Issues: Not applicable, competitive procurement

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EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
<ul style="list-style-type: none"> • With WTS contract, filter press could not handle amount of sludge needed to operate effectively. • Lowest bidder on treatment plant was not considered because of poor record of equipment which would have led to excessive operation and maintenance costs. 	<ul style="list-style-type: none"> • Since contract had performance specifications, CH2M HILL was able to withhold payment until subcontractor provided equipment capable of handling necessary amount of sludge. • Prime contractor had to write formal justification explaining why this bidder was not responsive. 	<ul style="list-style-type: none"> • Unit prices were used for excavation and well installation. When additional wells were needed due to differing site conditions, unit prices on wells easily allowed the changes. • The technology in the ROD was generic and allowed flexibility to accommodate a design tailored to site conditions. • Use of performance specifications required subcontractor to provide correct equipment (instead of what was specified in the subcontractor's design) to perform job at their cost. • Two separate bids were let -- one to construct the soil flushing system (e.g., infiltration galleries and wells) and another to build a wastewater treatment system to treat the elutriate. • Soil flushing is standard construction type work.

United Chrome Products

An in situ soil flushing technology was used on the United Chrome Products site in Oregon (EPA Region 10). This technology was originally procured as a subcontract through a REM IV contract which was later converted to an ARCS contract. The ARCS contractor is CH2M Hill. There are two subcontracts: Wastewater Treatment Systems (WTS) provided hardware and is constructing the treatment plant, and Riedel built the containment unit and infiltration galleries, and is installing the wells. In addition the potentially responsible party (PRP) is the city of Corvallis, who is operating and maintaining the treatment plant. The procurement for the treatment plant began in October 1987 and ended five months later in February 1988. The procurement for the well installation began in September 1987 and ended four months later in December 1987.

The two subcontracts were competitively procured through sealed bids. The bidders were required to submit a technical proposal, cost proposal, their corporate health and safety program, their equipment, and their subcontractors. Seven bids were received for the treatment plant contract, and the second lowest bidder won the contract. The lowest bid was considered too low to include operation and maintenance costs, and CH2M Hill wrote a formal justification for why this bidder was excluded from further consideration. Both contracts used a combination of firm fixed prices (lump sums) and unit prices.

The RPM at the site noted that the Riedel contract has been flexible enough to allow for change orders, which were critical to accomplish the work. For example, since the remedial investigation underestimated the amount of contamination in the plume, more wells were added through change orders. This was possible because the wells were unit priced in the contract. In addition, the contract had originally anticipated that only a section of the building on the site would be demolished; when the plans changed, it was possible through change orders to have Riedel demolish the entire building. The RPM stated that he was able to save several hundreds of thousands of dollars by using change orders.

Problems were avoided by using performance based specifications for the WTS contract. For instance, the first treatment unit which WTS provided contained a filter press that was inadequate for the amount of sludge it was expected to handle. Since the contract with WTS utilized performance specifications, CH2M Hill was able to withhold payment until WTS provided more expansive equipment which was capable of handling the necessary amount of sludge.

The ROD for this site was one of the first RODs ever written in EPA Region 10. The description of the remedy in the ROD was general, and only stated that a pump and treat technology would be used. Therefore, the ROD did not limit the remedy to one specific type of technology. The flexibility of a nondetailed, nonspecific ROD enabled the contracts with CH2M Hill, Riedel, and WTS also to be flexible.

Riedel was required to have performance, bid, and payment bonds. Riedel went to a bonding company to obtain these bonds. They did not encounter any bonding difficulties since they had previously performed work at Superfund sites.

SITE INFORMATION**Site:**

Lipari Landfill
(Operable Unit 2)
New Jersey
Region 2

Contact:

Mr. Thomas Graff (COE)
Project Manager
(816) 426-5832

Ms. Joanne Chapman
(COE)
Contract Specialist
(816) 426-5832

Technology:

In Situ Soil Flushing

CONTRACT INFORMATION

Procurement Lead: U.S. Army Corps of Engineers

Contractor(s): BECHTEL Environmental; Subcontract: CDM

Procurement Started/Completed: 4/89-7/89 (4 months)

Number of Bids: 8

Phase of Procurement: Contract Administration

Method of Solicitation: Competitive, sealed bid

Type of Contract: Fixed unit price and lump sum

Protests/Claims: None

Change Orders: Several

Special Clauses Used in RFP/IFB/Contract: None

Bonding Requirements: 100% bonding was required

Patent Issues: None

Prequalified Bidders: No

Type of Specifications: Design

Sole Source Issues: Not applicable, competitive procurement

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EXPERIENCES ENCOUNTERED	RESOLUTION/ OUTCOME	WHAT WORKED WELL/ADVICE
None	(Not applicable)	<ul style="list-style-type: none"> •Unit prices were used for well installation, extraction and injection. •Lump sums were used for construction and operation and maintenance.

Lipari Landfill

For the remediation of Operable Unit 2 (OU2) at the Lipari Landfill site in New Jersey (EPA Region 2), an in situ soil flushing technology was competitively procured through sealed bids by the COE as a subcontract through a prime contractor. The procurement began in April 1989 and was completed four months later in July 1989.

BECHTEL Environment, the prime contractor for this site, received eight bids, and awarded the subcontract to CDM. In procuring this technology, COE did not encounter any problems; there were no patent issues and no protests or claims. To minimize potential problems, COE used a complete design package, which prescribed the total treatment system and hence, minimized the need for decisions on the part of the contractor.

The subcontract for the in situ soil flushing technology was a fixed price contract, using a combination of fixed unit prices and lump sums. Unit prices were used for well installation, extraction, injection wells, and discharging the water to a publicly owned treatment works because it was difficult to ascertain the exact volume of material to be remediated at this site, and even a small difference in the projected volume (as opposed to actual volume) would result in a large cost difference. Both parties hedged their risk by using a combination of lump sums and unit prices in that, the contractor is fairly compensated if there is more soil to be treated than originally anticipated, and the Government does not lose money if there is less soil to be treated than expected.

**Contracting and Solicitation Options/
Considerations (continued from page 2)**

- 3) **Time and Materials Contracts**-the government pays a fixed rate for each hour of direct labor worked by the contractor, up to a negotiated ceiling on the total price. This type of contract is used for engineering and design services, repair, maintenance or overhaul work, or in emergency situations where there are generally unforeseen circumstances.
- 4) **Cost Reimbursement Contracts**-the government pays for reasonable, allowable and allocable costs of the remedial action plus a fixed fee or an award fee. A fixed fee does not vary with performance while an award fee is based upon a government evaluation of contractor performance. Cost-plus-fixed-fee contracts are used when the performance desired cannot be clearly specified, and when accurate cost estimates are impossible.

Superfund Remedial Contracting Options: For contracts under \$15 million, there are four choices:

- 1) **Alternative Remedial Contracting Strategy (ARCS) vehicle** - ARCS prime contractors may be used to complete a remedial design and/or award remedial action subcontracts to execute the selected remedial action.
- 2) **State Cooperative Agreement** - EPA provides funds to states, political subdivisions, and Indian tribes to assume lead responsibility in awarding and managing contracts for remedial action.
- 3) **Site Specific Contract** - EPA procures the work directly from a contractor instead of using an ARCS contracting vehicle.
- 4) **U.S. Army Corps of Engineers (COE) or Bureau of Reclamation Interagency Agreement** - The COE or Bureau of Reclamation manages the procurement of prime contracts and subcontracts after the Record of Decision is signed. The COE or Bureau of Reclamation can procure standard competitively bid contracts, Preplaced Remedial Action (PRA) contracts or Rapid Response (RR) contracts. For PRA and RR contracts, the solicitation is only released to prequalified bidders, which expedites the procurement.

For contracts over \$15 million, either a State cooperative agreement may be used or the contract must be managed by the COE or the Bureau of Reclamation.

Q5. What Types of Specifications Are Being Used In Bid Packages For Innovative Treatment Technologies?

A5. Design specifications precisely state how the contract is to be performed. Performance specifications, as defined in this fact sheet, specify the technology to be used and set goals to attain, but allow flexibility in design. Performance specifications work best in the procurement of innovative technologies. Since performance specifications specify the cleanup goals without specifying exactly how the site is to be cleaned up, EPA has to pay only for what is cleaned up to these performance standards. Also, if problems arise during the remedial action, the contractor's performance can be measured against these standards, which facilitates documentation of any problems. Performance specifications are especially good to use when dealing with proprietary processes and/or materials, because corporations generally will not have to release their proprietary designs. An exception might be when a region is concerned about the by-products of treatment with a technology (see Pinette's Salvage Yard).

Q6. What Issues Need To Be Addressed If The Technology Being Procured Is Patented?

A6. Some innovative technologies may be patented. It is important to involve the CO early in the process if the technology is patented. The RFP/IFB should point out that the technology is patented, and how this issue will be handled in the procurement. If a Waiver of Indemnity Clause is included in the contract, the government bears the liability if a patent is accidentally infringed upon.

Q7. What Special Contract Clauses Or Requirements In the RFP/IFB Have Been Used To Facilitate The Procurement Of An Innovative Treatment Technology?

A7. To facilitate the procurement of innovative technologies the following contract clauses have been used:

- Contract clauses which indicate that the contract can be terminated for convenience if the contractor's pilot test fails;
- Contract clauses which include optional years and high enough ceilings in service contracts in order to clean-up all of the waste that could possibly be found at a site; and
- Payments clauses which allow contractors to receive payment as the work progresses based on the amount of work completed.

Often, IFBs/RFPs include special requirements, such as treatability variances. In addition, several RFPs/IFBs required a demonstration that the technology would be effective at the site. This has resulted in bidders performing treatability studies at their own expense prior to bidding on the site.

All standards that the contractor must meet should be set out in the contract. It is essential that the EPA CO and the RPM both review the IFB/RFP and the contract to ensure that the requirements are not ambiguous from either a contractual or a technical perspective.

Pre-award surveys can be of use in determining the responsibility of the low bidder or selected offeror. These surveys are evaluations of a prospective contractor's capability to perform a proposed contract. A pre-award survey is completed before the award of the contract, and is used to determine the financial capability as well as the physical and technical resources of the low bidder or selected offeror.

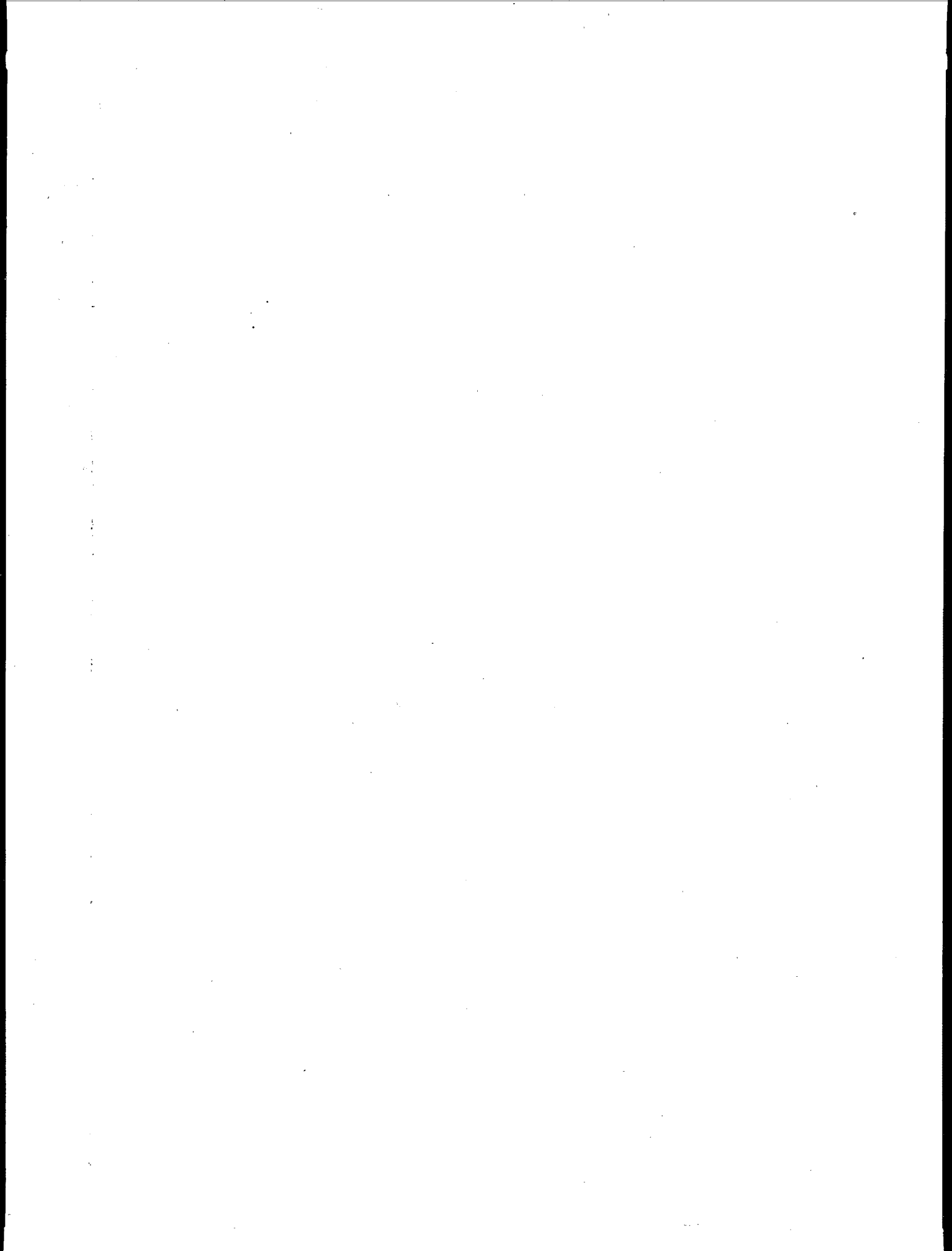
Q8. Are Subcontractors Prohibited From Being Awarded The Construction Contract At Sites Where They Have Performed A Treatability Study?

A8. 48 CFR Part 1536 of the EPA Acquisition Regulations (EPAAR) clarifies the Federal Acquisition Regulations (FAR) Part 36.209 by stating that subcontractors performing treatability studies are not prohibited from being awarded the construction contract for a project. Other subcontractors are also not prohibited from being awarded the construction contract for a project unless their work substantially affected the course of the design. Prime contractors of the design and subcontractors whose work substantially affected the course of the design must receive prior approval by the responsible Associate Director of the Procurement and Contracts Management Division under EPA's Office of Administration and Resources Management before they can be awarded the contract.

For further information on procuring innovative technologies, please refer to the following documents. EPA employees may request documents with EPA directive numbers by writing to: Superfund Document Center, U.S. Environmental Protection Agency, (OS-245), 401 M Street, S.W., Washington, D.C. 20460, Fax: (202) 260-2596.

- U.S. EPA/HSCD, "USACE Preplaced and Rapid Response Contracts," EPA/9355.5-05/FS, December 1989.
- U.S. EPA/OERR, "Procurement Under Superfund Remedial Cooperative Agreements," EPA/9375.1-11, June 1988.
- U.S. EPA/PCMD, "Superfund Guidance on the Applicability and Incorporation of the Davis Bacon Act/ Service Contract Act and Related Bonding," January 1992. (To obtain this document, please call Sue Anderson in PCMD at (202) 260-9170, or send a written request to EPA, Mail Code PM214-F.)
- U.S. EPA/OSWER, "Furthering the Use of Innovative Treatment Technologies in OSWER Programs," EPA/9380.0-16, June 10, 1991.
- U.S. EPA/OPM, "CORAS Bulletin," EPA/9200.5-4011, intermittent bulletin on different issues related to procurement.
- U.S. EPA/OSWER/TIO, "Innovative Treatment Technologies: Semi-Annual Status Report," EPA/540/2-91/001, Semiannual Publication on the Status of Implementation of Innovative Technologies at Superfund Sites.
- U.S. EPA/OERR; OWPE, "Advancing the Use of Treatment Technologies for Superfund Remedies," EPA/9355.0-26, February 21, 1989.
- 40 CFR 35, Final Rule, "Cooperative Agreements and Superfund State Contracts for Superfund Response Actions."
- 48 CFR 1536, Final Rule, "EPAAR Clarification of Applicability to Subcontractors of the FAR Provisions on Construction Contracts with Architect/Engineering Firms."

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