



Pay-For-Performance Cleanups

Effectively Managing Underground Storage Tank Cleanups



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Introduction: Pay-For-Performance Cleanups

Underground storage tank (UST) cleanups are often “bought” using time-and-materials agreements that can result in high cleanup costs, slow cleanup progress, and failure to reach cleanup goals. In contrast, pay-for-performance cleanup agreements pay contractors a fixed price as measurable environmental goals are reached. Paying for cleanups through such agreements rewards contractors for quickly and efficiently reaching cleanup goals. Pay-for-performance agreements produce speedier cleanups that protect public health and the environment sooner. They enable state staff to focus their attention on environmental results instead of on auditing contractors' internal costs. They minimize paperwork and administrative costs and delays. Incentives that otherwise inflate cleanup costs are curtailed by pay-for-performance agreements. As a result, cleanup financing can stabilize in a cleanup program based on pay-for-performance contracts.

Using pay-for-performance cleanup agreements programmatically saves money and sustains environmental protection by:

- Focusing cleanup dollars on cleanup work,
- Focusing state staff work on environmental results,
- Reducing administrative costs and paperwork for the state and for contractors,
- Enabling more accurate budgeting and spending projections,
- Making financial audits of cleanups much clearer, and
- Rewarding effective, efficient cleanup contractors and technologies.

This booklet originates in the experience of the UST Bureau of the New Mexico Environmental Department as it introduced pay-for-performance UST cleanups. However, this booklet both extends and supplements New Mexico's experience with ideas from other state officials, experienced cleanup contractors who have commented on its drafts, and the U.S. Environmental Protection Agency. This booklet is intended as a starting point from which state officials, cleanup contractors, and UST owners can design pay-for-performance cleanup programs tailored to their own special circumstances.

How policy makers, program managers, and cleanup overseers can use this booklet...		
Section 1 (pages 2 - 4)	For policy makers...	Why pay-for-performance cleanups can achieve cleanup goals faster and more cost-effectively than time-and-materials cleanups.
Section 2 (pages 5 - 16)	For managers of cleanup funds or programs...	How to start, scale up, and maintain a program of pay-for-performance UST cleanups.
Section 3 (pages 17 - 30)	For hands-on cleanup overseers...	How to draft an individual pay-for-performance UST cleanup agreement.



Why Use Pay-For-Performance Cleanup Agreements?

Most UST cleanups do not justify a time-and-materials contract.

With over 140,000 cleanups of gasoline, fuel oil, and similar products already completed (as of March 1996), thousands of contractors involved, and a small set of technologies in use, there is rarely much mystery in how to do UST cleanups. As a result, paying for UST cleanups via time-and-materials contracts is often not justified. Only highly uncertain, complex cleanup sites may justify paying cleanup contractors for effort (via time-and-materials contracts), rather than for environmental results (via performance-based contracts). Most UST cleanups can be done more effectively, more quickly, and more economically using pay-for-performance agreements.

Time-and-materials contracting creates numerous problems.

In pursuit of better cleanups at better prices, many states try to specify and scrutinize in ever greater detail how a contractor does a cleanup. This seldom works well or long before bogging down. Review, rejection, and rework of time-and-materials work plans delay the start of cleanups. Reimbursement payments to contractors are slowed while invoices are checked against documentation and workplans. Delays in reimbursement increase the contractors' cost of doing business and, in turn, encourage business and accounting practices that further inflate the cost of cleanups. Technical staff are diverted from technical work to address billing issues. In state cleanup funds, large backlogs of unpaid bills can accumulate and create intense political pressure for fast, generous payments that inflate cleanup prices and undermine public and political confidence in a state's cleanup program. Despite state and federal efforts to streamline this aspect of UST cleanup programs, many still have long backlogs in paying for cleanup work and delays in reaching cleanup goals that arise directly from time-and-materials cleanup agreements. Using pay-for-performance agreements routinely can eliminate most of the problems associated with time-and-materials agreements.

Pay-for-performance agreements reward environmental results.

Pay-for-performance UST agreements save money on cleanups by rewarding contractors for cost-effective cleanups that meet environmental goals sooner. Instead of rewarding failure to achieve contamination reductions with payment for further time-and-materials charges, pay-for-performance agreements pay when the contractor succeeds. Pay-for-performance agreements also shift the attention of state staff from cost-accounting details and second-guessing contractor engineering decisions to risk-reduction and environmental results.

Pay-for-performance cleanups save money and sustain environmental protection.

In programs driven by pay-for-performance agreements, payments to cleanup contractors depend on their reaching environmental goals. Pay-for-performance agreements provide financial incentives in profit and predictable cash flow to attain the goals of a cleanup quickly and efficiently. Thus pay-for-performance agreements strengthen protection of human health and environment by linking contractor payment to measured contamination level reduction. Instead of diminishing environmental goals to cut cleanup costs, pay-for-performance agreements can stimulate

contractors to make better use of better cleanup technology, trigger market competition that drives down cleanup prices, and reduce administrative costs of contractors and of government.

Pay-for-performance cleanups focus cleanup dollars on cleanup work and reduce paperwork.

Time-and-materials cleanup contracts require extensive documentation of costs be submitted in support of bills. Pay-for-performance cleanup agreements require documentation of environmental results instead of documentation of the contractor's internal costs. Compiling, submitting, and occasionally defending cleanup time-and-materials billings adds to the cost of a cleanup, but does not get a site any cleaner. Using pay-for-performance agreements can reduce paperwork significantly by eliminating reporting of contractors' time and materials. This also eliminates the staff time needed to sort, file, review, cross-check, and resolve disputes about how the contractor is managing the business aspects of a cleanup. The state receives and reviews only information about measurable environmental results as specified in the performance agreement. Contractors can focus their managerial attention on closer internal cost controls and more effective cleanup technology to enhance their profitability. State agency staff can focus their attention on environmental results rather than on contractors' invoices.

Pay-for-performance cleanups focus state staff on environmental results.

Pay-for-performance agreements focus state staffs' work on environmental results instead of on contractors' internal financial management. Most engineers and scientists who were hired into state UST cleanup programs neither intended nor trained to work at financial accounting. The use of time-and-materials cleanup contracting diverts technical staff to financial tasks beyond their interests and training. The use of pay-for-performance cleanup agreements frees the state's technical and scientific staff to focus their time and training on assuring that the environmental results required for the contractor to be paid are indeed attained.

Pay-for-performance cleanups strengthen financial integrity.

The ability to support a clear, credible audit is an important practical consideration considering the large amount of public funds UST cleanup programs are responsible for spending, the politically sensitive quality of some sites, and the solvency problems encountered by some state funds. The minimal paperwork required to support pay-for-performance agreements provides a clear, clean audit trail between cleanup results and disbursement of state funds. Financial integrity in cleanup spending is easier to document and maintain because the simplicity and directness of pay-for-performance agreements and practices leave a much clearer audit trail than do time-and-materials practices.

Pay-for-performance yields more accurate spending, prediction, and budgeting.

Cleanup funders can predict and plan expenditures more accurately, because pay-for-performance sets a fixed price for each cleanup and puts severe restrictions on any price-increases and payments. By contrast, time-and-materials contracting costs go out of financial control via change orders, which are ad hoc changes in the scope and value of an agreement. Because change orders allow the total cost of a cleanup to increase easily, it is difficult to budget and manage the finances of cleanup programs that rely on time-and-materials contracting.

Pay-for-performance rewards effective, efficient cleanup contractors.

As pay-for-performance agreements are used more widely, cleanup contractors will cut their costs and prices to compete for more individual cleanup jobs. A contractor's profit will come from doing more cleanups, efficiently managing them, and using effective cleanup technology, rather than

from spending more time and material on a cleanup. In the future, as the market for UST cleanups begins to shrink, those contractors who have honed their management and technical skills will be able to work efficiently, effectively, and profitably in the smaller market.

Pay-for-performance lends itself to broad opportunities of use.

There are several different administrative vehicles through which pay-for-performance cleanup agreements can be implemented:

- In state contracts between state agencies and UST cleanup contractors;
- In state policies that set the terms for reimbursing UST owners for cleanup costs; and
- In private contracts between UST owners and cleanup contractors, especially where a state or insurance company “pre-approves” a maximum amount it will pay for a cleanup.

Despite the presence of a time-and-materials contract between an UST owner and a cleanup contractor, a state may still be able to set pay-for-performance terms for state reimbursement of the cleanup charges. The state may impose pay-for-performance terms on such a cleanup by administratively setting a maximum total amount it will reimburse and the contamination levels (instead of time-and-materials terms) at which it will make payments.

Pay-for-performance agreements may also be applied to the free product removal work that often must be done before a full-scale UST cleanup begins. Free product removal work often occurs outside the ordinary procedures intended to control the scope and cost of cleanup work. As a result, free product removal costs can sometimes soar; and, without performance criteria, poorly designed free product removal can even unintentionally spread the contamination. Free-product removal seems especially ripe for the application of pay-for-performance cleanup principles, although we are not aware of its use in this way at this time.

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How To Implement A Pay-For-Performance Cleanup Program

For maximum benefit, pay-for-performance cleanups must be a program's standard practice, rather than the exception. It is one thing to craft a handful of pay-for-performance agreements at special sites, but another to scale up use of pay-for-performance agreements to become standard practice. This section describes how a cleanup program can systematically replace use of time-and-materials cleanups with pay-for-performance cleanups. Pay-for-performance cleanup agreements need to be used programmatically to generate the forces that drive down cleanup prices, sustain environmental results, and reduce administrative workloads sufficiently to produce its full benefits.

This section describes how to establish and manage a program of pay-for-performance cleanups under the following three headings:

- Four basic tasks to set up a pay-for-performance cleanup program;
- Two stages in making pay-for-performance agreements standard practice; and
- Developing stakeholder support for pay-for-performance cleanups.

How to write an individual pay-for-performance cleanup agreement is addressed in Section 3.

Four basic tasks to set up a pay-for-performance cleanup program.

Pay-for-performance cleanup program managers must deploy staff and resources to:

- ▶ Set performance goals, cleanup prices, and payment terms for each cleanup;
- ▶ Monitor contamination levels to authorize or withhold payments;
- ▶ Grant individual exceptions to using a pay-for-performance agreement; and
- ▶ Invoke the escape clauses in an active pay-for-performance agreement.

Each of these types of program work is discussed below.

Set performance goals, cleanup prices, and payment terms for each cleanup.

State staff must specify performance goals for each cleanup in terms of environmental contamination levels. A pay-for-performance agreement pays only for environmental results. Level-of-effort measurements, such as operating time for treatment equipment, are not cleanup performance measures, as they measure effort instead of environmental results. The specific contamination level goals for a pay-for-performance agreement may be set by Risk Based Corrective Action (RBCA) procedures or by other standards a state normally uses.

Setting a maximum price to be paid for each individual cleanup is a major source of the overall cost-savings possible from a pay-for-performance based cleanup program. Many states already cap part of the price of cleanups by "pre-approval" of cost and scopes of work for parts of a cleanup. Pay-for-performance simply extends this idea to cap the total price to be paid for the whole cleanup, not just its components.

The responsibility for setting the maximum prices for cleanups should be clearly assigned to individuals or teams fully empowered to set the prices. The pricing of individual cleanups should not be made routinely subject to multiple levels of bureaucratic review, despite pressure to do so from stakeholders who want a higher price. Routine, multiple-level bureaucratic review of cleanup prices causes delays and introduces pressures that will chill the market competition that is essential for pay-for-performance cleanup programs to succeed. Although, there should be a mechanism for adjusting or appealing prices argued to be too high or too low, managers should assure that its usage is restricted to situations in which market forces clearly fail to respond to the demand for cleanups.

The practical question is how to set a maximum price for a cleanup site and, if possible, drive down actual prices below that maximum. A state can trigger competitive bidding on individual cleanups to drive cleanup prices down below state-estimated maximums. Where the cleanup is being conducted by a state contractor, the state-fixed price can be used as the upper limit in a bidding process in which the lowest bid below the fixed price wins the cleanup job. Or, where the actual contract is between an UST owner and a private contractor, competitive bidding can be required and contracts awarded to the lowest bid below the state-set maximum reimbursement amount.

A state might also set a “lump sum” price for a whole package of multiple cleanup sites to be addressed by a state-lead contractor. The lump sum price for the whole package of sites would be based on individual price estimates prepared by state staff. If the sites were similar enough, a single price could simply be multiplied by the number of sites to produce the lump sum price. Performance-payments could be pro-rated across the number of individual sites and made contingent on meeting performance criteria at each individual site as described below.

Terms for payment of the cleanup contractor are set within the framework of the cleanup contamination-level goal and the price that is fixed for reaching that goal. Intermediate contamination levels that mark progress towards cleanup goals become milestones at which the cleanup contractor gets a partial payment of the price set for the cleanup. The relative sizes of payments and the contamination levels at which payments are made are structured to give cleanup contractors financial incentives to reach cleanup goals quickly and efficiently within the fixed price.

Monitor contamination levels to authorize or withhold payments.

Contractors are paid as contamination levels hit milestone levels set in the cleanup agreement. Monitoring contamination levels and authorizing or withholding payments is the primary work of staff who oversee pay-for-performance cleanups. In time-and-materials cleanup programs much staff effort is used to scrutinize technical effort and cost documentation rather than to scrutinize the contamination reductions yielded by cleanup efforts. In a pay-for-performance cleanup program, staff should allocate much of their time to analyzing and probing contamination monitoring reports.

Staff should be proactive in monitoring contamination levels at pay-for-performance cleanup sites. Rather than wait until the owner or contractor submits a request for payment, staff may obtain and evaluate interim contamination reduction data for signs of interim progress. Staff should early and formally call to the attention of the cleanup contractor any indications of insufficient contamination reductions to justify a payment.

Because much hinges on monitoring data, there will also be staff work needed to assure that the data are indeed valid. If there is any appearance or doubt that monitoring data and analyses produced by a cleanup contractor might not be valid, monitoring data can be collected and/or analyzed by a private third-party independent of the cleanup contractor. If monitoring-data collection is not at issue, the state can split samples with the contractor at final verification of

performance. Site monitoring systems should address the things that are put at risk by the UST release, so that the time staff spend evaluating monitoring data bears directly on reducing risks to health and environment, as well as on determining whether a cleanup payment is made. How to incorporate site monitoring into individual pay-for-performance agreements is discussed in more detail in Section 3. A technical introduction to monitoring contamination reductions from alternative cleanup technologies can be found in “How To Evaluate Alternative Cleanup Technologies For Underground Storage Tank Sites” (EPA 510-B-94-003).

Grant individual exceptions to using a pay-for-performance agreement.

Pay-for-performance cleanup agreements can be a highly effective administrative tool, but they are not a panacea. In some circumstances, the price or results of pay-for-performance agreements may be challenging to predict. In such circumstances, it may be wiser to do the cleanup with a time-and-materials agreement. Avoiding inappropriate use of pay-for-performance agreements is important to gaining acceptance of their use, especially among cleanup contractors accustomed to the financial advantages that time-and-materials cleanups give the contractors.

Program staff should have criteria and procedures that expeditiously identify sites that are not suitable for pay-for-performance cleanup agreements. For example, pay-for-performance agreements may be less effective where:

- The contamination to be cleaned up is known to come from different sources, some of which are unidentified or uncontrolled;
- There is a cluster of active cleanups already in progress and affecting the pay-for-performance cleanup being contemplated;
- The geology or hydrogeology of the site is highly complex or poses major barriers to effective use of all the cleanup technologies ordinarily applicable to UST releases; or
- The release to be cleaned up poses an urgent and high risk to public health or environment, such as imminent contamination of a community drinking water wellfield.

When first starting up a pay-for-performance cleanup program it is wise to avoid complicated circumstances. As experience with pay-for-performance cleanups develops in relatively straightforward cleanups, state staffs and contractors will become able to use pay-for-performance for more complex cleanups.

Where the site is not eligible for cleanup at state expense, the private parties involved can enter into a pay-for-performance cleanup agreement with each other. For example, pay-for-performance cleanup may be an especially appealing instrument for insurance, real estate or banking entities that for business reasons need a site cleaned up expeditiously and effectively.

Invoke the escape clauses in an active pay-for-performance agreement.

Even if a site is suitable for pay-for-performance cleanup at the beginning, circumstances at the site can change. If this happens it will become necessary to either revise the pay-for-performance agreement or to convert that cleanup to a time-and-materials basis for further work. Pay-for-performance cleanup agreements include “escape clauses” (see pages 28-30) that set conditions on which the terms of the cleanup agreement can be changed. The program staff will also need time to respond to claims and requests for escape from the original agreement and to develop an alternative agreement. It is important to do this work expeditiously because it can easily expand to displace working time that program staff need for price estimation and for monitoring results of the pay-for-performance cleanup sites.

Two stages in making pay-for-performance agreements standard practice.

Time-and-materials cleanups should require special justification and should be rarely used when pay-for-performance is fully implemented. You can make the change to pay-for-performance cleanups in two stages:

- ▶ Start-up stage carefully selects staff, sites, and contractors; and
- ▶ Second stage widens use until it becomes standard operating procedure.

These two stages are discussed in the pages which follow.

Persuasion and leadership, not just technical prowess, are necessary to move through these two stages and achieve program-wide use of pay-for-performance practices. People used to working in a time-and-materials business environment may not be eager to work differently at first. To move pay-for-performance agreements to full implementation, managers and staff must plan to repeatedly explain and discuss pay-for-performance cleanups in a widening circle of stakeholders, including contractors, auditors, and legislators.

Start-up stage carefully selects staff, sites, and contractors.

Begin pay-for-performance cleanups at a small number of sites and use the experience thus gained to help spread the technique to more sites, more staff, and more contractors. Begin by assigning several experienced staffers and select some new, obviously suitable sites to be cleaned up under pay-for-performance agreements. Have the staff write up pay-for-performance agreements for these sites (see Section 3). Also identify a few experienced cleanup contractors who have already demonstrated their competence and offer them the chance to work on a prototype cleanup. Once these cleanups are operating and several performance payments have been made, your start-up staff should develop standard documents and procedures, as well as train other staffers to write and monitor more pay-for-performance cleanup agreements. Staff, sites, and contractors are the basic ingredients you need to start up pay-for-performance cleanup agreements. Select sites, staff, and contractors that can succeed relatively quickly in your prototype set of cleanups. Some hints about what to look for in each follow below.

Selecting staff

At first engage only a few staff in the start-up set of pay-for-performance cleanups. You may not be able to find individual staffers who are strong in all the characteristics described here. The person who is strong in monitoring and measurement may have trouble composing the language of a performance agreement. Organizing staff to work in teams, rather than independently, can solve this problem. However, if staff work as individuals, you should provide some way for them to share and compare their experiences as their cleanups progress. Mindset is important, so focus staffers' time exclusively on pay-for-performance cleanups, rather than splitting them between time-and-materials and pay-for-performance contracts. Look for staff who have the following attributes:

Positive attitude. Select staffers who have a positive attitude towards pay-for-performance concepts and goals. At this stage their work is to create, not to critique this new way of working. (There will be plenty of opportunity for critiquing once the initial set of cleanup agreements have been put in place.) Avoid selecting staffers who think of expense as a surrogate measure of the

quality of cleanups, as they may tend to overprice performance agreements. Persuade and use these staff later when you have gotten results.

Experience pricing cleanups. Assign staffers to pricing who have sufficient experience to price cleanups credibly. Whatever their level of experience, staff who price cleanups will find their task is greatly facilitated by using TANK RACER software, which helps staff make consistent, sound pricing. More information regarding TANK RACER software capacity and availability appears on page 19.

Ability to distance themselves from concerns about “excessive” contractor profits. Staff (as well as managers) who are long accustomed to overseeing time-and-materials cleanups rightly develop a concern for “excessive” contractor charges and profits. However, preoccupation with contractors’ internal methods, costs, and profits is counterproductive in pay-for-performance agreements, where contractor profits can come only from efficient management and effective use of technology. Assign staffers to pay-for-performance cleanups who can disengage their belief that part of the government’s responsibility is to prevent contractors from making “excessive” profits.

Knowledge of contamination measurement and monitoring. Technical knowledge of contamination measurement and monitoring techniques is more important than knowing how to engineer a cleanup design in pay-for-performance cleanups. Designing an effective cleanup is the sole responsibility of the contractor. Overseeing pay-for-performance agreements requires clearly specified provisions for contamination monitoring data on which reimbursement or contractor payment hinges. One or more of the pay-for-performance staff should have sufficient technical knowledge of contamination measurement and monitoring to develop robust contamination-monitoring criteria for paying the contractor. The monitoring “experts” on the start-up team should have sufficient confidence in their technical knowledge of monitoring to avoid backsliding into specifying engineering details as surrogate performance measures. Whereas in time-and-materials contracts knowledge of the engineering of a cleanup is important to evaluating and managing cleanup prices, pay-for-performance staff should beware of engaging in such design detail.

Ability to explain pay-for-performance to others. Find staffers who will become able to explain, as well as build, pay-for-performance cleanup agreements. The staff who help start up pay-for-performance are the resources you will use to create the basic materials and procedures, train other staff, and nurture the individual stakeholders involved in the first batch of pay-for-performance cleanups you do.

Selecting cleanup sites

In the start-up stage of a pay-for-performance program select sites that you expect to be geologically simple. Keep in mind that the main object of the start-up period is to develop your program’s capability to widen use of pay-for-performance agreements relatively quickly.

Start with a set of relatively simple sites. Select sites where contamination is relatively fresh and plumes are well-defined. Your start-up sites should have no barriers to the access necessary to install performance-monitoring points. Leave more complex, challenging sites for inclusion later when the procedures and effectiveness of your pay-for-performance program have been established and proven. However, do not make your start-up set too simple--for example, only small excavation and removal jobs--lest they not be convincing to skeptical stakeholders when it comes time to expand usage of pay-for-performance.

The start-up sites must have a valid, thorough site characterization. A good site characterization is necessary in order to set the maximum price and to establish the contamination-level measurements that will trigger payments to the contractor. An incorrect or incomplete site characterization could be used as grounds to void the terms of a pay-for-performance agreement and open it up to change orders and time-and-materials charges.

Start with a set of sites that can be completed relatively quickly. Select sites that can be completed relatively quickly in order to provide examples to staff, contractors, and policy makers whose support is needed to widen the use of pay-for-performance agreements.

Working with cleanup contractors

Being a direct party to the cleanup contract is not necessary. Your state may establish pay-for-performance agreements either directly with a state-hired contractor or indirectly as terms for reimbursement of work performed under contract to an UST owner. You need not have a direct contractual relationship with the contractor to create a de facto pay-for-performance cleanup agreement. In most cleanups the contractor's direct legal relationship is with the owner of the UST site. In this context, you can create the functional equivalent of a pay-for-performance agreement by setting terms of reimbursement that are tied strictly to pre-specified, measured contamination reductions. If you are starting up a program of pay-for-performance cleanups in a state reimbursement-fund context, your program may already "pre-approve" the amount a contractor will be paid, regardless of how much the contractor bills. You can use "pre-approval" to set the maximum price the state will reimburse for a cleanup. Then you can divide this amount up in reimbursements to be made as the cleanup attains contamination-reduction milestones the state sets. If your state government contracting regulations pose obstacles to pay-for-performance agreements, it may be quicker to start up pay-for-performance agreements as criteria for reimbursement of UST owner-hired cleanup contractors.

Financial strength of the contractor. Cleanup contractors participating in the start-up phase of your program should have sufficient financial resources to continue operating if a cleanup ~~site~~ in meeting the performance levels required for payment. Because contamination measurement and monitoring are the key to getting paid, start-up phase contractors should also have a good track record in collecting and managing the kind of data needed to document their performance-payments. It is very important to maintain the discipline of payment-for-performance to assure that the program's incentive effects really work on the contractor. If the financial survival of the contractor, rather than meeting a contamination-reduction milestone, becomes justification for a payment, the driving force of your pay-for-performance program will be weakened.

Financial strength of the cleanup fund. Reliable and prompt payment of contractors as a cleanup site's performance criteria are met is essential to sustaining the incentive effects of a pay-for-performance program. The prospect that a state may delay making performance payments due to lack of funds or administrative bottlenecks heightens the financial risks that a contractor takes when doing a pay-for-performance cleanup. This risk can have two bad side effects on a pay-for-performance program. Contractors may bid higher prices to compensate for the cost of financing delayed payments, or contractors may simply decide not to work on pay-for-performance cleanups. Neither of these responses will serve a state's cleanup program well. Enduring damage can be done to a pay-for-performance cleanup program if payments falter at the start-up stage of the program.

Second stage widens use until it becomes standard operating procedure.

The start-up stage provides a toehold from which to widen the use of pay-for-performance agreements to more staff, more sites, and more contractors. At this widening stage, the pay-for-performance program begins including more and more newly reported leak sites. More staff divert more time from time-and-materials cleanups until most staff and cleanup sites are covered by pay-for-performance agreements. At this stage you should also develop a simple database in which the milestone and payment data for each pay-for-performance agreement can be stored and compared to performance data submitted electronically by the contractor requesting a performance payment. Aspects of developing this stage follow below.

Leverage start-up sites, staff, and contractors

A pay-for-performance cleanup program can be implemented on-the-run by leveraging the start-up staff, sites, and contractors. Use the start-up staff and cleanups to generate basic procedures and documentation to be used with subsequent pay-for-performance cleanups and staff. Take care that these “training” sites are relatively straightforward because their strategic function is to build staff competence and external stakeholders’ confidence in pay-for-performance agreements. Start-up staff will first get a set of pay-for-performance cleanups underway. Once this first set of cleanups is started, the start-up staff will train other staffers to draft more pay-for-performance agreements with a comparable set of sites. While “in-training” staff are working with new cleanups being done by the first set of pay-for-performance contractors, the start-up staffers can develop pay-for-performance agreements involving new sites and different contractors. During the start-up stage participating staffers will have to spend some of their time building the pay-for-performance program, training fellow staff and contractors. After staff and contractors are trained and working procedures are in place, staff will be able to oversee significantly more pay-for-performance cleanup sites.

Use simple information management tools

You should implement information management tools, such as a database and electronic data reporting forms, to collect, store, and display the contamination-level data. Your staff need easy, reliable access to this information to oversee pay-for-performance cleanups and to approve or withhold payment at appropriate times. The bottom line in pay-for-performance cleanup oversight is the measurement data that show whether the contamination levels required to approve payment have been reached. This is a simple but data-intensive question to answer. Thus the database and its matching electronic data reporting forms should be kept as simple as possible. For each pay-for-performance cleanup, the key information will be the baseline and the target contamination levels set for each contaminant at each data collection point stipulated in the agreement. The cleanup contractor will submit dated, corresponding data electronically at intervals stipulated in the performance agreement. The required reporting dates should also be entered in the database when the agreement is struck and baseline contamination levels are entered.

Cultivate a competitive set of pay-for-performance cleanup contractors

Meanwhile also use a combination of pay-for-performance training workshops and administrative incentives to recruit more contractors to compete for pay-for-performance cleanup jobs. Use your “experienced” pay-for-performance staffers to conduct half-day pay-for-performance training workshops for contractors. (This training should include the rest of the best contractors working your state’s cleanups.) Encourage contractors to participate in pay-for-performance cleanups by expediting approval of cleanups conducted under pay-for-performance agreements. Also you can

expedite performance-payments and give higher priority to payment of contractors doing pay-for-performance cleanups.

“State-lead” contractors--those under direct contract to a state to do cleanups for which the state has assumed responsibility--can also be managed with individual pay-for-performance agreements. Where state-lead cleanup contractors are being recruited into pay-for-performance, it is important that the cleanups that pose higher financial risk and those that offer little financial risk (but good profit margins) be spread across different contractors. A contractor who becomes overburdened with difficult pay-for-performance sites may seek to escape from them, and thereby open that set of jobs to significant cost inflation for the state. It does not serve the state's interest in maintaining a competitive set of cleanup vendors for any single contractor to assume and absorb too many high financial risk sites.

Redistribute staff workload

Because each pay-for-performance site reduces the staff workload in comparison to time-and-materials agreements, staff will be able to handle more pay-for-performance sites effectively. Meanwhile the time-and-materials cleanups already in progress must be cost-controlled and concluded as quickly as possible because they will continue to drain excessive staff time and state funds until they are closed. The program manager must balance staff attention and resources between the need to expand pay-for-performance sites and the need to control and close time-and-materials sites. In such circumstances, search for positive or negative financial incentives that would encourage contractors to expedite completion of time-and-materials cleanups, rather than drag them out. For example, assign pay-for-performance contracts higher priority for payment when state disbursements are limited. Approval of new time-and-materials cleanups can be given a lower priority than processing of new pay-for-performance cleanups (except at high-risk sites).

Widen usage in small increments

Repeat the activities described above until all agency cleanup staff are competent in crafting and overseeing pay-for-performance cleanups and most of your cleanups are being conducted under pay-for-performance agreements. It will probably take most cleanup programs several years to reach a point where pay-for-performance agreements are predominant. Most cleanup agencies will have an ongoing legacy of time-and-materials agreements. Once your pay-for-performance program has gained a toehold you may be able to convert some unsuccessful time-and-materials agreements to pay-for-performance agreements to bring these cleanups to closure standards. (It is expected that a cleanup agency will have an occasional few sites where conditions are so complex and uncertain that a time-and-materials agreement will remain the most appropriate approach.)

Manage pay-for-performance to succeed over the long run

The work of managing the pay-for-performance cleanup program will change and bring differing challenges as the program matures. At first, there will be relatively few pay-for-performance cleanups and much of the work of program management will be in program development. Once a critical mass of staff and contractors are trained and procedures established, program management should focus on widening the number of cleanups and contractors covered by pay-for-performance agreements in the privately-funded as well as in state-funded cleanups. Eventually, time-and-materials cleanup agreements will be rare and require special justification to use.

At each stage managers should invent and initiate tactics to stimulate the competition and technological innovation that will drive cleanup prices down and improve cleanup results. During the start-up stage of the pay-for-performance program there may be little or no immediate reduction in cleanup prices. Prices during the start-up stage will rely heavily on the pricing of time-and-materials cleanups and competitive forces will not yet be in full play. Thus, immediate cleanup price reductions should not be expected from the start-up phase of pay-for-performance cleanups. However, start-up phase cleanups should emphatically be expected to succeed in meeting their contamination-reduction goals within their fixed prices. A public record of cleanup contractors' performance and price should be started and kept as the pay-for-performance program widens and matures to foster price and quality competition in the cleanup market.

As pay-for-performance widens to encompass more cleanups and contractors, managers must act to reduce estimated maximum cleanup prices and to strengthen competition among cleanup contractors. During this stage, competitive bidding could be introduced to begin driving down prices below initial estimated prices. Program managers should beware of cleanup contractors who do not make reasonable bids for pay-for-performance cleanups and do only lucrative time-and-materials cleanups. For example, program managers might wish to "qualify" contractors for time-and-materials work only if the contractor successfully completes a significant number of pay-for-performance cleanups. During the widening-use stage, increasing pressure will come to bear on contamination-level monitoring and performance-payment criterion data. Program managers may have to give these concerns special attention to maintain the integrity and effectiveness of pay-for-performance cleanups. In anticipation of this, program managers could encourage development of independent third-party specialists in contamination-level monitoring and data analysis who could be used either to audit or measure performance independently of the cleanup contractor. State programs can develop their own policies on how and when third-party monitoring specialists should be used, and on who will pay for those services.

Managing a matured pay-for-performance program will bring different challenges. Management vigilance will be required to prevent pay-for-performance cleanups from triggering escape clauses and lapsing back into expensive time-and-materials terms. In a matured program managers may face tough political forces as they come to deal with pay-for-performance cleanups which *have not* performed. Managers will also have to sustain a steady flow of cost and price information into the cleanup market so that market forces can operate in full strength, to keep cleanup pricing very competitive and improve cost-performance levels. The privatization of financial responsibility for UST cleanups may even diminish the role of state cleanup programs in pricing and financing UST cleanups, in which case management's responsibilities will focus primarily on assuring that cleanup contamination-level reductions are measured validly and goals met. In states which continue to finance UST cleanups with public funds, improved tank technology and leak detection systems will reduce the number and scope of releases to be cleaned up. As this occurs, pay-for-performance program managers may find their staffs working with relatively fewer cleanups and devoting more attention to determining whether individual especially complex cleanup sites justify a time-and-material cleanup.

Developing stakeholder support for pay-for-performance cleanups.

At each stage of developing and widening a pay-for-performance program, stakeholders' interests will be affected. To widen the use of pay-for-performance agreements, cleanup program managers should plan time to listen to and address stakeholders' concerns about this approach. Some stakeholders and how you can respond to their typical concerns are discussed below.

State program technical staff.

The work habits and ethics of many state program technical staffs have been formed primarily in time-and-materials cleanup agreements that reward inefficient and ineffective cleanups and require close state scrutiny of contractors' plans and charges. Pay-for-performance cleanup agreements do not justify the relatively close scrutiny of cleanup plans and charges because they do not financially reward poor performance as do time-and-materials agreements. Technical staff may be reluctant to make the necessary shift in their attention from plans to environmental results. Focusing staff work on environmental monitoring and providing supplementary professional staff training in environmental monitoring will aid in getting state technical staff to buy in to pay-for-performance cleanups.

State fund reimbursement staff.

In time-and-materials programs, much of the time and effort of state fund reimbursement staffers goes to financial (rather than environmental) review of cleanup work: comparing actual expenditures (and their documentation) to cleanup plans and state allowable expenditures. This financial review of contractors bills and their documentation is an ongoing battle that has had limited success in controlling cleanup costs. Such staff are often so overworked that introduction of a pay-for-performance cleanup program could reduce their workload and enable them to review the leftover time-and-materials cleanups more effectively.

Government auditors.

Most UST cleanup programs are subject to audit by independent government auditors, such as an auditor's office reporting to the legislature. Pay-for-performance cleanups leave a much cleaner audit trail than do time-and-materials cleanup agreements. At first glance, auditors accustomed to the problems of time-and-materials contracting may be skeptical of the reduced paperwork necessary to document pay-for-performance cleanups. However, once auditors understand the strong, simple connection between what the state pays for and the environmental results it gets in pay-for-performance agreements, they will find they can do their job more quickly and effectively in a pay-for-performance regime. A demonstrated state record on tightening cost projections to control costs will help relieve concerns about initial pricing of contracts and consultant profits.

Legislators and legislative staff.

Consider the following two different perspectives that often shape the attitude of legislators and their staffs towards pay-for-performance cleanups.

Spending as a surrogate for protection of human health and environment. One common perspective has been that the level of spending involved is a direct indicator of political commitment to protection of human health and environment. Efforts to control cleanup spending may be seen as an attempt to weaken protection of human health and environment from this perspective. However, the strong emphasis which pay-for-performance places on holding contractors responsible for actual reductions in contamination levels can be forged into a persuasive case for such staffers.

Government spending and "bureaucratic" delays. Legislators and their staffs are often concerned that UST cleanup program spending may be out of the control of government administrators. An

UST cleanup program designed on pay-for-performance principles can be shown to address the causes of such seemingly uncontrollable cleanup expenditures. Another concern centers on delays in starting cleanups and in payment for work performed under time-and-materials contracts. Pay-for-performance cleanup program design can be shown to address these delays by shortening lengthy workplan review/approval procedures and by expediting payments that are linked strictly to well-documented environmental results rather than to the complex justifications required by time-and-materials contracts.

Cleanup contractors.

Cleanup contractors are likely to be concerned that pay-for-performance imposes more financial risk than time-and-materials contracts. Under time-and-materials contracting, the state assumes most of the financial risk when the work of a cleanup contractor proves to be ineffective. In this bargain, the contractor accepts state restrictions on profit in exchange for relief from the financial risk of cleanup failure. In contrast, in a pay-for-performance cleanup, the contractor takes on the financial risk of cleanup failure in exchange for removal of state-imposed limits on profit within the fixed price set for the cleanup.

Although pay-for-performance may pose more financial risks for the contractor, there is also opportunity for higher profits than in time-and-materials contracts. Cleanup contractors can enhance their profits under pay-for-performance agreements:

- By using more efficient cleanup technology;
- By drastically reducing internal costs for reporting and documentation otherwise required in time-and-materials agreements; and
- By receiving payments from the state more quickly, which reduces the contractors' financing costs.

Because the contractor can retain as profit the difference between actual cost of the cleanup work and the price set for it, contractors have a powerful incentive to choose more efficient technologies and management techniques than under time-and-materials contracts which have no such incentive. Because the administrative burden of documenting and reporting the cost of time-and-materials in order to get paid is eliminated in pay-for-performance, that administrative cost can be retained directly as profit or passed on as price cuts in competing for more business that will enhance profitability. Financing the out-of-pocket cost of cleanup work done while awaiting time-and-materials payments from states with long payment delays has also imposed another hidden cost on contractors. Under pay-for-performance agreements, the administrative delay in processing time-and-materials invoices is eliminated and contractors' financing costs are cut by prompter payments. The reduced cost of financing can be taken as profit directly or reinvested in improving business operation or market share.

Contractor profits: a political and philosophical issue for state staff, legislators, and contractors. To what extent should cleanup contractors profit from their work? To date, this question has been resolved in time-and-materials contracting practices that are intended to impose government limits on the contractors' profits. However, many state program officials observe that the cost-control tools available that are imposed on time-and-materials UST cleanups actually drive contractors to practices that increase overall cleanup cost and profits, without commensurate contamination reductions. Used programmatically, pay-for-performance agreements can avoid this problem because contractors can use the profit incentive to produce faster, better, and less expensive environmental results.

3 How To Construct Pay-For-Performance Cleanup Agreements

A pay-for-performance cleanup agreement sets a fixed price to be paid on attainment of pre-set, numerical levels of environmental contaminant reduction. A pay-for-performance cleanup program becomes reality--or slips away--in the wording and administration of each individual agreement that sets the terms on which cleanup contractors are paid for the environmental results they produce. This section discusses how to create an individual pay-for-performance cleanup agreement (given that the particular site is suitable for this approach as discussed earlier on page 7.)

A pay-for-performance agreement to cleanup a site must address the following four matters, which are discussed below:

- Set the maximum cleanup price;
- Decide on cleanup performance measurements;
- Establish contamination-level data reporting and contractor payment linkage; and
- Define “escape clauses”.

Set the maximum cleanup price .

A pay-for-performance cleanup agreement hinges on the maximum price, the “lump sum” that will be paid to reach contamination-reduction goals at the given cleanup site. Setting and sticking to the “lump sum” the state will pay (or reimburse) to reach the levels of contamination required is crucial to making performance contracts work environmentally and financially. At the same time, you will want to create a setting which encourages contractors to make bids that fall below your maximum cleanup price.

Use site characterization and risk based corrective action (RBCA) analyses to take into account the scope and complexity of cleanup work needed in the price you set, the contamination-reduction goals to be attained, and where and how to measure the results for the contractor to receive payment. Site characterization provides important background information for pay-for-performance agreements. The following few pages identify basic information a site characterization should include to enable you to frame a pay-for-performance agreement to clean up the site.

Develop an appropriate site characterization.

For small, straightforward sites and in regions where there is minimal geological variation, you may be able to price the cleanup without having to have a site characterization. In such cases the cost of a site characterization can be included in the scope of the performance contract for site cleanup.

Where hydrogeology or other factors are more complex, it may be wiser to price and buy the site characterization separately from other cleanup work. Keep in mind that contractor competence--how efficiently and how effectively the cleanup contractor works--can influence the cost of a cleanup as much as the hydrogeological complexity of the site.

Site characterizations are often done by a contractor other than the one doing the cleanup work. So site characterizations must contain sufficient information for other contractors to do internal cost

estimates on a cleanup, as well as enough information for state staff to price the cleanup and set measurable terms of payment for the performance agreement.

Site information needed to set a cleanup price.

Basic information. To help you price and write a pay-for-performance agreement a site characterization should include:

- Depth to groundwater
- Rock types
- Grain size
- Stratification
- Contaminant type

Even within this basic information there can still be large differences in how much sampling and analysis work is done and how it is done. For example, aquifer test data may be necessary. If so, test information about the potentially affected aquifer may already be on record. It is tempting to drive the site characterization towards exhaustive data collection and analysis. Instead you should scope site characterization to the minimum needed to frame the performance agreement and engineer the cleanup. The Risk Based Corrective Action process may also drive the information that must be gathered in site-characterization. (Further technical information about site characterization techniques can be found in ASTM's "Provisional Standard Guide For Accelerated Site Characterization Techniques"). Technical information about the specific site characterization data required for particular cleanup technologies can be found in "How To Evaluate Alternative Cleanup Technologies For Underground Storage Tanks" (EPA 510-B-94-003).

Draft and start pay-for-performance agreements quickly after site characterization.

Draft and implement the performance agreement for a cleanup site as quickly as possible after completion of the site characterization. If you delay, site conditions, contamination levels, and plume delineation may change. Such changes in site conditions can force you to abandon the pay-for-performance agreement because real conditions would have changed by the time the performance agreement was made. (See also the section on "escape clauses" on pages 28-30).

Commingled plumes. Presence of commingled plumes may pose a barrier to using a pay-for-performance cleanup agreement. If there are commingled plumes at the site, the site characterization should try to differentiate the sources of the plumes to determine whether they are the responsibility of a single owner. If all the plumes can be identified as the responsibility of one owner and are already stopped at their source, it may still be possible to use a pay-for-performance agreement for their cleanup. (See the discussion of when to use pay-for-performance agreements on page 7.)

Property accessibility. If the plume crosses property lines the site characterization should document the extent and address property accessibility. Knowledge of and access to the full extent of the plume can significantly affect the cost of a cleanup if the underground plume extends beyond aboveground property lines of the cleanup site. In residential areas, where there are many different owners of small parcels of property, access to gather samples and to install and operate cleanup equipment may be quite difficult. If the contamination has remained--and is contained--within the owner's property boundaries, access may be a relatively

minor consideration. Regardless of the size or pattern of property ownership, access may also be thwarted by property owners who simply do not want cleanup personnel or equipment on their property.

Using TANK RACER or professional judgment to price cleanups.

Two methods that can be used separately or together to set a cleanup price are TANK RACER cleanup cost-estimation software and professional judgement of staff.

Using TANK RACER software to estimate a cleanup price. Price-estimation software developed by the U.S. Environmental Protection Agency and the U.S. Air Force can provide fast, accurate, and comprehensive cleanup price estimates on a site-specific basis. TANK RACER software can be a powerful tool for developing reasonable and dependable cost projections for a site. Using TANK RACER cleanup software will both speed up and standardize cleanup price setting, as well as enable less experienced staff to help set maximum cleanup prices. Staff who price your first cleanups may have to defend whatever prices they produce. Using TANK RACER software to estimate a price for a pay-for-performance cleanup automatically documents the basis for the price. This can be helpful when a cleanup price must be defended or contractors refuse to bid at or lower than the set price. Keep in mind that contractors accustomed to working on time-and-materials basis may tend to estimate relatively high prices because they will no longer have the “insurance” of change orders to cover the costs of underestimated tasks, rework, and engineering-design failure. You can use TANK RACER cost-estimation software for PC to quickly price a cleanup using data from the site characterization, detailed built-in engineering information about cleanup technologies, and your state’s local unit-costs. TANK RACER generates a detailed cost-estimate in a standard format, including a bottom line total price for the cleanup. These estimates can be produced and modified very quickly, even working from default data values. TANK RACER cost-estimation software makes it very fast and easy for a user to adjust its estimates according to the user’s judgment or experience. (Information on obtaining TANK RACER is available by contacting Delta Research Corporation at 904 897-5380.)

Using professional staff judgement to price cleanups. There are several ways technical staff can be deployed to set prices for individual cleanups, as individual estimators, pricing teams or committees, and support groups for individuals. One or more senior staff may be designated to individually set the maximum price the state will pay for each individual cleanup. (This role is similar to that of an estimator in a private insurance company.) Or a workgroup could be tasked to set the prices to be paid for individual cleanups. Such a group may work either by acting as a “support group” to individual staffers who set the cleanup price or by acting as a team which sets the price to be paid for each cleanup.

However the work of pricing cleanups is organized, state price-setters must stay current on technical information and marketplace forces that could reduce or increase prices. By fixing price and performance payment criteria, pricers challenge contractors to profit by becoming more efficient and more effective, rather than by increasing billable hours and other internal charges, as occurs under time-and-materials agreements.

Focus on cleanup’s environmental performance and price.

After years of working with time-and-materials contracts that require staff to guard against “excessive” charges by contractors, it is easy to bring that same mindset to pricing pay-for-performance cleanup agreements. However, in pay-for-performance cleanups, concern with whether a contractor will make a high profit or suffer a big loss on a job cannot be allowed to intrude as state staff set cleanup prices. Instead, focus staff attention on the primary state responsibility--the contamination reductions produced by the cleanup.

In some instances the state-set cleanup price will turn out to be well above the contractor's actual cost of the cleanup, and the contractor will make a generous profit. In others, the state price will turn out to be below the actual cost of the cleanup and the contractor will lose money on that job. Regardless of this, it is not the state's role to intervene in a cleanup just to limit the contractor's profits or to protect contractors from losses from a cleanup. It is the prospect of generous profits that drives companies to reduce their internal waste and improve technology to increase profit margin within a fixed price. In turn, the prospect of generous profits also ignites price competition in the marketplace if the state plays its role right.

State cleanup pricers' role and the cleanup marketplace.

As the number of pay-for-performance cleanups grows, market forces can begin to influence what is paid for cleanups. As you develop pay-for-performance agreements or policies, keep in mind that more competition and better technology usually drive down costs and improve performance. If the state prices cleanups too high, prices will tend to stay high; if it prices cleanups too low, contractors may abandon the work or overuse "escape clauses" that are part of pay-for-performance agreements.

Tips for pricers

- Negotiate with the consultant if necessary, especially when pay-for-performance is new in your state. Work to drive prices down and performance up.
- Include a conditional, limited cost-increase "buffer" so that the contractor can absorb unforeseen cost increases -- for example, a lightning strike takes out a treatment system.
- All parties to the agreement should share some of the financial risk. Think about how to tell if the goal you set really cannot be reached for the price you set, and what to do in that case.

From the state "buyer's" point of view reducing the price of cleanups overall is an important aspect of pay-for-performance cleanup contracts or reimbursement policies. The appeal of pay-for-performance for contractors is in the financial incentive of being able to increase or sustain profit margins by reducing the cost of their cleanup work more than they reduce its price. How can state cleanup buyers make a win-win situation out of the seeming conflict between the state buyer's interest in reducing the price of cleanups and the contractors' interest in operating a profitable business? The most promising way to reach a win-win situation is to base a cleanup price reduction strategy on incentives and market competition to reduce cleanup prices.

A win-win state strategy for driving down pay-for-performance cleanup prices can encourage and reward bidding competition between rival contractors to produce lower bid prices than the state-set maximum price for a cleanup. For example, a state might require that a contractor have successfully conducted pay-for-performance cleanups to qualify to bid competitively on (or to be reimbursed for) more challenging cleanups that can produce higher profits (such as complex, risky sites done under time-and-materials agreements where the state assumes much more of the financial risk). Incentives in the form of access to bidding or "bonus points" in bid evaluation might be offered for contractors that develop aggressive internal cost-reduction programs--for example, monetary awards to employees for no-cost or less-cost improvements in the contractor's cleanup performance. Another incentive for contractors to lower prices can be to "fast-track" pay-for-performance payments, giving them quick priority processing for disbursement. Besides creating advantages for contractors who successfully reduce their cleanup costs and prices, state cleanup buyers can also encourage competition between cleanup contractors. For example, a state could encourage new contractors to enter the cleanup market by establishing fast-track qualifying procedures for them. Such positive-incentive and market-based tactics can also have the effect of increasing a cleanup contractor's overall profitability by increasing the market-share of contractors who succeed in meeting price and performance goals of the cleanups they do.

“Consumer” information about price and performance are vital to creating and sustaining marketplace competition that gets buyers more for their money. But in the UST cleanup marketplace consumer information about the price and performance of the contractors are seldom if ever available to state or to private buyers of cleanup services. State agencies have been wary of taking on the work and political risks of publicly “evaluating” cleanup contractors. However, the state could release public-record data on contractor prices and performance available for evaluation and publication by others interested in getting better cleanups at better prices.

One word of caution: state price setters who tie their pricing actions to contractors’ internal costs step into a trap. Pricing strategies that use state auditing of contractors’ actual internal costs to reduce cleanup prices are flawed. It is quite labor-intensive for a state to capture contractors’ actual-cost data and then translate that into reasonable lower maximum-prices set for subsequent cleanups. The real work of collecting, auditing, analyzing, and translating cleanup cost records into decisions about how much to pay has already proven to be a very significant burden and bottleneck in state reimbursement of time-and-materials cleanups. Imposing state financial audits on internal costs of pay-for-performance cleanups could reimpose these “auditing” side-effects on pay-for-performance cleanups.

Another pitfall for this auditing approach lies in undesirable counter-responses. Contractors may decide not to seek any pay-for-performance jobs if they face the same cost-reporting hassles, but have lower profit margins and more financial risk than in time-and-materials jobs. Audit-driven price reductions of cleanup prices is a counter-incentive to cost reduction if the contractor cannot profit from it and so this strategy will quickly dry up real cost reductions. Audit-driven price reductions can also have the longer-term effect of reducing the number of cleanup contractors below competitive levels. So few contractors survive that those who do come to control the supply of cleanups and thereby dominate cleanup pricing.

The win-win tactics mentioned earlier are just starting points, not permanent engines of incentives and competition for cleanup price reduction. Incentives and market dynamics that can be used to lower overall cleanup prices can be short-lived. No single tactic should be expected to work forever. A stagnant cleanup marketplace will not produce lower internal costs accompanied by lower cleanup prices. State staff who set the maximum prices for individual cleanups should, as an ongoing part of their job, devise and test new tactics to refresh incentives and stimulate strong price competition between cleanup contractors.

Despite the emphasis placed on contractor financial incentives, these tactics should not be allowed to protect cleanup contractors from marketplace discipline. It is in the public interest for inefficient and ineffective cleanup contractors to be eliminated by market forces. This will not happen if the state’s policies and practices pay contractors regardless of poor performance. Strong, valid measurement of cleanup performance in terms of contamination level reductions attained is vital to assure that protection of human health and the environment are not sacrificed in pursuit of lower cleanup prices. How performance can be measured is discussed below.

Decide on cleanup performance measurements .

How you measure the performance you will pay for is crucial to making it work. Wording measurable payment criteria that refer to environmental contamination levels is at the heart of cleanup performance contracts. Some general principles to keep in mind as you draft your contract’s performance criteria are discussed below.

Base performance payments on direct measurements of contaminant levels in the cleanup environment.

You could write performance contract criteria to pay for cleanup reports by the page or by the pound. But if you did so, you would likely just get lots of very long reports and not much reduction in environmental contamination. Remember, you get what you pay for. Thus, measurements of the performance for which your contract will pay should be based as closely as possible on data from direct measurements of the affected environment. The more distant payment criteria are from directly measured environmental data, the weaker a performance contract's power to produce the desired environmental results within cost limits. Always keep in mind that the purpose of a cleanup performance contract is to pay for environmental results, the attainment of environmental goals set for the cleanup site.

Monitoring must be congruent with performance-payment criteria and risk-analyses.

Monitoring systems are often installed relatively soon after a release occurs. Hastily installed monitoring systems may not provide data that matches up to your performance-payment criteria. Acquiescing to monitoring that is incongruent with your performance-payment criteria may later weaken your performance contract's ability to resist non-performance based claims from the contractor. If the site has used RBCA to set goals for the cleanup, monitoring systems that will trigger performance-payments should also reflect reduction in risk levels posed by the release.

Include basic components of performance-payment criteria .

There are four basic elements that cleanup performance-payment measurements should include:

- Where contamination will be measured--sampling locations;
- What contaminants to measure;
- Numerical contamination level criteria for payments to contractors; and
- Contamination-level data reporting and payment schedules.

These elements of performance-payment measurement are discussed below.

Where contamination will be measured--sampling locations. A pay-for-performance contract should unambiguously specify where the performance-payment criterion data samples will be taken. This determination should be based on the site characterization, including the extent of the plume and on risks posed by the plume. If the site's cleanup goals are based on RBCA, the payment-criteria sample locations should be capable of measuring contaminant levels for affected or potentially affected receptors identified by the RBCA process. The RBCA analysis of a cleanup site will identify contamination levels that should be reached at specific points needed to minimize the risk posed at the cleanup site. The payment criteria in a pay-for-performance agreement should be focused to include these RBCA-identified risk-reduction measurement points. This linkage of payment criteria to the points at which risk reduction is measured is another key to assuring that the cleanup really does protect human health and the environment.

What contaminants to measure. As a general rule of thumb, your contract's performance-payment criteria should focus on only the state's regulated contaminants. The more substances your contract bases payment on, the more complex and costly it will become to administer. If the site is one where risk-based corrective action analyses have been done, performance-payment criteria should include those substances which risk analyses identify as posing the actionable risks. Where the contract frames performance-payment criteria in terms of multiple substances, one way to keep things simple is wording that says that specified levels for each and all contaminants on a list you make must be reached for payment to be made. Once introduced into the performance agreement it can refer to that list as often as needed in wording the performance-payment criteria.

This assumes that the specified levels for all the listed contaminants must be attained in order to receive payment.

Numerical contamination level criteria for payments to contractors. To set the intermediate performance-payment criterion numbers you can interpolate the difference between the initial levels of contamination at the site and the specific numerical goals the cleanup must eventually reach. For example, if you decide to make two intermediate performance-payments between equipment-startup and first reaching cleanup-goal levels, you could split the difference to set the payment levels.

You can also state performance-payment criteria levels in terms of percentages reduced from the baseline levels of contamination--for example, payments could be triggered at 30, 60 and 90 percent reductions from initial baseline measures of contamination. You can also allocate the amount to be paid according to the percentage reduction attained. To provide an incentive for the contractor to persist when contaminant recovery rates begin to diminish, you can make the end payment larger and the preceding payments smaller. Whatever way you link performance levels to payments, it places a significant financial burden on the data that are used to trigger payment. Thus you should beware of measurement or analysis errors or artifacts that would trigger payment prematurely.

Good baseline data are the foundation for valid measurement of cleanup performance. Collect baseline data when the cleanup equipment is installed and ready to start up. Do not let your baseline data go stale before you get the performance agreement written and signed. If there is a long period between site characterization and getting a performance agreement in place, site conditions may change significantly from those the state used to price the cleanup and establish measurement points. For example, the plume could spread off-site, requiring more extensive cleanup effort, incurring site-access problems, and requiring different performance-measurement points. Such site-condition changes could activate the escape clauses (discussed below) that either increase the price you must pay or let the contractor off the hook without reaching cleanup goals.

Combining data from multiple points and contaminants into one number. Multiple data sampling points and multiple contaminants can quickly make even relatively simple plans generate a complex mix of data. For example, data from five sources on three different contaminants generates 15 different numbers from which someone must write an unambiguous pay or no-pay signal. Because the combination of sampling points and contaminants can so easily multiply into complex data sets, it is wise to keep these as simple as circumstances allow. A pay-for-performance agreement should specify at least the minimum number of points necessary to satisfy the state's regulatory criteria. The next page contains a detailed example taken from a pay-for-performance agreement conducted by New Mexico that shows one way of aggregating data from multiple points and multiple contaminants to create a single-number criterion to trigger performance payments. Aggregate measures of cleanup performance can be easily calculated and administered, and they are already accepted in the regulatory community.

In some settings aggregate measures of cleanup performance could obscure "hot spots" where site-contamination levels are above set standards. This need not be a barrier to formulating a suitable, objective pay/no-pay signal from monitoring data. For such settings it is possible to devise an algorithm to generate a payment-signal from disaggregate performance data that explicitly takes "hot spots" into consideration.

Establish contamination-level data reporting and contractor payment linkage.

Linking contamination-level data reporting to payment of the cleanup contractor is at the heart of pay-for-performance cleanup agreements. There are two important aspects of this that deserve close consideration:

- Producing a pay/no-pay signal from monitoring data; and
- Structuring contractor payments in relation to the pay/no-pay signal.

Each of these topics is discussed in the following sections.

Producing a pay/no-pay signal from monitoring data.

Contaminant monitoring data serve to trigger and document a pay/no-pay decision. If performance-measurement data will come from multiple locations on multiple pollutants, the agreement's payment criteria should simplify or summarize this data so that the terms of payment are clear and unarguable from the beginning. The more locations from which data are sampled, the more complex the decision to pay or not to pay will become unless the data are somehow combined into a simple pay/no-pay signal.

Some monitoring plans are inherently simple. For example many states routinely specify that groundwater contamination levels at a release site be measured at one or two points upgradient and two or three points downgradient from the point of release. There may also be provisions for measuring contamination levels at potentially impacted receptors such as nearby water wells and basements. The cleanup technology used at the site may also provide or require particular contamination measurement points or techniques.

Structuring contractor payments in relation to the pay/no-pay signal.

Payments should be spread out over the life of the cleanup work, not made all at once. Making one or two early-stage payments for system installation and testing can enable small contractors to compete for and perform your cleanups. However, most of the financial incentive--the money the contractor gets paid--is in payments that are tied to contamination-level reductions.

There are four major points at which your contract should provide for payments for the contractor:

- Payments when the cleanup system is installed and successfully tested;
- Payments as intermediate contamination levels are reached;
- Partial payment when final-goal contamination levels are reached; and
- Final payment after retaining goal levels for a set time.

The relative amounts of the performance payments over the life cycle of the cleanup fine-tune the financial incentive in important ways. Keep in mind that initial large reductions achieved early in the cleanup may be relatively inexpensive for the contractor. Later, as the rate of contamination reduction begins to decline, the contractor's internal expenses do not necessarily decline and may even increase. The amount of payments should be set high enough towards the end of the cleanup to provide sufficient incentive for the contractor to continue treatment after recovery rates begin to flatten out. Typically the performance payments scheduled towards the end of the cleanup should be relatively larger than intermediate performance payments.

An example of one way to calculate a performance payment number.

Performance is defined by the percent reduction of the initial total BTEX (less the standard of each parameter) from the total BTEX (less the standard of each parameter) of a performance sampling event. Wells BF1-2, BF1-3 and BF1-4 will be the performance monitoring wells and used in the percent reduction calculation. The following example illustrates the methodology to be employed in computing percent reduction and performance payment.

Initial Sampling (ppb)

Well	B	T	E	X	Total
BF1-2	2,200	7,600	4,200	3,800	
BF1-3	3,400	6,500	3,900	2,200	
BF1-4	720	985	2,450	1,630	
Sub-Total	6,320	15,085	10,550	7,630	39,585
Less Standard (X3)	30	2,250	2,250	1,860	6,390
Above-Standard	6,290	12,835	8,300	5,770	33,195

The concentration of 33,195 above becomes the baseline BTEX value. If a subsequent monitoring event yielded the following water quality results:

Subsequent Sampling Event (ppb)

Well	B	T	E	X	Total
BF1-2	800	2,100	1,700	1,400	
BF1-3	1,100	1,650	2,600	950	
BF1-4	330	622	1,900	870	
Sub-Total	2,230	4,372	6,200	3,220	16,022
Less Standard (X3)	30	2,250	2,250	1,860	6,390
Above-Standard	2,200	2,122	3,950	1,360	9,632

A percent reduction would be computed: in this case, $(33,195 - 9,632) \div 33,195 = 71\%$. Thus, the 30% and 60% performance payments would be due, if not already paid. The 90% payment would not be due yet.

Performance payments are:

30% Performance = \$33,333
 60% Performance = \$33,333
 90% Performance = \$33,334
 Total = \$100,000

Payments when the cleanup system is installed and successfully tested.

The only instance in which payments are not based on measured contamination reductions should be at the very beginning of a cleanup. One or two minimal payments may be made at early milestones such as on installation or successful test-operation of the treatment system. In defining and managing early payments, you must be careful not to drift back into paying for time-and-materials, which may open the door to later claims for larger amounts under your contract than you set. As a rule of thumb, such early payments should not exceed 33 percent of the total maximum amount of the performance contract. Under special circumstances early-stage payments may be as high as 50 percent, if the contractor has a proven track record. Most of the amount of your performance contract (50 to 80 percent of its total value) should be paid out as contamination levels decline to levels set in advance.

Payments as intermediate contamination levels are reached.

Contamination levels for intermediate performance-payments can be set in either absolute or relative terms. For example, a 53.6 percent reduction in benzene is a relative performance number and 100 ppm benzene is an absolute performance criterion. Many states have already set contaminant goals worded in specific terms. Whichever way you choose to state intermediate performance-payment contamination levels, you must tie a set dollar amount to each payment milestone. An example of how the total price of a cleanup could be paid out is shown in the box at right. The example in the box on the right shows three equal payments to be made as the contamination reaches each criterion level. In this approach, the payment amounts are fixed: if the contractor reports 71 percent reduction, payment is still made at the 60 percent level of payment.

Matching performance payments to amount of contamination reduced

- Assume the cleanup goal is to reduce contamination levels 90% from a baseline level of 100 ppm to 10 ppm in four steps of 22.5 ppm.
- The price of the cleanup is \$90,000 to be paid for as follows:
 - 75.5 ppm 25% performance = \$15,000 payment
 - 55.0 ppm 50% performance = \$15,000 payment
 - 32.5 ppm 75% performance = \$15,000 payment
 - 10.0 ppm Goal reached = \$25,000 payment
 - 10.0 ppm Goal + 9 months = \$20,000 payment
- Consider withholding some percentage of full payment long enough after reaching goal levels to assure that the final levels are sustained.

Partial payment when final-goal contamination levels are reached.

Schedule a relatively large payment to be made when contamination levels reach the goal set for the site covered by the contract. Generally, you should not pay out the entire remaining value of the contract when the cleanup goal is first reached. Modes of operating the treatment system, weather, and other factors can cause contamination levels to decline temporarily to your goal. These levels may not be retained after the treatment system has been shut off for a reasonable time or, for example, when groundwater levels rise during a wet season. If you pay too much on first reaching the goal, it may invite contractors to prematurely dismantle or walk away from re-activation of the treatment system if contamination levels later rise above goal-levels.

Final payment after retaining goal levels for a set time.

You should make final payment of the contract amount only after contamination levels have been retained at or below the site goal levels with the treatment system turned off for a reasonable time.

This part of your payment schedule should set a time-period or monitoring-report schedule during which specified levels of specific contaminants will not be exceeded. Then at the end of the period, or if later than that, on submission of monitoring reports showing levels at or below goals, the final payment of the cleanup contract is made.

The amount you reserve for this final payment should be large enough to assure that the contractor has a financial incentive to stay with the site. The amount paid on first reaching cleanup goals should be about the same as you plan to make in the final payment for retaining goal levels as described below. In setting the length of time you delay making this final payment keep in mind that the longer you defer making the payment the less it is worth to the contractor.

Make final-payment measurements after system is turned off, but still on-site. Measurements to support the final payment should not be made while the remediation system is active. The remediation system should be turned off (but left in place) and the site monitored for an appropriate time before the final payment is made. If contamination levels rise above the performance-payment criteria levels, the treatment system can be re-activated. Otherwise, final payment is made when contamination levels have stayed at or below your performance criteria for an appropriate time. (Where passive bioremediation has been the cleanup technique, it is not feasible to “turn off” the system in the same way one might turn-off a pump-and-treat system. In this special case final payment can be made simply after contaminant goals remain met for a reasonable period of time.) As a practical matter, a performance contract should leave the site at least measured in the way it should be to transfer the property to another owner. Documenting the satisfactory cleanup of a site is an important, but readily achievable byproduct of doing a cleanup. Your performance-payment criteria should also consider data requirements for property transfer.

Assure validity of performance-payment data.

Performance-payment data must also be tailored to the cleanup technology being used. Different cleanup technologies can require different approaches to measurement of contaminant reductions at a site. More technical information about matching contamination reduction monitoring plans to specific cleanup technologies can be found in “How To Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites” (EPA 510-B-94-003).

Although monitoring-data quality-assurance procedures are already quite common, the data do not carry as much weight in time-and-materials cleanups as they will when payment depends on them. Pay-for-performance agreements do not necessarily require any quality-assurance/quality-control methods beyond those already available, but it is important that these be incorporated at least by reference in a pay-for-performance agreement. Once a pay-for-performance cleanup is underway it may require more state-staff attention to confirm that data quality-control/quality procedures are guarded carefully.

Because the cleanup contractor has a financial stake in the contamination-reductions that monitoring data measure, it might be argued that the contractor has a conflict of interest and might be motivated to submit invalid data or analyses to get paid. Using an independent, third-party monitoring contractor is another way in which special expertise or additional credibility may be brought to bear on measuring contamination reduction at a site. A third-party monitoring contractor might either just audit the cleanup-contractor’s monitoring data or might assume full responsibility for measuring contamination reduction at the site. Alternatively, the state and the contractor might split samples for independent analysis to verify attainment of performance-payment criteria.

Define escape clauses.

Pay-for-performance agreements should not hold cleanup contractors financially responsible for circumstances beyond the contractor's control. To do so would discourage, rather than encourage, faster, less expensive, and more effective UST cleanups. Typically agreements that humans make with each other have explicit or implicit escape clauses, the conditions under which we can get off the hook or change our agreement. Pay-for-performance cleanup agreements should also have escape clauses. Below are discussed some escape clause conditions typically stated in pay-for-performance agreements and ways to restructure the cleanup agreement.

Conditions for escaping a pay-for-performance agreement.

Among the conditions that may reasonably trigger "escape" from a pay-for-performance agreement are:

- ▶ New releases and migrating plumes;
- ▶ Acts of God; and,
- ▶ Contaminant levels that "flatten out."

Each of these conditions is discussed briefly below.

New releases and migrating plumes. New releases at a site from an on-site source will almost surely confound the monitoring plan and data on which payment depends in an existing pay-for-performance agreement. Unless the cleanup contractor has somehow caused the new release, the contractor should not necessarily be held responsible to meet criterion levels that were set for circumstances no longer true. However, you cannot ignore the effect of the new release on the work to be done and on payment of the contractor. You will probably not want cleanup work to stop if a new release occurs (or is found), but for work to continue the contractor will require continued and predictable funding. Thus, in most cases, you will probably need to quickly renegotiate the payment criteria for the performance agreement to at least set interim terms for payment that remain performance based. The data-collection points and the levels at which payments are made also are likely to need changing when a new release occurs or a plume intrudes from another source off-site. The language of your escape clause should include some description of what evidence should be presented to support a claim that the agreement should be re-opened because of a new release or intrusion of an off-site plume.

Acts of God. If your geographic jurisdiction or the particular cleanup site is at high risk from such "acts of God" as earthquakes, floods or lightning, you may wish to include language to require that the contractor take reasonable precautions against such events--for example, lightning protection of the treatment system. As with other types of escape clause triggers, the pay-for-performance agreement should also specify terms for the amount to be paid in the event that an act of God prevents the contractor from reaching a payment-criterion.

Contaminant levels that "flatten out." During cleanup, contamination levels can decline to asymptotic levels that remain above the levels required to be reached to trigger one or more

Beware of triggering "change orders"

- Wording of a pay-for-performance agreement alone will not protect you from unintentionally opening the door for a contractor to demand additional payment for time-and-materials above the price you set for the work due to changes **you** asked for.
- Avoid telling the contractor how to do the cleanup work because this can open the door for the contractor to claim you ordered changes and bill for the additional work.
- Focus on whether or not the cleanup is meeting performance levels. Do not bog down in whether the contractor may be spending "too much" or "too little." Keep your eye on results instead and hold the contractor to a fixed price.

performance payments to the contractor. Some states that have statutes or regulations with specific numeric cleanup goals also have provisions for when reaching those goals is to be considered infeasible on technical grounds. A pay-for-performance cleanup agreement should include language that provides reduced payments, for example, or prevents payments when reaching payment-criterion levels becomes technically infeasible. The language of your escape clause should include some description of what evidence should be presented to support a claim that it has become technically infeasible to reach the payment-criterion contaminant levels. If your statute or regulations already have such language you may incorporate it by reference. Also consider what procedure would be followed to initiate a request to change payment criteria for reasons of technical infeasibility. Typically, the responsibility to initiate such a claim and provide the proof resides with the contractor requesting payment. Beware of making it too easy for the contractor to engineer a technically infeasible cleanup and walk away from the site when it fails. The amount of the payment to be made under technical infeasibility provides one way to discourage this. For example, the agreement might provide that only 25 percent of the amount remaining due will be paid when it is judged that reaching the cleanup goals is technically infeasible. Proportioning payments so that larger payments are provided when the recovery curve begins to flatten out may also aid in assuring that contractors do not simply walk away from cleanups that flatten out short of their intended goals.

Restructuring a cleanup agreement after an escape clause is triggered.

When an escape clause is triggered in a pay-for-performance agreement your options can range from canceling the agreement with no further payment, to partial payment, to conversion of the pay-for-performance agreement to a time-and-materials basis, or to renegotiation of a new set of performance-payment criteria. In crafting escape clause terms and payment conditions, avoid arrangements that would either give the contractor a financial incentive to walk away from incomplete cleanups or to bear all the risks alone.

For some escape clauses--for example, technical infeasibility--it may be wise to craft terms for escape clause payment that will not give contractors an incentive to propose infeasible cleanup systems in the first place. For acts of God, the escape clause payment provisions should probably enable the contractor to resume work after the event, but not be so generous as to replace the need for the contractor to take reasonable precautions and to be appropriately insured. For escape clauses involving new releases or intrusion of "foreign" plumes, it may be most appropriate to redesign the monitoring system and revise the performance-payment criteria and schedule to fit the new circumstances and to provide for some sort of interim payment.

Conclusion : The Future Of UST Cleanups

As of March 1996, about 174,000 UST releases either had not begun to be remediated or had not been completely remediated. The 1998 deadline for upgrading, replacing, or closing older USTs is expected to generate perhaps as many as another 100,000 discovered releases. Time-and-materials cleanups for these releases will further burden the state programs that will oversee and/or fund these cleanups. Beginning the switch to pay-for-performance cleanups agreements now can lighten this administrative and financial burden significantly when the coming wave of newly reported releases hits. In the future, better tank management will ultimately reduce the number of releases. Then, the incentives and measures of pay-for-performance cleanup policies and agreements will sustain effective UST cleanups even as the absolute number of sites and the need for oversight shrink.

Pay-for-performance agreements are the best business instrument for reaching the risk-based corrective action (RBCA) goals to be applied to most future UST cleanups. The primary purpose of RBCA is to protect human health and the environment. One aspect of RBCA that helps accomplish this is the setting of appropriate cleanup goals and measurement points. Pay-for-performance agreements pay cleanup contractors for reaching milestones in achieving RBCA-set cleanup levels, measured at the RBCA-set locations. Pay-for-performance agreements link cleanup spending directly to reducing risks to human health and the environment.

As private-sector organizations (banking, insurance, real estate, as well as UST owners) recognize good tank management and promote its importance as common business practice, UST cleanups will become much more results-oriented. Getting contamination levels at a release site down to risk-based goals will become the bottom line, rather than how much time and materials the cleanup contractor has put into a site. Business managers will be rightfully wary of time-and-materials cleanup agreements that can run up big costs and fail to satisfy the state risk-based goals. Pay-for-performance agreements can help to ensure USTs remain an asset to a property, rather than a liability resulting in property devaluation.

Pay-for-performance cleanup agreements will maintain, even strengthen, state agencies' protection of human health and the environment against UST releases. From the beginning of the federal UST program, EPA has recognized that leveraging non-federal governmental and private resources would be the only practical way to prevent and correct UST releases. Pay-for-performance cleanups refocus government oversight of UST cleanups from contractors' internal management of cleanups to environmental results. This re-focusing of government attention will yield better protection of human health and environment with the same or smaller government staffs.

Pay-for-performance cleanups are one of the most promising avenues for controlling the costs of UST cleanups and ensuring environmental results. State UST cleanup programs and organizations responsible for large numbers of USTs should consider the development of their own pay-for-performance cleanup capability now.