ENVIRONMENTAL BUSINESS COMMITTEE
WHITE PAPER

PERFORMANCE-BASED CONTRACTING

Executive Summary

Environmental remediation contracting demands a flexible contracting vehicle that varies according to the nature of the problem and the desired outcome. The true nature of environmental site remediation will only be discovered during the remediation phase of cleanup, and in all likelihood, will alter the scope of the remediation project. To stay competitive and make a reasonable profit in the face of huge uncertainties in site conditions, contractors have two basic choices: (1) assume the worst case when budgeting for field events which might or might not occur; or (2) budget to the best case (i.e., lowest price) situation in order to win a project, seeking to recover costs for unknown and unpredictable field events through change orders. Recognizing that change is inevitable will make client, contractor and even third party expectations about the approach to any cleanup more realistic. This reality leads us to performance-based contracting, a potential "win-win" approach to environmental remediation contracting.

Performance-based contracting combines traditional contracting vehicles such as cost-plus and fixed-price contracts with results oriented performance criteria and measures established during the discussion or proposal phases of the procurement process. Other keys to effective performance-based contracting include:

- Both client and contractor developing a "common" understanding of a problem and desired outcome through partnering,
- Establishing incentives to meet or exceed performance criteria, including opportunities to share savings and continue the relationship into new projects, and
- Balancing contract risks with rewards, utilizing incentives to meet or exceed goals and disincentives for failure to meet minimum performance criteria.

A critical factor in selecting the appropriate contract vehicle is to vary the approach depending on the specifics of the task and the magnitude of the unknowns. Cost-type contracts work best when the technical and financial risks and unknowns are large. Fixed-price contracts can be applied to discreet, well-defined tasks with relatively small risks and unknowns. Another approach utilized for environmental restoration contracts is the establishment of performance specifications in situations where the volume of wastes cannot be adequately estimated. Contract rates are then negotiated based on concentration levels of wastes, waste types (solid, liquid, sludge), and/or volume of wastes removed (e.g., cubic yards). In each case, performance metrics need to be well defined over the life of a project so that both parties have a clear, "common" understanding of the desired outcomes throughout contract implementation. Performance-based contracting offers both the public and private sector an opportunity to achieve more efficient and effective environmental cleanup results.

Background

Environmental restoration comprises the universe of activities in which public and private sector entities engage to restore contaminated air, water, soil or other media to a condition considered protective of public health and the environment. One of the by-products of this country's industrial revolution and a cold war legacy, hazardous wastes, contaminate landfills, rivers, lakes, bays, industrial sites, government facilities, cities, and rural areas. The threats posed by the variety of hazardous substances contaminating our environment vary depending on criteria such as characteristics, concentration, subsurface factors, and proximity to populations and sensitive ecosystems. Engineers and scientists in both government and the private sector are working to find safe, reliable and cost-effective methods for reducing, destroying or managing hazardous substances contaminating our environment and threatening public health.

Understanding the magnitude of the challenge facing public and private sector environmental management professionals is a key to developing a solution to any environmental restoration challenge. One notable expert, D.M. Mackay described the technical complexities of the contaminated site characterization and remediation process in the following way:

> "Envision an extremely complex, three dimensional maze in which are lost a variety of chemicals—some concentrated and localized, and some dilute and spread out. Imagine further that the chemicals are all moving at different rates and directions as a result of gravity and/or the flow of air and water through the maze. Then imagine that the internal walls of the maze are porous, like a hedge, and that the chemicals, air or water can move into and even through them at rates that vary throughout the maze. Lastly, imagine that you must find and remove all the chemicals but cannot enter the maze to do so. This, in essence, is the problem confronting those trying to clean up contamination of the subsurface."[1]

There are many in the site remediation business and among stakeholders who believe that site cleanup can be managed through the traditional engineering process (i.e., study to characterize the problem, design the solution and implement). This notion is based on the assumption that our current site characterization technologies can define the significant characteristics of the site (e.g., geology, location and character of significant contaminants). This assumption is not true in most situations.

Unless a site remediation problem is very simple (e.g., drums of waste, shallow subsurface contamination, very small site, very low risk of exposure, no sensitive ecosystems, etc.), site characterization will be highly inaccurate. The true nature of a site will only be discovered during the remediation phase, and in all likelihood will alter the

[1] Mackay, D.M.; Characterization of the Distribution and Behavior of Contaminants in the Subsurface; *Ground Water and Soil Contamination Remediation: Toward Compatible Science, Policy, and Public Perception*; National Academy Press; 1990; Washington, D.C. ; pp70-90.

scope of the remediation. Therefore, the real scope of any site remediation project is usually unknown until actual site cleanup takes place.

Federal budget pressures combined with basic misunderstandings about the complexities outlined above have led to the selection of inappropriate contracting vehicles for many environmental remediation projects. Eager to control costs and frustrated by the inability to accurately predict site remediation expenditures, many senior officials have turned to firm-fixed-price type contracts as a panacea for uncontrolled costs, despite the high degree of complexity and many unknowns inherent to this type of work. Current site assessment technology and diminishing budgets do not allow the extent of site characterization needed to fully define the scope of the work and justify the use of firm-fixed-price type contracts.[2] However, selection of contract type now appears to be driven by which vehicle offers the hope that the government can remain within budget (i.e., the firm-fixed-price contract).

Another result of this focus on controlling costs is that insufficient budget is being established for the critical up-front site characterization. Such work is necessary for uncovering and identifying the many unknowns on a hazardous waste site. Reducing site characterization leads to an even higher level of risk for the contractor and the government and can result in a higher level of risk to both the community and the environment.

Furthermore, there is more contract capacity than work available under current environmental remediation contracts, again due to severe budgetary limitations, not due to lack of need for remediation. This over capacity in the marketplace has also contributed to the inappropriate use of firm-fixed-price contracting. Firms eager for work are reluctant to turn down contracting opportunities, including "high risk" firm-fixed-price contracts, for fear that no other contracts will become available (remember the government shutdowns which dramatically curtailed remediation contracting).

To make a reasonable profit in the face of huge uncertainties in site conditions, contractors have two choices: (1) assume the worst case when budgeting for field events which might or might not occur, such as encountering highly toxic contamination requiring a higher level of health and safety protection, and thereby risk losing the contract to a lower priced competitor; or (2) budget to the best case (i.e., lowest price) situation in order to win the project, and seek to recover costs for unknowns and unpredictable field events through change orders (making choice #2 is often the only way to win a job). In the case of the second choice, such potential budget increases defeat the government's goal of controlling costs over the long term and not only result in discord and harm to client-contractor relationships but also potentially result in bad past

[2] In accordance with FAR 16.103(b), a firm-fixed-price contract "…shall be used when the risk involved is minimal or can be predicted with an acceptable degree of certainty." In addition, the guidance contained in FAR 16.202-2(d) indicates that use of the firm-fixed-price type contract is appropriate when "performance uncertainties can be identified and reasonable estimates of their cost impact can be made…." Finally, the government guidance for selection of contract type (FAR 16.104(d)) explicitly states that appropriate assumption of risk between the government and the contractor based on the complexity of the contract requirements should be one of the major drivers in the decision-making process.

performance evaluations by the client. A bad past performance evaluation will most likely make the contractor less qualified to compete in this already overloaded market.

Work scope changes in environmental remediation contracts can increase the original cost estimate by large orders of magnitude. Such changes can lead to litigation among the parties associated with the contaminated site. Litigation involves additional costs and time delays, creating a "lose-lose" situation for affected parties.[3] Such a scenario is not uncommon in the federal Superfund program.

In light of these issues, this paper outlines a potential "win-win" contracting approach for environmental restoration activities: performance-based services contracting, which is a tool for meeting client objectives while still maintaining the flexibility to manage the inevitable changes in site remediation projects. This approach addresses the fact that clients are likely to have multiple performance objectives—cost control will likely be one important objective. Performance-based contracting places performance objectives, requirements and the associated metrics along with positive and negative performance incentives in a contract. The parties to the contract also establish a process for determining performance against an agreed-upon standard. Before expanding on this idea, a brief examination of current contracting approaches is warranted.

Traditional Environmental Contracting Approaches

Environmental contracting has been accomplished using a variety of vehicles with a focus on cost control. Uncertainty in environmental remediation can be viewed as a spectrum ranging from high to low uncertainty. Firm-fixed-price (FFP) contracts are typically used when uncertainty is low and cost-type contracts are used when uncertainty is high. Given the ability to define the scope adequately when uncertainty is low, FFP gives procurement officials a tool for controlling costs with the probability high that scope changes will be minimal. Unfortunately, many key government decision-makers seem to share a belief that FFP guarantees delivery of a project for a fixed price. This is not a valid notion, because as described above, change orders and large contingency fees are then needed to protect against unanticipated site conditions or technology performance.

Cost-type contracts give procurement officials another tool to utilize when uncertainty about the work to be done at a site is high. This vehicle delivers labor hours at defined classifications and grades for fixed hourly rates. It is often used when the scope and project requirements are not well defined. Cost-type contracts such as cost-plus-fixed-fee and cost-plus-award-fee allow costs to be carefully regulated by controlling the rate of

[3] To illustrate this point, remedial action at the Motco Superfund site highlights the potential magnitude of the change orders possible in a hazardous waste site cleanup. The contractor bid on a won a $30 million fixed-price contract to incinerate oily wastes at the 11 acre site. After costs exceeded $76 million, the contractor filed a $56 million lawsuit against the potentially responsible parties at the site, claiming costs far exceeded their $30 million bid. Ambiguity in the description of the wastes were claimed to be inaccurate and misleading—the contractor expected oily and liquid wastes but instead found contaminated soils and sludge that did not incinerate as well in the constructed incinerators. A federal jury awarded the contractor $83 million in the lawsuit but appeals are likely. This illustration shows that change orders can reach over 150 percent of the original bid for a firm-fixed-price contract for environmental remediation.

expenditure and closely monitoring overhead rates. Cost-plus-award-fee contracts employ an element of performance-based contracting by basing some portion of the fee on a contractor's performance.

One way that public and private sector contracting authorities are trying to speed up the remediation process and deal with its accompanying uncertainties is through "turnkey" or Engineering, Procurement and Remedial Construction (EPC) contracting. Combining the study, design and construction phases of site cleanup into one "turnkey" or EPC contract has had several significant impacts. This approach emphasizes up front planning before beginning a project, allowing a contractor to execute the work with a well-defined understanding of scope and the desired results. The approach facilitates continuous interaction between the study, design and construction staff under a single contract vehicle and enhances the ability to respond and deal with changing conditions during the remediation process. There is some concern, however, that increasing the size and scope of turnkey contracts decreases the ability of small and mid-sized firms to successfully compete for remedial prime contracts.

It is important to acknowledge that significant changes to the federal procurement process are already underway. For example the recently proposed changes to federal acquisition regulation FAR Part 15, which governs the negotiated contracting process, would bring the federal procurement system a step closer to the commercial contracting process. Suggestions outlined in this paper go hand-in-hand with the evolutionary changes to the federal procurement system inspired by the Federal Acquisition Reform Act of 1995 and other similar initiatives. Other examples include changes that affect consideration of contractor past performance. All contractors are incentivized to perform better to give themselves the best opportunity possible of winning new work in the future. The application of a realistic and fair performance-based contracting approach as outlined in this paper should result in contractors striving to perform better, faster and cheaper.

Performance-Based Services Contracting

Performance-based services contracting not only employs each of the established contracting tools for environmental services, it takes into account objectives beyond cost control. To be most effective the approach requires fundamentally altering our current approach to environmental restoration contracting. Both client and contractor should strive to develop a common understanding of the problem and a recognition that change is inevitable. Most cleanups with the exception of some of the most basic (i.e., easy to characterize and remediate using existing technology) will more often than not necessitate some change or deviation from the original approach for mitigating risks posed at a contaminated site. As the Motco Superfund site illustrated earlier, the magnitude of these changes can be significant orders of magnitude greater than the original estimate. Recognizing that change is inevitable will make client, contractor and even third party expectations about the approach to any cleanup more realistic.

Performance-based services contracting when designed and implemented as described in this paper responds to the uncertainties inherent in environmental site remediation. The approach can be generally defined as follows.

- A performance-based contract reflects a mutually beneficial relationship based on the achievement of desired results.

- To make this approach work best demands meaningful, effective partnering between customer and contractor.

- Clear, results oriented performance criteria and measures are established in a proposal or through discussions.

- Appropriate incentives for contractors to meet or exceed the criteria effectively and efficiently provide opportunities for savings and include the possibility of continuing a customer-contractor relationship into subsequent work.

- Balancing the incentives are disincentives for failure to meet the minimum performance criteria, such as fee reduction, an integral element to effective performance-based contracting.

- Performance-based incentives must balance both the client's and contractor's risks and rewards.

Some of the essential elements of performance-based contracting include:

- ***Adaptability***—contract terms must consider the changing, uncertain conditions associated with activities such as *in situ* remediation.
- ***Shared Mission and Vision***—customer-contractor relationship premised on a shared mission and vision.
- ***Appropriate contract vehicles***—mix of cost-plus, time and materials, fixed-unit-price and firm-fixed-price contract vehicles utilized for discrete projects: cost-plus should be used when uncertainty and risks are high; and fixed-price could be used when uncertainty about conditions, contaminants and technologies is low. Typically, the latter would be selected for commodity services or when the statement of work and quantities are well defined. Incentives for fixed-price would differ from cost-plus contracts in some key ways.
- ***Results-oriented***—statements of work should focus on outcome, eliminating over emphasis on process: contractor must have an appropriate degree of freedom to deliver cost-effective and timely results, such as meeting milestones.
- ***Logical, rational and clear incentives/disincentives***—both incentives and disincentives should be clearly stated and agreed upon up front. They should be based on a combination of monetary and non-monetary factors balancing

risks and rewards. Such factors include safety, labor force retention, fee and small business subcontracting goals.

Performance-based contracting varies the contracting approach depending upon the specifics of a given task or discrete project. By utilizing cost-type contracts when the risks and unknowns are great and then applying fixed-price contracts to discreet, well-defined tasks with small unknowns, efficiency gains and cost savings can be realized. Performance-based contracting utilizes both contract types in combination with appropriate "performance-based" incentives. However, performance "expectations" are established prior to initiating the work with both parties agreeing on the metrics for measuring performance. Agreeing to specifics such as performance metrics, incentives, disincentives and the process for scope changes all depend on both parties developing a "common understanding" of the client-contractor relationship and contract objectives.

Having achieved a "common understanding" of the problem and the desired end product, a performance-based contracting approach to environmental site remediation can lead to a cheaper, better and faster solution. Reasonable assumptions are made about the best approach to addressing contamination at a site, recognizing that knowing the full extent and character of the wastes is limited by existing technology and cost. Remedial action is broken into phases with well-defined milestones.

As action is taken to achieve a milestone, the approach is periodically reassessed based on observable information about the extent and nature of the wastes and the effectiveness of a given technological solution. The "observational method" as this approach is known demands a contract vehicle that is flexible, tailoring the contract form to each situation.

Another contracting approach utilized under environmental restoration type projects involves performance specifications in cases where the volume of wastes cannot be adequately estimated. In these instances, contract rates are negotiated based on concentration levels of wastes, waste types (solid, liquid, sludge) and/or volumes of wastes removed, such as cubic yards. These are hybrid contracting strategies that combine a variety of contract types applicable to the site conditions. For instance, a building demolition may be considered for fixed-price contracting, while a sludge lagoon excavation would lend itself to a cost-type performance contract that would be negotiated based on a cubic-yard removal basis until a defined cleanup level is achieved. A flexible contracting strategy is essential to effective and cost efficient site remediation.

Similarly, performance-based contracts should employ a common-sense approach to establishing performance metrics. Performance metrics that are easily measured need to be defined and detailed over the life of a project and monitored regularly. Such an approach will give the contractor an opportunity to understand the outcome of continuing work at the same pace or under the same conditions. Senior managers and project managers can then be more responsive to making recommendations for improvement to a project on a routine basis, and in turn, they will better understand what the results of such an effort would mean.

Specifics of a performance-based contract and its oversight include the following:

- Statement of Work contains performance requirements that are mission related,
- Contract has performance quality metrics for measuring performance against a clear, mutually agreeable standard,
- Contract contains both positive and negative incentives based on the performance metrics,
- Performance evaluators are adequately trained to evaluate contractor performance,
- Fair conflict resolution procedures are established, and
- Methods of determining changed conditions (e.g., site characteristics) is embedded in the contract.

These basics provide an outline of key ingredients to a successful performance-based services contract. The key to successful implementation is based on the quality of the partnership between the contractor and the client. The more effective the partnership, the more successful the project is likely to be.

Many in government are driving environmental contracting towards performance-based approaches as outlined here. Some of the best examples are within DOD (e.g., the U.S. Army Corps of Engineers' Total Environmental Restoration Contracts, or TERCs). Many other government contracting authorities have only begun to experiment with performance-based contracting concepts. The natural evolution of contracting may move slowly, and sometimes erratically, but emphasis continues to shift towards achieving results as cost effectively and efficiently as possible. Finding a common understanding of how best to reach these goals should be the first priority. Performance-based services contracting may offer both the public and private sector an excellent opportunity to work together to find more economical and timely solutions to the challenges of environmental site remediation.

Lessons-Learned from Public and Private Sector Contracting

While there are notable differences between public and private sector environmental contracting, the most significant difference is that the private sector is (mostly) non-adversarial. Private sector, or commercial, contracting practices are not bound by the same laws and regulations (e.g., the Competition in Contracting Act, the Procurement Integrity Act, federal acquisition regulations and other requirements governing the federal procurement process) that govern federal contracting. These laws address valid public sector concerns about contracting but nonetheless hinder the process. To the extent that we can work to replicate the flexible, partnership, outcome-oriented nature of private sector contracting, we ought to do so. We nonetheless recognize that public sector contracting which involves expenditures of public funds demands a balance between societal goals (i.e., full and open competition) and contract goals (achieving desired results as efficiently and effectively as possible). There are limits to how far the

public sector contracting process can be reformed to replicate private sector contracting, and our recommendations on performance-based contracting are designed to work within the bounds of existing federal contracting laws and requirements.

There are a number of significant lessons-learned about performance-based contracting for environmental services that help to illustrate how this approach can successfully be employed to lower costs, to increase efficiencies and to deliver more effective solutions. The following examples highlight how the approach can work in practice.

Private Sector Example 1

Contractor A, through a partnership arrangement with Industrial Client B, provides comprehensive environmental management services at a large site with a 90 year old refinery. For this project, Contractor A has established a sitewide, risk-based approach to remediation that prioritizes and integrates both RCRA and CERCLA cleanup activities for the 50 solid waste management units on the site. Contractor A began work on the site as Industrial Client B's environmental contractor in 1991. In 1996, Contractor A entered into a 15 year partnering agreement with Industrial Client B to continue to provide environmental services under a performance-based "program" model.

Under this agreement, both parties achieved such a high level of partnering that a "virtual corporation" has been formed, with company lines blurred in favor of integrated teams, working together to achieve shared, measurable performance objectives.

The Contractor A and Industrial Client B partnership is structured as a cost-based contract with performance-based fee. In this arrangement, all parties affected by the outcome of the project are co-located into the same onsite office, and incentivized with a common mission: to achieve the cost-effective, safe cleanup of the 50 solid waste management units on the site. Contractor A and Industrial Client B's construction contractor are bound with a single set of performance metrics, with team performance establishing fee earned by each partner. Performance evaluation categories are safety, strategic planning, management, schedule and cost performance, and breakthroughs and innovations.

Industrial Client B, Contractor A, and the construction contractor representatives measure performance quarterly. For 1996, the first year the agreement was in place, team performance improved by 8% per quarter.

Private Sector Example 2

At a major site at which explosives were produced during World War II, Contractor A conducted an RI/FS and turnkey remediation for the PRP committee, comprised of Client B and two other chemical companies. Contractor A assisted the PRP group in negotiating a consent agreement with the State's Department of Health and Environment. Contractor A saved Client B more than $1 million by using the "observational approach" to significantly reduce the number of samples needed to meet the RI objectives. A state-of-the-art computer tool known as Site Planner was used to develop 3 dimensional site models to define field activities, resulting in cost savings for sampling analysis.

A "cost plus performance based fee" form of agreement was utilized that offers the flexibility to fine tune the underlying motivation provided by the commercial contract. Cost is define as the real, direct labor, indirect labor burden, out-of-pocket expenses (including all subcontractors and suppliers) and overhead costs not covered in labor burden. The fee is a percent of the total cost. The actual performance fee earned would be tied to the degree of actual cost variation from a "cost budget" or "target cost" associated with a defined scope. The performance fee is also based upon a number of other performance factors, appropriately weighted, each of which reinforces a particular desired behavior believed to underpin Industrial Client B's objectives. The sum of the weighted evaluation factors represents a fairly sophisticated motivational tool toward achieving the desired behaviors will usually be project-specific and at the same time, emulate partnership philosophy.

Performance factors include Cost, Safety, Satisfaction, Quality Improvement, and Schedule. There are a number of assumptions upon which fee factor development is based.

- Initial scope, schedule, and budget will be well defined, including a complete listing of exclusions (very important) and any inclusions upon which fee factor development is based.
- All out-of-scope changes approved by Industrial Client B will be reflected for impact on schedule and budget in Current Schedule and Cosrt and used to determine factor values.
- Project schedule is based on a 40 hour work week and assumes that full project staff loading is achievable on this schedule
- Failure of Industrial Client B or any Agency to deliver approvals and permits, etc.. as required by the schedule constitutes a change of schedule with corresponding changes to budget
- Base Fee will be invoiced and paid monthly with an adjustment to Final Fee at project completion (or agreed milestones)
- Invoice period is monthly with estimated invoice for period submitted on day 1 of period and payment to be received within 30 days. Period estimated/actual invoices will be reconciled and an adjustment issues within 30 days of close of period.

Public Sector Example 1

Contractor B is the integrating management contractor at a large DOE facility. Contractor B is placing most of its fee at risk to achieve aggressive, results-oriented, and measurable cleanup objectives. For severe accidents, DOE may withhold all Contractor B fees for the performance period in which the accident occurred.

Each year, a set of performance measures - specific goals, tasks, and timelines for work to be completed during the upcoming fiscal year. Each measure has a timeline and fee attached to it. Performance measures are typically categorized as standard or stretch. Standard measures commit to fully funded activities that can realistically be completed during the time period allotted, while stretch measures are those measures that would represent a significant creative effort by contractor B.

In FY97, DOE and contractor B agreed to two more categories - "super stretch" and "gateway". Super stretch are activities that go beyond the funded scope of work for the site. In order to accomplish them, funding must come from cost-savings. Associated fees are in addition to the basic fee pool. Gateway measures are linked through progression of work toward activities that are part of a future performance measure. For example, if Contractor B fails to achieve gateway measure "A" during the allotted time, not only does the company not get fee for measure "A", but it also cannot take credit for accomplishing follow-on measure "B" without first completing measure "A"

The contract includes a unique feature - employees receive 20 percent of the company's performance fee as incentive compensation. The incentive aligns the entire site workforce with the "pay-for-performance" concept.

Contractor B also has a cost-sharing program with DOE. When the company reduces costs, DOE receives 65% of the savings, and Contractor B earns 35%. Of Contractor B's portion, employees receive half as an incentive to identify future cost-saving opportunities.

Examples of the performance objectives:

- Placing Special Nuclear Material in a Safe Consolidated Storage Configuration and Shrink the Protected Area
- Environmental Restoration and Risk Reduction
- Site Reconfiguration and Safe Closure
- Waste Management
- Safety and Health
- Workforce Performance, and
- Social, Administrative, and Security

Public Sector Example 2

An example of how a cost-reimbursable contract vehicle could be utilized successfully in the context of performance-based contracting is at a large Department of Defense weapons production site. Contractor X and Client Y agreed to a scope of work to remove a submerged quench incinerator. The delivery order scope was conceptual in nature at the time of award due to the desire of the client to get the work started before complete definition of the scope was possible. The contractor and the client agreed after the actual start of the work to get a salvage contractor to demolish the structure. This resulted in an approximately $1 million cost savings—almost 40 percent of the awarded value of the delivery order—since the price of the demolition was offset by the salvage price of the components. An additional $500, 000 was saved by running several delivery orders concurrently utilizing the same management, supervisory staff and common support facilities. The cost savings was then reprogrammed by the client to execute additional environmental cleanup projects

Public Sector Example 3

A large military installation on the National Priorities List, containing a complex mixture of volatile organic compounds (chlorinated hydrocarbons) that had leached into the groundwater surrounding the site, provides an example of why fixed-price contracts do not provide a cost-effective contracting solution to some environmental restoration projects. The cost-type contract employed for the cleanup at this site provided a streamlined approach and sufficient flexibility to
select a mix of technologies that resulted in project completion 20 months ahead of the traditional fixed-price approach. Project savings are estimated to be $8 million over a ten-year period based on technology selection and the reduction in time to complete the project.