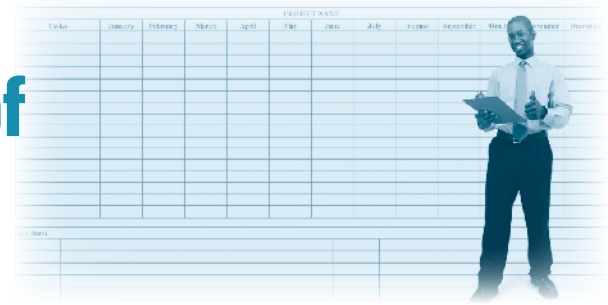
by David Elam

Peer Review: Just a Specialized Case of End-of-Pipe Treatment?



Many project managers rely on peer review as an important quality control operation. Properly implemented, peer review is an effective process for ensuring project quality. Unfortunately, in many of today's time- and resource-constrained organizations, peer review (or some equivalent) is the only quality review function that takes place. Too often this review—or inspection—occurs in the final stages of the project when schedule demands contribute to oversights and corrections are difficult and expensive to implement. In other words, project quality control systems that rely heavily on peer review in final project stages are equivalent to end-of-the-pipe pollution control strategies: they can work, but they are not always the most effective or least expensive option.

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Total quality management systems rely on prevention rather than inspection to produce products and services that conform to quality requirements. Inspection is still an important aspect of the quality management system; however, inspections are limited and intended to measure or confirm product or service quality. Inspections within these systems are not intended to catch flaws and drive repeat work. Instead, inspections yield data that support statistical analyses of operations, which provide a basis for continual improvement. These systems rely on preventative mechanisms such as training, standard operating procedures, and checklists to yield operations that produce conforming products and services at each step in the process. Similarly, we ensure compliance with emission or discharge limits by installing pollution control equipment on processes and then operating the process over defined ranges using trained operators and programmed systems.

Peer reviews are common in science and engineering and reflect the long-standing practice of critical, independent review of technical, often original work. To this end, they remain useful for today's environmental projects. Peer reviews are particularly important for original treatment strategies and project designs; data analyses and interpretations; assessments of data quality objectives, such as impacts of outlying quality control data and incomplete data sets; and overall study conclusions. It is, however, a waste of resources to reduce a peer review to an inspection process intended to evaluate project quality. Instead, a peer review should be performed to verify or refine a conclusion or design based on data of confirmed quality.

UPON FURTHER REVIEW

Consider the straightforward example of a project involving quarterly sampling of a wastewater discharge to demonstrate compliance with a privately owned treatment works (POTW) permit requirement. A successful project outcome—that is, the quality expectation—will vary from stakeholder to stakeholder. Plant management may be satisfied if sampling results do not result in a notice of violation. Operations staff may be satisfied if the pollution control equipment works properly during the sampling period. The technician performing the sampling may be satisfied if a complete set of sample containers is received from the lab and the autosampler works properly. The plant environmental manager may be satisfied if complete results are submitted on time. The POTW may be satisfied if timely results are reported based on properly collected and preserved samples that have been analyzed by an accredited lab using the right methods within the sample holding time limits. The state agency with POTW oversight responsibility may be satisfied if the POTW meets its National Permit Discharge Elimination System (NPDES) permit limit.

Given this varying set of quality expectations, what is the scope of the review if the peer reviewer is charged with endorsing project quality? What tools are in place to document the peer reviewer's actions and conclusions? If these tools do not exist, what keeps one peer review from differing from another, even if performed by the same person? If this 30-day project occurs during the last month of the quarter in which the results are due, how can a quality system based solely on peer review guarantee quality results in a timely manner? Finally, if tools do exist to guide the peer reviewer

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through all aspects of project quality and document his or her actions, why not adapt the tools for use earlier in the process where results can be used to ensure that quality expectations are realized with minimum effort? In short, doesn't it make sense to replace an end-of-the-project inspection—the "peer review"—with training programs, standard operating procedures, and checklists that establish accountability for quality at the earliest possible point in the project process and thus reserve the peer review for an objective evaluation of conclusions and recommendations?

Many will argue that training, standard operating procedures, and checklists are not the responsibility of the project manager because the investment in their development or implementation cannot be justified by project finances. Yet the project will be expected to bear the financial consequences when project failures attributable to the lack of these resources require repeat work. Hence, it is in the interest of a project manager to support the development and implementation of training programs, standard operating procedures, and checklists. It is often possible to spread the costs of these tools over several projects by allocating a percentage of each project budget to quality control. The quality control budget can then be used for both peer review and the development of systems that enhance the value of the peer review process.

Peer review will remain an important aspect of project delivery systems. Organizations that use peer review systems effectively will enjoy success and credibility; however, those organizations that forego staff training, standard operating procedures, and checklists in favor of an end-of-the-project inspection packaged as a "peer review" will spend time and money on repeat work and lose credibility due to missed deadlines and financial overruns. Few environmental professionals would recommend the installation of pollution control equipment that "could handle anything," the equivalent of an open-ended and all-encompassing peer review. Instead, most of us would take steps to control the process, staff it with trained operators, equip them with the necessary tools to evaluate ongoing performance, and then install treatment technology that operates over that range. We, and the stakeholders we serve, will all benefit if we apply the same standards to project execution and review. We'll find that we'll have fewer project quality problems and that peer review will add substantive value. **em**

Mea Culpa

I caught an error in my last column ("Sustainability, Environmentalism, and Green: The Next Bubble?" *EM* January 2008, p. 28) after the magazine had printed. The mistake was made in the referenced date for the Shellenberger and Nordhaus article cited in the opening paragraph. The cited date was October 2005. It should have been October 2004. I apologize for the error and any inconvenience the citation may have caused readers or the authors of the cited article.