



Employment Outlook, Opinions and Opportunities

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To the Graduates, Students, and Friends of the IET: AN EDITORIAL

STATE OF THE ENVIRONMENTAL BUSINESS:

by

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The environmental industry is in sad shape these days. Herd instinct continues to drive the large consulting companies onward in believing that industry wants good science and engineering, in perpetuating the matrix management system, and in permitting non-technical management and human-resource personnel to interfere with technical management or project operations. Human-resource personnel should only provide support to management, among other functions, but should not be involved in the decision-making process of technical personnel selection or project execution.

Marketing with quality, senior professionals seems to be waning in favor of young, quasi-technical promoters promising low prices, obedient service to industry, and fast turn-around. In driving the technical responsibility into the lower levels of the consulting company's organization, managements have cut prices in order to compete in marketing, reduce overall costs and improve profitability. In doing so, quality control and quality assurance have become less and less important. As a result, the number of lawsuits involving technical errors and omissions is rising in recent years, creating even more problems for consulting companies with attachable assets (Gibby and Moon, 1996). So-called "junk science" has also become a nuisance, and, as litigation increases in the environmental field, it will continue to be a problem. An interesting way to remind professionals of their responsibilities is through the infamous list of alleged practitioners of [junk science](#).

The perceived need for senior personnel has decreased and the value for meeting technical requirements according to a reasonable standard of care has decreased markedly over the past few years. Newly empowered technical personnel are struggling with the forces of expediency and many have turned toward the dark side, if only to keep their jobs.

Good science and engineering continue to erode as the value for conducting

appropriate site characterizations and other environmental investigations and evaluations declines into expediency, often led by improperly oriented, inexperienced managers whose training has been under nonexistent senior personnel. The incidence of non-compliance by industry is growing as a result of reduced regulatory enforcement. [Hilton\(1996\)](#) hints at this very trouble in the US environmental industry as the political pot continues to boil in this election year.

As the brain-drain (caused by consolidations, downsizing, and overhead elimination) continues out of the environmental industry, Tier I consulting companies (i.e., those with a national and international presence) continue to try to find their place in an industry collapsing into black-hole conditions where reckless expediency, price wars, and the matrix management system are the rule, not the exception. Many Tier II and III consulting companies (i.e., smaller and local groups) are thriving as industry requires obedient service and expects to replace them at a moments notice if any significant irregularities are reported by or to the regulatory agency. Other consulting groups are in the wings waiting for their turns to manage the environmental brew with their own smoke and mirrors. As never before, professional ethics are under stress as the conflict between expediency and continued employment expands like an invisible, odiferous fog rolling across the environmental field.

There are three principal causes of this expediency. The first of these causes is the rise of engineering influence in the environmental field over the last five years. Engineering implicitly includes expediency as one of its vital components, to get the job done as quickly as possible. As the remediation stage of projects began after years spent on site characterization, and with due exception and apologies to those many enlightened engineers, many poorly-trained engineers and others have rushed into the industry. They do not have a technical understanding or appreciation for the activities involving the project definition required in environmental projects. Through ignorance or indifference, they suspect that characterization of the subsurface is so subjective that even untrained personnel can: a) describe and take drilling samples for geologic and laboratory analyses, b) conduct aquifer tests and associated analyses, and c) make other judgements on subsurface conditions and future ramifications in remediation projects. All these sources of data, and many others, form the basic input for remedial design and subsequent clean-up. If these data are grossly inaccurate, minimized, or misrepresented then subsequent remediation projects will not be successful, neither technically nor economically. [Cehrs and Bianchi \(1996\)](#) have recently raised these issues by discussing the compatibility of environmental consulting and good science in the current business climate.

To the uninformed, or self-serving, environmental geology and hydrogeology are presumed by many engineers and others to be subdivisions of engineering and, therefore, appropriate activities for the engineer and others to perform. However, these fields were separated from engineering in the late 1800's and early 1900's because they developed as fields of science which require [specialized methods of](#)

evaluation, sampling and interpretation for the purpose of providing information that can be used as a basis of subsequent remediation. If these data are not collected properly, or worse yet, not assembled at all, then the foundation on which project engineering is based is flawed and has little chance to provide the appropriate basis for a successful project measured in terms of a limited budget and time for completion. Therefore, the common result is that projects are not completed according to regulatory goals and requirements or at a reasonable cost and time to complete.

The need to complete large Superfund projects, which started in the 1980's, has led in the early 1990's to the attitude that "there have been sufficient studies conducted but not many projects have been cleaned up." Although a laudable expectation, the problems in site characterization, especially in the subsurface, often consist of complex scientific relationships that require systematic sampling and testing, followed by appropriate analysis. The frustration with the lack of quick, easy answers, combined with the newly empowered, younger personnel, sparked the beginning of the expediency stage in the environmental field. It spread quickly throughout smaller projects which had been relegated to junior personnel. As engineering functions and leadership began to be responsible for the implementation of remediation projects, the perceived value of site data began to decrease. For those personnel not having developed a value for good science, many engineers, by their very nature, tend to rush to judgement on clean-up projects in the name of optimization and, yes, expediency. This is because, although the project's site characterization foundation was poor, the project could still be completed under budget and on time, if, that is, the regulatory agency would accept such activities.

The second principal cause of the breakout of expediency in environmental projects is a result of a softening of regulatory agency resolve. As mentioned, the regulatory agencies have recently allowed certain expediencies to occur in the name of risk assessment and regulatory cooperation. Although also laudable aspirations, the pendulum of reasonability can swing too far before it comes under the appropriate influence of political gravity. However, the premature implementation of ill-conceived measures involving bulldozers, backhoes, landfills, and the like often have made a mess of projects, scattering contaminants, making sites of future clean-up projects, driving costs up and extending schedules well beyond what they should have been if front-end loading of appropriate activities had occurred. In a comprehensive investigation of more than 400 remediation projects, Findley and Whitridge (1996) have reported an unexpected and troubling trend in the industry by showing a decreasing incidence of appropriate site characterization since 1990. In fact, their study shows that the value of science in driving site characterization has decreased substantially and has led to more expensive projects with longer completion times. At mid-project, project managers are often heard muttering to themselves that they should have conducted a better site characterization program.

Well-managed consulting companies, balanced technically with the appropriate

geological and engineering personnel, are struggling to compete against the pressures of engineering expediency; many are losing the battle in the market place, which compounds the problems. Most of the major consulting companies have been laboring under the impacts of market pressure, consolidation and the loss of senior personnel, all of which are affecting corporate profitability as indicated by their general performance in the [stock market](#) over the past year. Those few groups showing marketing and technical improvements have been rewarded by rising stock values (the stock trend chart for Du Pont has been included with the charts to illustrate the general industry trend for the period). It is obvious that cutting costs does go directly to the bottom line for industry in general, including the environmental industry.

The third cause of expediency is the only one that is excusable: the industry desire to minimize cost and maximize profit. The intrinsic value of capitalism in the U.S. and elsewhere in the world needs no justification here. Economic health and well being of our industrial base ranks high on the American agenda and others, but capitalism requires moderation from time to time, to smooth some of the rough edges it shows when operating unattended. History shows us that industry would make a mess of our environment if left to its own, and regulatory controls are necessary to convince industry to improve its efficiency in handling wastes and byproducts. The trick is to find the way to establish a reasonable balance between the two opposing forces of unrestricted capitalism and regulatory control. Once resolve is restored to the regulatory agencies, much of the expediency will begin to disappear. Once industry is again required to conduct all appropriate and reasonable environmental investigations and associated clean-up, consultants will be required to respond with appropriate professionalism and competitive costs, based not on rhetoric but on the ability of the consultant to perform a technically-sound, economically-prudent project. During the approaching transition away from the conditions present in the environmental industry today, the net result of the past few years may be the elimination of many of the excesses in the existing regulations. These come from the looseness of the earlier statutory language and only the U.S. Congress can tighten the language so that its intentions are clearly stated for direct federal and state regulatory implementation, not interpretation by the whims of a dynamic bureaucracy.

The prognosis in the short term is that of *business as usual*. As consolidations, mergers and acquisitions continue in the environmental field, only raw market factors of costs and prices will continue to prevail. Certainly with congressional clarifications of the environmental issues under consideration, industry, as a result of pressure from the state regulatory agencies, will get the message that *non-compliance* is not consistent with a green image, and certainly not with ISO 14000 aspirations. Only regulatory pressure will clear away the present fog of expediency so prevalent today in the environmental field.

Sooner or later, projects will again be conducted according to reasonable technical protocol by appropriately trained personnel, and continuing education and training

will be required and supported by consultants and industry. Striving to restore good science and less expedient engineering will make sense on an economic basis as well as an environmental basis. Until that time, let the litigation involving errors and omissions continue to flourish, absorbing corporate profits, distracting senior personnel, challenging the ethics of the technical employees, complicating marketing, and inhibiting the company's ability to prosper and grow. Maybe next year, or the next, we'll see improvements in the beleaguered environmental industry's reputation, technical procedures, regulatory compliance, and bottom-line performance.

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