parties. In the engineering community, deviations (from the cost estimate) of around 10 percent are probably acceptable, while deviations in excess of 33 percent will probably result in liability. The grey area between these two levels may result in liability judgements depending on the legitimacy of the engineer's legal case.

According to one source, in addressing the cost liability issue, engineers must obviously be extremely cautious in their cost preparations. This entails checking cost estimates with various sub-contractors and suppliers, reviewing actual costs of earlier projects, and maintaining records identifying the sources of all information reviewed. The precise project scope must be described, and any client requests and changes to this scope should be confirmed in writing. Where possible, contract language should also include a clause similar to "the only person who may rely upon an engineer's cost estimate is the client". Other recommended steps in this regard include: files of all documents should be maintained; approximate costs should be quoted where possible; written contracts or letters of agreement for small projects should be obtained detailing the services to be performed; construction procedures should be observed where possible; and close client contact should be maintained.

Insurance Costs for Engineers

Table 4 presents information from the journal *American Consulting Engineer* pertaining to engineering liability trends, deductibles and coverage. It indicates, for instance, that insurance costs represent about 4 percent of the average engineering firm's billings (and range from 1.4 percent for large U.S. firms to 6.3 percent for small firms). Small firms generally have deductibles of less than $5000 and coverage limits in the $250,000 to $1 million range, while large firms have deductibles exceeding $100,000 and coverage limits in the $1-10 million range.

It is estimated by one Canadian consulat official that "normal client practice" in the U.S. requires $1-3 million in liability insurance for any contractor on an environmental site.

Environmental Enforcement Capabilities are Increasing

It should be noted that environmental enforcement is increasing throughout the United States. Fines imposed in 1990 by the EPA totalled $US 91 million - these will continue to increase as the EPA augments its enforcement efforts. Over one-half of all EPA fines levied in its history have occurred during the past three years. It is estimated that the EPA will have 200 criminal investigators by 1995 compared to fewer than 50 in 1990. Fines of up to $25,000 per day, and jail terms up to two years, are among the arsenal which EPA has at its disposition. Felonies of knowingly releasing hazardous pollutants can be punished by up to 15 years in jail. Even minor