

Between a Rock and a Hard Place

By Christopher R. Head

This article is the fifth in a special six-part series examining technically-related contractual issues that can arise during development of privately financed hydroelectric projects. This article argues in favor of managing geological risk through collaboration rather than confrontation.

I know a number of very fine geologists, but none of them have X-ray eyes. When asked what the tunneling conditions are going to be like 300 meters below a hillside, they are happy to give an informed opinion, although, understandably, few would back this heavily with their own money. The issue of geological risk is a recurrent theme whenever the conversation turns to construction contracts for hydro projects. Quite simply, it is the biggest single indeterminate in the pricing of such works, and almost certainly the principal cause of contractual disputes.

The problem will not go away. Geological risk may be mitigated by thorough site investigation, but it cannot be eliminated. In consequence, the final cost of all hydro projects is uncertain until they are completed.

Of course, the final cost to the owner can be fixed in advance, but this simply means that the contractor is carrying all of the exposure. One might argue that this is what contractors are paid for, but only in proportion to their potential returns on the project. It is one thing to pay somebody to manage a risk he can control, but something entirely different when you ask him to assume a risk far beyond his control.

The first generation of private hydro developers sought to place all of the ground condition risk onto the turnkey contractor. In the course of this process, many fingers have been burned, both on the contractors' side and among the developers — and the lawyers are laughing all the way to the bank. Not surprisingly, most of the problems have occurred on underground works where contractors, faced with difficult ground conditions, have looked for savings on the cost of ground support and tunnel linings. Slope stability and

foundation preparation are other potential problem areas where, if the situation gets bad enough, the contractor will be forced to look for every means he can to mitigate his losses.

This situation also creates serious problems for the owner. The integrity of the project may be jeopardized if the works are skimmed but, furthermore, the owner is likely to be presented with a claim for additional costs and time extension. This is despite the fact that the contract was ostensibly on a fixed price, time-sure basis. If the owner loses on the principle of additional costs, he is likely to have to concede an extension of time, which means that in the event of late commissioning he is seriously exposed to loss of generating revenue without being able to recover liquidated damages from the contractor. In most cases, this is likely to be much more damaging than the additional costs incurred in overcoming the geological problem itself.

The key to managing geological risk obviously lies in site investigation, but unfortunately this activity increasingly is being pared down under commercial pressure to reduce front-end costs. If he is lucky, the contractor will have a reasonable amount of site data on which to base his bid, although there is still a school of thought that perversely argues that the less information he is given (by the owner), the better it is from the viewpoint of protecting the owner. Even then, the site data that is made available is likely to be on a "non-contractual" basis, so that if it is wrong there can be little redress for the contractor unless he can prove that the information provided was maliciously or negligently misleading.

In such a situation, pricing a job with a large ground-contact element becomes a lottery. The contractor either assumes the worst and probably prices himself out of the job, or he takes a more optimistic view and gambles on the fact that the geology will not throw up any nasty surprises. Neither approach is satisfactory. The contractor is, indeed, between a rock and a hard place!

Against this background, it is not surprising that people are looking for alternative approaches that reflect the growing view that geological risk is best tack-

led by collaboration rather than confrontation. The principal parties to this process must, of course, be the owner and the contractor, but in some cases the power purchaser may also be involved. Among the solutions currently being used, or actively considered, are:

- Contracts in which the civil works affected by ground conditions are paid on a quantities-related basis, possibly capped at an upper limit;
- Risk layering, where the parties to the contract, and sometimes insurers, assume exposure to cost overruns in a predefined order;
- Sharing of certain defined cost overruns on an agreed percentage basis; and
- The pass-through of geologically-related construction risks to the power purchaser.

An example of the latter can be found in the BOOT arrangements for private hydro development in Turkey. These contain a provision for increasing the allowable cost of the project, and therefore the tariff payable by TEAS, in the event of the revealed geology proving to be less favorable than the reference geology on which the works were originally priced. It is not clear to what extent this formula actually has been invoked in practice, but it forms the basis of the risk apportionment set out in the Concession Agreement on a number of Turkish projects, including the recently commissioned 672-MW Birecik scheme.

It is impracticable to consider the relative merits of each of these approaches in one brief article, and anyway it depends upon the particular circumstances. However, all of the approaches have a common feature, in that they require "open-book" accounting on the part of the contractor for the variable cost element. As soon as one moves into a cost-sharing regime, all parties concerned must be comfortable with the basis of costing and the way in which any variations will be valued. Probably this will ultimately manifest itself in a unit cost/quantities-related formula, but behind it will be the contractor's method statements and proposed resource allocations, which will need to be revealed.

It is clearly important to establish, and carefully document, the datum from which any price deviations will be measured. Without a datum, the process of apportioning cost variations is likely to get bogged down by arguments over original pricing assumptions. In addition to establishing the reference geology (which is what everybody believes to exist), it is also necessary to have a common understanding on the engineering

approach, such as the criteria for determining the length of steel liner, or the rock support measures to be provided for particular rock classifications.

If ground conditions are not as expected, the appropriate measures have to be agreed to by all the parties concerned. Therefore, the sharing of geological risk has the advantage of bringing the owner back into the design process when key decisions have to be taken during the course of the works. The contractual arrangement must motivate all parties to collaborate in a way that results in the most cost-effective, technically acceptable solution, instead of leaving the contractor (the one party with no long-term interest in the project) to wriggle out of the problem as best he can.

There are inevitable financing implications if the owner is to assume some of the geological risk, as he may need access to additional funding. The concept of contingent equity or mezzanine financing (involving a hybrid of debt and equity) is not new, but it has yet to be widely accepted as a solution to cost variations arising from geological risk. This is not because it cannot be done, but because developers and financiers are not attracted by the idea of a project having an uncertain end cost. However, in the case of hydro, past experience suggests that the alternative is even less attractive.

The sharing of geological risk is simply a recognition of two immutable facts: a) the risk cannot be avoided; and b) it is counterproductive to try to place all of the risk on the contractor. This leads to the conclusion that it would be more constructive to take a flexible approach, based on risk sharing and transparency of pricing. Remember that the corollary of accepting a formula for sharing cost overruns is that it can equally apply to cost savings. It then becomes a question of judgment as to where one pitches the starting price, in the knowledge that a sensible arrangement is likely to result in a less expensive project and more secure contract for all parties in the long run. ▲

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".. by signing the Contract, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works;"

— Extract from the International Federation of Consulting Engineers FIDIC Silver Book Conditions of Contract for EPC/Turnkey Contracts
