Environmental Issues in Mining and Petroleum Contracts

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Introduction

Environmental protection provisions in minerals and petroleum exploration and development (E & P) contracts substantially pre-date current fashionable concerns with environmental matters. Current concerns, however, serve to emphasis the issue and perhaps to accelerate the pace of constructive thought about it.

Mineral exploration and production activity inevitably causes substantial disturbance to the environment and brings with it the risk of major pollution hazards. Mining and Petroleum Laws and mineral investment agreements have for many years contained environmental protection provisions and much experience has been gained. Nevertheless, environmental standards change and environmental awareness currently stands at one of its periodic peaks. One of the reasons why mining and petroleum companies are once again appraising prospects in recently neglected developing countries may be that the 'environmental risk' that they perceive (in the sense of the risk that new and more stringent environmental standards may be imposed, or that a company may be forced to accept an unanticipated liability for environmental damage, directly or indirectly caused) is lower than it is in traditional mineral industry locations such as Canada, Australia or the USA.[2]

Environmental problems occur at two broad levels. There are those which involve the 'global commons' — the ozone layer, the state of the oceans or tropical rain forests — and those which affect the local habitat of humans, flora and fauna. Most environmental problems in exploration for and production of crude minerals (though not necessarily in mineral processing) occur in the second category.

Mining and petroleum operations are, by their very nature, a significant disturbance of the local environment. Exploration activity alone can cause extensive damage (especially to vegetation). Development activity in either mining or petroleum entails a major industrial construction project; in mining it also commonly entails the stripping, and storage or disposal, of large tonnages of overburden to expose mineable ore. Production operations require disposal (in mining) of waste, tailings and re-agents. Both industries pose significant, but usually avoidable, environmental hazards: well blow-outs, failures of tailings dams or leakages of toxic wastes, for example.

These operations are carried on in the knowledge that significant, and costly, environmental protection measures will nearly always be needed, and that one party or another will, explicitly or implicitly, assume the risk of liability for accidents or other sources of unexpected environmental trauma.

Heightened concern about environmental risks coincides with a period of rapid liberalisation in developing countries and former centrally-planned economies. The success of this liberalisation is, in large measure, predicated upon accelerated inflows of direct foreign investment and the loan capital it can marshal. Countries with promising geology for discovery of mineral or hydrocarbon resources are re-emphasising the requirement for private foreign investment in these sectors.

Environmental policy issues fall into three distinct categories. First, there are issues concerned with the operational management of mines, oilfields and plant facilities, where the concern will be to prevent or limit environmental damage arising from normal operations. Second, there are issues related to the possibility that there will be an environmental trauma, catastrophe or accident. Here the problems are the degree of assumption of risk by investors and government respectively, the circumstances in which each party will be liable for damage to the environment and the limits of that liability. The issues in this category give rise to difficult questions of law and may involve considering causation — the most elusive topic in English common law.[3] Third, there is a special set of problems surrounding the reclamation of land affected by mining when operations cease, and the safe abandonment or removal of plant, equipment or structures that have no further use but constitute a

[1] With acknowledgement to Alyson Warhurst for helpful discussions and the formulation of some of the ideas which form the economic background to this note [Warhurst 1991]. Philip Daniel also acknowledges the opportunity to consider these issues afforded by his collaboration with the World Bank on an Africa Mining Policy Study. The authors alone are responsible for the views expressed.

[2] See Crowson, P., 1991, 'Foreign investment in natural resources: a one-way pendulum?', *IDS Bulletin*, Vol.22, No. 2 April.

[3] Hart, H. L. A. and Honoré, 1985. *Causation in the Law*, 2nd edition, Clarendon Press, Oxford.

potential hazard (such as offshore oil and gas platforms).

Trade-offs in Environmental Protection

A switch of mineral investment to developing countries in search of lower costs of compliance with environmental regulation or lower risk of contingent environmental liability implies a view of mineral production in which reduced production costs per unit of output tend to mean increased environmental costs. In other words, the mining industry is viewed as a 'consumer' of environmental services for which others pay — the government, or those who suffer the effects of pollution. If the costs of environmental use by the minerals industry are 'internalised' (borne by the producing company) then, on this view, fewer projects are economic and the industry is less profitable overall.

An alternative view[4] suggests that environmental regulation in OECD countries with mineral industries (especially the USA, Canada and Australia) has provided a sharp stimulus to innovation in environmental protection technology for the mining and petroleum industries. This technology then becomes 'embodied' in the investment package which substantial international mining companies bring to exploration and development in developing countries. On this view, it frequently pays companies to innovate, or otherwise acquire new technology in order to improve the trade-off between environmental damage (costs) per unit of output and production costs per unit of output.[5]

This alternative view of the trade-off leads to the proposition that production efficiency is a necessary condition for achievement of best practice in environmental protection. Among the different categories of mineral producers it seems likely that large international mining companies achieve environmental best practice more frequently than small-scale and artisanal miners or state mineral enterprises in developing countries. Small-scale miners lack both the resources and the technical knowledge (and also have limited incentive) to deploy the best available techniques for combined productive and environmental efficiency: hence, for example, the high-grading of surface gold deposits and excess discharge of mercury from gold recovery activity. State mineral enterprises (as in Zambia and Zaire) emerged from the nationalisation of privately-owned firms, where techniques of production were already embodied in large historical capital investment. Resources for subsequent re-investment have been scarce and so facilities now tend to be less efficient than they could from both environmental and productive efficiency viewpoints.

The petroleum industry is probably more homogeneous with respect to exploration and production technology, and perhaps also with respect to environmental practices — though in E & P operations the largest companies appear to employ the more comprehensive and rigorous procedures. Oil companies of all sizes face the major risk of a well-publicised catastrophe such as the events of Piper Alpha or the Exxon Valdez.

In general, it is likely that the promotion of foreign private investment in the mineral industries of developing countries will now tend to improve environmental protection practices in addition to the direct economic benefits it can bring. Whether this in fact happens depends, in part, on industry expectations about future environmental regulation in the region and upon the kind of environmental risk-sharing provisions that evolve in mining and petroleum agreements. The greater is international awareness about environmental protection requirements the more likely it is that improvements in the trade-off between environmental costs and production costs will be sought by innovation or acquisition of new, 'best practice' technology.

There have been fears that governments might compete to provide 'pollution havens' — providing less onerous environmental obligations or regulations to investors than they might find elsewhere. These fears reflect the view that environmental protection imposes an additional cost which must lower either profitability or tax receipts, or both. This is more likely to be the case for existing operations than for new investments. The fiscal arrangements in place will certainly affect the incentive both to innovate and to undertake environmental protection measures. Where a modern, profit-related regime is in place an investor can expect the state to meet, through tax deductibility, perhaps two-thirds of the protection cost in a profitable mine and substantially more in the case of an oilfield (as a result of the generally higher marginal rate of taxation on successful petroleum ventures).

Regulation or Incentives?

Environmental legislation in both industrial and developing countries has, until recently, tended to rely on 'command and control' (CAC) policy approaches. Typically, these involve the setting of an emission or effluent standard and requiring a specified type of technological addition to achieve the standard. For example, a specific type of smelter might be required to fit a specific type of flue-gas scrubber to achieve a prescribed ambient air quality standard. In Papua

[4] Warhurst, Alyson, April 1991, *Environmental Degradation from Mining and Mineral Processing in Developing Countries: Corporate Responses and National Policies*, Science Policy Research Unit, University of Sussex, (processed).

[5] Examples of this kind of innovation are available in Alyson Warhurst's report.

New Guinea, the Ok Tedi mine was originally required to limit its deposition of incompetent waste rock into the river system to a specified tonnage and to construct a retention system for any excess.

These CAC measures stand in contrast to market-based instruments (MBI). CAC regulations limit the freedom of the operator to determine the appropriate technology to achieve a given environmental outcome. MBIs are designed to remedy market failures or create markets where none exist, instead of substituting government regulation, and thus might permit more economically efficient solutions to environmental problems. Much current debate concerns the relative costs and effectiveness of contrasting CAC and MBI approaches.

MBIs are of two types: price-based and quantity-based. Pollution taxes or deposit-refund systems fall into the price-based category, while tradable pollution rights or marketable permits to emit or discharge would belong in the quantity-based category.[6]

Experience with MBIs in the developing world, and especially in Africa, is very limited. It is difficult, at present, to see much scope for quantity-based MBIs relevant to the minerals industry in Africa. There may be more opportunity for price-based MBIs, though initially these are unlikely to extend much beyond a generalised taxation incentive to undertake environmental protection measures of the kind inherent in a profits-based tax regime. One necessary measure to make the tax incentive effective is to designate environmental protection expenditure as allowable or deductible expenditures in tax laws and the accounting procedures of E & P agreements.

This, however, immediately raises the issue of how necessary and legitimate environmental expenditures are to be assessed. At first sight, the establishment of general standards to which all operators must comply is attractive if there are to be CAC measures at all. The problem here is that relevant standards for mining tend to be location-specific and project-specific; emission and pollution standards are also changing rapidly over time as public tolerance alters and as new preventive technologies are developed and made economically feasible. Despite the potential of project-specific CACs to give rise to investor uncertainty or the development of corrupt practices there seems to be little alternative but to establish transparent **procedures** by which the environmental standards applicable to particular projects can be set, monitored and, where disputes arise, adjudicated.

At the development stage of any mining or petroleum project consideration of environmental issues will always take place. However, in many — perhaps most — developing countries, there is no existing network of statutory requirements confronting the operator. Provisions designed to prevent or limit environmental damage are project-specific and will have a consensual dimension. Environmental issues provide one of many reasons why it is unreal and simplistic to aim at a legal/fiscal regime for major minerals activity which is fixed and has no discretionary element.

Characteristically, a mining or petroleum code or E & P agreement will have a provision requiring the preparation of a development plan when commerciality has been established and a company is seeking long term rights in a lease or production licence. Normally the development plan or company 'proposals' will require approval by government before lease or licence is issued.

What should happen if there is disagreement? Should government be prepared to go to arbitration or submit the dispute to a binding determination by a third party expert? Where the issues are concerned with technical questions relating to the way operations should be carried on — cut-off grades, production profiles, infrastructure design and utilisation — governments in most developing countries are now prepared to agree to dispute settlement provisions involving international arbitration or expert determination. This affords considerable reassurance to prospective investors and is clearly an important element in a modern mining or petroleum code.

If the dispute preventing agreement on the Development Plan is about environmental management should governments be prepared to accept arbitration or expert determination? At the development plan stage companies may have spent very large amounts on exploration and feasibility studies and could stand to lose these expenditures if government imposed unreasonable or arbitrary requirements which were not consistent with the economics of the project. (This kind of problem is more acute where after development government seeks to impose new standards or introduce new requirements. At that stage sums at stake may exceed a billion dollars and bankers as well as investors are concerned — see below.)

The problem for companies is very obvious, but how should governments respond? Would it be right or, indeed, feasible politically, for governments to allow foreigners to decide on issues which may involve for its own people balancing the advantage of increased revenue from a mining project against the disadvantage of environmental damage?

Some distinctions may help in the context of that problem. If standards have, in a particular context, been established by government and accepted by the investor (e.g. the acceptable level of suspended particulate matter in a river system resulting from mining operations), there should be no real objection

[6] The description of CAC and MBI at the beginning of this section draws substantially on the contribution by D. O'Connor, Chapter 5, Section 2, in Alyson Warhurst, op. cit.

to expert determination if there is dispute about whether proposals in a development plan are adequate to ensure compliance with the established standard. On the other hand, the situation is quite different if the dispute is about what standard should be established. In that case the issue is how much damage to local interests should be permitted for the sake of a profitable mining project from which the government will derive much needed revenues. That judgement is fundamentally a national one, though obviously constrained by the need to attract investment and develop the project in question.

The distinction referred to above is embodied in the provisions of the Ok Tedi 6th Supplemental Agreement, Papua New Guinea. The Company agreed to undertake an environmental study to determine the impact that the mining operations of the company 'have had and are likely to have on the River System'. The Government undertook on the basis of that study to establish (unilaterally) 'the Acceptable Particulate Level'. Although the decision was the Government's, the Government agreed to follow certain criteria set forth in the 6th Supplemental Agreement.[7]

Once the 'Acceptable Particulate Level' had been established by the Government the Supplemental Agreement went on to deal with the possibility that a dispute might arise about whether 'facilities' proposed by the company were or were not adequate to ensure compliance with the 'Acceptable Particulate Level'. In the event of such a dispute the Government and the Company agreed on reference to an Environmental Expert.

The issue dealt with in the Ok Tedi Supplemental Agreement did not arise at the stage where the company was first seeking approval for its development proposals. They arose later when the Company wished to modify its original proposals. How to deal with 'change' whether at the instance of the Company or of the Government raises difficult questions. Governments may wish to make changes in an environmental plan previously agreed because:

(i) It may have decided over a period of time that stricter standards should apply;

(ii) New scientific data may have become available showing the existence of dangers or deleterious consequences not previously known about;

(iii) Some unforeseen physical events or dimensions may have become apparent in the project itself.

These and some others are reasons why the Government will be unwilling to fix environmental standards irrevocably at any particular point in the life of the project.

For investors the prospect of Government changing the rules of the environmental game after their investment is in place is alarming. A major mine may cost as much as a billion dollars and, however large the players, a substantial part of the capital is likely to be borrowed and secured (inter alia) on the project. That means that banks as well as mining and oil companies are interested in the issue. If there is drastic change in the rules of the game after the investment is in place the economic assumptions on which the decision to develop was taken may be falsified. That, of course, is an old problem in terms of the fiscal regime, but one which is largely solved by the development of more flexible fiscal arrangements. In the context of environmental controls the issue is more intractable.

Some companies have tried to seek a special status for their approved environmental plan such that their project will be exempted from any future environmental laws or regulation, or government actions, that would change the basis upon which the project was to be developed and operated from that envisaged in the approved development plan.

Few governments would accept such an arrangement and companies do not, realistically, expect it. However, there is a genuine problem and no obvious solution. If in the event some form of arbitration or expert determination is the only way home it might help if:

(i) Under international auspices (such as those of the United Nations) there was established a new Centre for Settlement of Environmental Disputes between governments and foreign investors which would try to develop acceptable ground rules to take account of the inherent conflict of interest.

(ii) In the agreements providing for dispute settlement detailed criteria for arbitrators or experts were set out similar to the criteria in the Ok Tedi 6th Supplemental Agreement.

In this way, there could be an equitable evolution of general environmental standards while sufficient scope is left for project-specific arrangements and for the revision of arrangements. The general requirement on major investors would be for an environmental impact study as part of the feasibility study, from which an environmental plan would emerge. This plan would form the basis of subsequent action: government requirements in respect of it and variations of it initiated by either party would be subject to agreed criteria, compliance with which would be settled, in the event of dispute, by some acceptable system of arbitration or expert determination.

Environmental Risk-Sharing

In establishing mining and petroleum policy and in negotiations with companies, environmental provisions entail establishing the limits of risks to be assumed and how they are to be shared. In this sense,

[7] Ok Tedi, Sixth Supplemental Agreement, p.19, Clause 8.

the problem is analogous to that faced in structuring financial responsibility for a project. Pollution risk insurance appears to be difficult to obtain and so the route of converting the cost of risk-bearing into an explicit operating charge is not readily available (though there are still important questions about what risks can and should be insured, and who should be responsible for insuring against them). The issue is then one of the degree of precautionary measures that have to be taken and whether company liability for unforeseen environmental damage is limited. Most companies will wish to limit this liability, whereas governments will usually argue that it is not in the public interest to do so. The limitation of liability frequently turns on whether the mining operation can be held to be the 'proximate cause' of environmental damage.

In some mining and petroleum agreements, and in certain environmental codes, governments retain powers to suspend operations that they consider environmentally damaging. Clearly, the existence of a unilateral power of this sort greatly increases perceived risk to the investor. Nevertheless, through the fiscal system, government and company in effect share this risk and have a mutual interest in devising procedures (such as those outlined in the previous section) for ensuring that suspension powers do not have to be used. Most modern agreements also contain provisions requiring companies to take prompt measures to deal with emergencies and defining expenditure on such emergencies as allowable for tax purposes. Conversely, remedial expenditure by government is often made recoverable from the company, though it is difficult to see how the recovery can be made easily enforceable.

In the present international climate, companies investing in the developing world come under considerable pressures from their shareholders, home country governments, lenders and public opinion in general to assume environmental responsibility and take a sophisticated level of environmental protection measures. This climate of opinion is probably more effective than almost any regulatory measures, but governments can make effective use of it by having transparent procedures for preparation of environmental plans, monitoring of conformity with them and settling disputes that may arise.

Environmental Compensation and Reclamation Schemes

Since much of the environmental damage from exploration and production operations in minerals is specific and local, the population immediately affected is often identifiable and can, in turn, identify the cause of damage to the environment they use. As has happened prominently in the Pacific region, this leads to compensation claims which can be disruptive of mining operations unless procedures and funds for settlement are promptly put in place. Such claims raise the further problem, for governments, that they increase production costs and reduce taxable profits. Once again, both governments and companies have a mutual interest in a satisfactory arrangement for settlement of local environmental damage claims.

The endowment of a fund for the purpose is a possible device. The decisions on payments from a compensation fund need to be made by persons independent of the claimants and the companies, or else negotiations between the parties need to be supported by an arbitration procedure.

Reclamation of exhausted minesites raises related issues. The first problem is the setting of reclamation standards. The reinstatement of mining land as it was before mining commenced is frequently impracticable and, even if technically feasible is likely to be prohibitively expensive. The alternative is to rehabilitate the land to a standard set by reference to feasible future use.

Since, by definition, a project will have no cash flow after exhaustion, the costs of reclamation have to be met either by charges on other operations of the company concerned or by some other arrangement for sharing of the burden between company and government. This is a problem in fiscal arrangements which also arises as the 'abandonment' issue for offshore petroleum installations.

There are three possible ways to approach provision for reclamation or abandonment costs. All of them will require a costed and approved reclamation or abandonment plan. The first is to allow the company to make tax-deductible provisions. This route is a problem for jurisdictions observing English tax law, since deductions cannot normally be taken until actual expenditures are made. The funds provided would in any case remain exclusively under the control of the companies. Second, a reclamation fund, under independent or joint control, could be built up, perhaps by company tax-deductible contributions in proportion to estimated depletion of the ore reserve or hydrocarbon reservoir. Third (by analogy with arrangements for petroleum in the Norwegian sector of the North Sea), government and company could fund agreed reclamation and abandonment expenditures in proportion to the shares of cash flow they have derived from the mine or oilfield in question. Fourth, as is allowed in the USA, a carry-back of tax losses could be introduced to allow companies to reclaim reclamation expenditures against past tax payments. The obvious difficulty with both third and fourth options is that they require governments to provide, in effect, lump sum grants towards reclamation. In the present state of public finances in many developing countries this is probably unrealistic; accordingly, the independent reclamation fund device is probably worth exploring in circumstances where the issue is likely to be important.