Mining and National Parks

by

John P Trudinger
Director, Mining Services
Dames & Moore
(a subsidiary of URS Corporation)

and

Thomas C Pool
Vice President - Engineering
Nuclear Fuels Corporation
(an affiliate of General Atomics)

BACKGROUND

The areas available for exploration and mining have been substantially reduced as a result of the development of National Parks and other reserves for conservation of ecosystems and/or other natural or man-made values.

National Parks have been in existence since the 19th-century. The increase in environmental consciousness that occurred around 1970 led to a marked increase in the numbers of National Parks in both the developed and developing countries. The rate of establishment of new Parks has slowed in the 1990s, except for marine parks, and it is unlikely that many new National Parks will be established in the foreseeable future. Nevertheless the trend continues for further restrictions to exploration and mining, not only in National Parks, but on operations outside Park boundaries. This trend is fostered by an increase in environmental awareness, and the growing eco-tourism movement. It is fed by a media that delights in controversy and confrontation, regardless of the merits of the case. A current example is the controversy over barge transportation of concentrates within the Great Slave Lake, several hundred kilometres from the park boundary, but crossing the main water access to the Park. Thus, with cases such as these, opponents to mining, have succeeded in expanding the halo of protection well beyond park boundaries.

National Parks differ widely in terms of their purpose, size, usage, and management. Also, in most countries, there are a number of levels of conservation and types of reserves. Not all National Parks are administered at the national level. In some countries such as Australia, National Parks are established, administered, and managed by provincial, state, or territory governments. Given a large number of entities involved and differences in geography, is not surprising that there is considerable variation in the degree of protection afforded by National Park listing, and consequently, on the land uses that are permitted or tolerated within National Park boundaries. While protection of habitats and ecosystems is the primary objective for most National Parks, this is not always the case. Tourism is an important raison d'etre for many Parks. However, there are others that are rarely visited, or where tourism is tightly controlled, or even discouraged.

While many governments embrace the concept of " multiple land use "in National Parks, most do not include mining among the permissible uses. One exception is the state government of Western Australia, which "allows access for exploration and mining onto all classes of reserve land including National Park"(Batini,1997). This, of course, does not mean that any mining proposal involving a National Park would be permissible in Western Australia. In fact some such proposals have been accepted while others have been rejected.

PROPOSITION

This paper puts forward the proposition that mining and National Parks should no longer be considered to be incompatible, and that therefore, regulatory authorities who have not already done so should consider including exploration and mining among land uses that can be permitted, albeit under very stringent controls. Clearly, this would represent a major change of direction for many governments, would be very actively campaigned against by conservation groups, and would not be readily accepted by the public at large in many countries. So why reopen this argument which has, in many countries, been closed for decades? Apart from the purely economic argument that the industry might put forward, there is a strong case to be made that the interests of conservation may well be served if mining is allowed to proceed in or adjacent to National Parks. The Western Australian experience seems to support this view.

A necessary requirement if National Parks are to benefit from mining, is that the company will co-operate with regulatory authorities not only in mitigating impacts, but in other ways by enhancing environmental management and improving environmental attributes. Again, experience in Western Australia indicates that the industry does this willingly to produce " win- win " situations(Batini,1997; Stoddart & Batini, 1999). The identification and investigation of alternatives is a key aspect in developing the Win-Win solution.

ISSUES

Core Values

Most National Parks contain one or more core areas in which the main values are contained. These values may be biological, geological, cultural, scenic, or commonly a combination of more than one of these attributes. This paper does not advocate any disturbance that would directly or indirectly affect core values, except in the case of scenic values where some temporary effect may occur.

Buffer Zones

Normally, National Park boundaries enclose an area much larger than the core areas. The intervening and surrounding areas represent the buffer zone which is often considered to be necessary to protect the core values from external influences. In particular, the presence of a buffer zone enables the managing authority to carefully control land uses and activities that might otherwise encroach on and adversely effect core values. Clearly, mining would need to be subject to very stringent controls, if it was to be permitted within the buffer zone.

Commonly, for historical reasons, Park boundaries may be less than optimal. Parcels of land acquired to create a National Park usually comprise tracts with more or less arbitrary boundaries. This can mean that in some instances, the buffer zone may be wider than necessary, in which case there may be absolutely no loss of amenity if part of the excess was to be excised for the purpose of mining. In other instances, the buffer zone may be inadequate. In such a case the proponent may contribute financially to the acquisition of land that will more than compensate for the land to be mined. Such an outcome was negotiated in Western Australia for the Marandoo Iron Project, located within the boundaries of Hamersley National Park.

Clearly, some environments are much more sensitive than others, and accordingly are less able to tolerate pressure from whatever source. In such sensitive environments, wider buffer zones are usually provided. Given an adequate buffer zone there is no reason why mining should not be permitted close to but outside the Park boundaries, subject only to normal environmental impact assessment procedures. Yet, conservation groups are increasingly using " proximity to National Parks " as a reason to prohibit mining.

Existing Threats

In any consideration of mining within National Parks, it is necessary to consider the external and internal pressures to which the areas are already subject. The most obvious of these is usually tourism, although grazing, abstraction of water, the presence of weeds and/or feral animals, and even air pollution may be equally detrimen-

tal, depending on the circumstances. Management plans have been formulated for most National Parks to minimise these pressures and to remediate degraded areas. However most managing authorities complain that funds available for management are generally inadequate. Again, financial assistance from mining companies may be the only practical way that sufficient funds become available, and by providing these funds, companies may more than offset the adverse effects of mining.

Perception Versus Reality

Arguably, the main barrier to be overcome if a new approach is to be taken to mining in National Parks, is to overcome public perceptions, particularly misconceptions based on environmental damage from past mining practices before the advent of responsible environmental management. The fact is that, in a wide range of circumstances, the industry is now capable of:

- Minimising and containing potentially harmful emissions and effluents such that there is no offsite contamination, and
- Reclaiming disturbed areas to a standard consistent with inclusion in a National Park.

Unfortunately, this is not recognised by the public which is still being fed press reports, after overblown, of damaging incidents such as the Summitville event in Colorado or the Marcopper incident in the Philippines. Realistically, before significant changes to National Park legislation can be expected, the industry will need to do a much better job of communicating its successes.

REQUIREMENTS

If exploration and mining are to be allowed in National Parks, proponents will lead to comply with exacting requirements, including quite onerous levels of scrutiny and oversight from a sceptical, if not hostile community.

Preservation of Core Values

A fundamental requirement if exploration and mining are to be permitted, is that there be no threat to the core values of the National Park. This of course requires that the core values are recognised and agreed upon. National Parks commonly include a wide variety of attributes, and management programmes seek to maintain and enhance all positive attributes, regardless of whether they represent core values. Generally, the core attributes are those that were cited in the original listing of the National Park. Clearly, as part of the permitting process, it will be necessary for the proponent to demonstrate that his actions will not effect or threaten these values.

Minimisation of Short Term Impacts

Mining cannot be carried out without causing adverse impacts. In order to be accepted, exploration and mining activities in National Parks will be required to adhere to extreme limitations in terms of the areas occupied (the project's "footprint") and containment or treatment of effluents.

Restoration To Avoid Long Term Impacts

In all probability, proponents seeking to explore and/or mine in a National Park, will be required to demonstrate "zero residual impact". Accordingly, all areas that have been directly or indirectly disturbed by mining or associated operations must be reclaimed, meaning in most cases that there can be no final voids. This does not mean that all disturbed areas need to be restored immediately to their original condition. This is not possible, but neither is it necessary. Reclamation needs only to create a result that is consistent with the values of the National Park. This means that any new landforms are congruent with surrounding landforms and that soils are comparable to those that occur naturally, in terms of their physical and chemical characteristics. It also means that only local species are used in revegetation, and in many cases that local provenances are preserved. Given these conditions, natural succession will eventually result in restoration of all components of the original eco-system. This requires that proponents make a commitment to ongoing management extending well beyond completion of mining activities.

Compensation

Recognising that even with the most stringent management practices, exploration and mining activities cannot be undertaken without adverse impact, mining companies seeking to operate in National Parks will be expected to pay or make compensation that is commensurate with the perceived impacts. The most appropriate forms of compensation are those that further the aims or enhance the values of the National Park. These include remediation of areas contaminated by historic mining activities, land swaps, weed eradication programmes, fencing to exclude livestock and, in some cases, provision of tourist infrastructure.

OPERATIONAL CONSIDERATIONS

Exploration and Mining Methods

In general, exploration and mining methods utilised in National Parks will be those that are least intrusive. In exploration this is likely to mean the use of man portable drilling rigs, a prohibition on clearing of vegetation, back-filling of boreholes , and even removal of drill cuttings if these contain sulphide minerals. For mining, underground methods would be favoured. Large, deep open pits are unlikely to be acceptable. Shallow surface mining that enables progressive back-filling could also be acceptable. If operations lead to the production of potentially acid generating materials, these materials would need to be returned to the mined-out area and capped or saturated to avoid acid formation.

Total Containment

The concept of "total containment" of wastes, particularly liquid effluents, has been around for a long time. However, in practice this has been very difficult to achieve, particularly given the changes in water budget that occur over the life of a mine, and the variation in climatic conditions. Nevertheless, total containment is likely to be a requirement for mining in National Parks. This may require innovative means of volume reduction such as the use of waste heat or enhanced evapo-transpiration.

Offsite Processing

One means of minimising the effects of mining in National Parks is to remove the ore for offsite processing. In combination with underground mining, this approach leads to a very small site footprint that is readily reclaimed, and also facilitates achievement of total containment and zero contamination beyond the mine limits. An example of the successful use of this approach is the Orphan Uranium Mine which operated within the boundaries of the Grand Canyon National Park, close to Park headquarters. Far from being incompatible with National Park values, remnants of the mine constitute an attraction in their own right and have recently been designated as a National Historic Landmark.

Financial and Regulatory Provisions

Observance of the stringent standards advocated in this paper will lead to higher than normal operating costs. It is therefore inappropriate for mining of marginally economic orebodies to take place in National Parks. Realistically, only the most robust projects should be considered. Similarly, the mining company involved needs to have both a strong balance sheet and a proven record for responsible environmental management. Also, adequate funds should be set aside at the outset of the project, to ensure that all environmental commitments can be achieved whether or not the company survives or the project proceeds to completion.

EXAMPLES

To the authors' knowledge there has been no worldwide survey of mining in National Parks; however, there are many examples, including some that are quite recent. Focussing only on the small sub-set of National Parks that are also listed as World Heritage sites, Thorsell & Sigaty (1998) have prepared lists of sites, supposedly at risk from one or more human activities. For OECD countries the sites for which mining is noted as a threat, and the corresponding notations are:

- Great Barrier Reef, Australia = "oil shale extraction being considered".
- Fraser Island, Australia - "(in past)".
- Nahanni, Canada - "Mining in buffer".
- Canadian Rocky Mountain Parks - "Open-pit coal mine proposed 5km from boundary".
- Whale Sanctuary of El Vizcalno, Mexico - "Salt extraction".

Examination of the list reveals several inconsistencies, among which are:

- Salt extraction is noted for El Vizcalno but not for Shark Bay, Australia.
- Past mining is noted for Fraser Island, Australia but not for Grand Canyon, U.S.A. or Great Smoky Mountains, U.S.A.
- Mining in buffer is noted for Nahanni, Canada but not for Kakadu, Australia or Yellowstone, U.S.A.

The situation with the non-OECD list appears similarly inconsistent. Many of the entries appear to be relatively minor, for example "gold prospecting", "quarry mining" and "gems-illegal". Three examples illustrating points made previously in this paper, are discussed below.

Antamina

Antamina is a major copper - zinc deposit located in the Peruvian Andes 480km northeast of Lima at altitude of 4200 metres. As a joint venture between Noranda, Teck and Rio Algom, the project is expected to produce more than 270,000 metric tons of copper and 80,000 metric tons of zinc per year for approximately 20 years beginning in 2002. Transportation of concentrates to the coast, some 130 km from the mine, poses a significant logistical problem for the developers.

Huascaran National Park, a World Heritage site, stands directly between Antamina and the port of Huarmey, the proposed outlet for concentrates and a major staging point for operating supplies and equipment. A road bisecting the Park is currently in use for transportation of copper concentrates from a small mine and offers the most direct route to the coast. Truck haulage of concentrates was incorporated into the initial operating plan. Such haulage would have put a 42 ton haulage truck on the Park Road every three minutes.

During the process of environmental analysis connected with the project development and project financing, concerns were raised about the impact of the transportation corridor on the Park. A concentrate pipeline through the corridor was then considered as an alternative to truck haulage of concentrates. Still, supplies and equipment would be inbound through the corridor. A further study of alternatives identified several potential routes to the south which would bypass the Park altogether. Ultimately, one of these routes was selected for both truck haulage of supplies and pipeline transportation of concentrates, even though the total distance traversed was substantially in excess of the initial proposal and some 70 km of new road through the Andes was required.

This consideration for the environmental values of Huascaran National Park resulted in the World Heritage committee citing Antamina as "a model for reconciling environment and development needs".

New World Mine

Few mining operations in the world have generated as much opposition as a proposed 1,200 short tons per day underground gold - copper - silver mine located 4 km from the north-east entrance of Yellowstone National Park. Situated in an old mining district on a major drainage divide, the New World mine would not have been visible from the Park. It would have utilised a gravity concentration process to generate about 5.5 million tons of tailings to be stored in a 77 acre pond. It was the acid generating potential of these tailings that was seen by unbiased observers as the key element in the licensing process.

Opposition began locally, based on unfounded fears that an open pit mine would be developed, with processing using cyanide in a vat leaching process. Accusations and misinformation flowed freely. Included in these accusations was a notion that Yellowstone's world-famous geysers would be impacted by the operation; the nearest is 70 km away. The US National Park Service voiced its concern on several other issues including:

. Disturbance of wildlife habitats
. Loss of scenic and recreational values
. Noise
. Degradation of air quality
. Socio-economic issues, and
. Cumulative impacts

A number of celebrities and politicians, led by President Bill Clinton, became involved in the controversy and gained additional press coverage as a result. Objective opinions remain unpublished, but all agree that misinformation coupled with personality conflicts and media hype pushed the potential for meaningful dialogue to the vanishing point. At the instigation of federal authorities Yellowstone National Park was listed by the World Heritage Committee on the World Heritage in Danger List.

More than six years of permitting effort and controversy ended in 1996 when President Clinton announced that a settlement had been reached and that the federal government would, in essence, purchase the site for about US$42.5 million. Considering the amounts spent on predevelopment activities, $33.3, million and on settlement of the dispute, $5.4 million, the company's after-tax net amounted to $2.5 million.

Ranger Uranium Mine

The Ranger Uranium Mine has operated since 1980 in the Alligator Rivers region of northern Australia, one of Australia's major mineral provinces and one in which mining had taken place over many decades. The Australian government's decision to permit mining at Ranger followed an extended and detailed government inquiry. Extremely stringent conditions were placed on the proponent, and the government established a site supervising authority to provide detailed oversight of mining and processing activities. Concurrently with planning for the mining activities, Stage 1 of the Kakadu National Park was proclaimed. Three areas were excluded from this Park, one for the Ranger mineral lease, and the others for other prospective mineral leases including one for the prospective Jabiluka Uranium Project. The areas excluded from the Park do not contain the spectacular scenery, Aboriginal sites or important ecological values for which the Park is famous. In 1981, Kakadu National Park Stage 1 was inscribed on the World Heritage list. In subsequent years, two large additional tracts of land were added to Kakadu National Park, and later to the World Heritage listing.

The Ranger operations are now well advanced. The first of two open pits has been mined out, and is currently being back-filled with tailings dredged from the tailings impoundment. Progressive rehabilitation of waste rock disposal areas is well underway, producing landforms and vegetation communities that already blend well with the surroundings. Despite recurring problems with excess water, the objective of total containment has been achieved. It is already evident that E.R.A., the proponent, will be successful in achieving complete reclamation of all disturbed areas to a condition suited to ultimate re-inclusion of the mineral lease into Kakadu National Park.

Despite the demonstrable success of environmental management at Ranger, there was (and continues). widespread opposition when E.R.A. proposed to develop the nearby Jabiluka Uranium Project. This is in spite of the fact that development of Jabiluka was foreshadowed at each of the 3 stages in development of Kakadu National Park and at each stage of World Heritage listing This underground mine has a very small footprint, much smaller than that of Ranger or , indeed , of any other mine of comparable value. Following a brief site visit, the World Heritage Committee gave notice of their intention to place Kakadu National Park on the World Heritage In Danger list, citing a variety of environmental and social concerns. It was only after considerable diplomatic activity and the preparation of extremely detailed rebuttals to each of the technical concerns, that the Committee was persuaded to reverse its decision.

CONCLUSIONS

Environmental management has now reached the stage at which it is reasonable to reconsider the ban on mining in National Parks, particularly in those cases where a distinct " win - win" outcome can be assured. Not all mining projects would be acceptable and those projects that are permitted would be required to commit to the most stringent environmental standards and closest scrutiny. Conservation stands to benefit if selected mining operations that meet the acceptability criteria are permitted to proceed. Particularly in the case of the more remote Parks where lack of visitor usage usually means insufficient funding for management, mining may provide the only source of additional funding.

References

BATINI, F, 1997
Multiple and Sequential Use - A Land Manager's Viewpoint on Mining and Conservation. Proceedings 22nd Annual Minerals Council of Australia Environmental Workshop, October 1997, Adelaide, South Australia.

STODDART, J.A. and BATINI, F, 1999
The role of non-traditional reserves in reconciling biodiversity and regional development. Proceedings 24th Annual Minerals Council of Australia Environmental Workshop, October 1999, Townsville, Queensland.

THORSELL, J and SIGATY, T, 1997
Human use of World Heritage natural sites, a global overview. A contribution to the Global Theme Study of World Heritage Natural Sites. Natural Heritage Program, IUCN, Gland, Switzerland.