Public's Lack of Science Knowledge Affects Mining (Newsletter)*

April 22, 2008

Scientific knowledge, understanding, and insight seem to have fallen from favor. Some see such knowledge as elitist and something that should be avoided. This attitude produces problems for society in general and mining companies in particular. Two examples of this knowledge void involve the precautionary principle and biodiversity.

The precautionary principle arose from poor understanding of risks and their management. The most common definition of the principle applies to an action perceived as potentially harming the public or the natural environment. If there is no scientific evidence that harm would not occur, the action should be forbidden until those who advocate for it can prove no harm. There are too many fallacies with this principle to cover in a short newsletter, but two are summarized.

First, it is impossible to prove a negative. Natural systems are so dynamic and variable that scientists cannot "prove" that a proposed action would have no "harm." Consider how you could "prove" that you avoided a serious automobile accident by choosing the route and timing when you drove to work today.

Second, this "principle" is selectively invoked by those who do not adhere to it in other aspects of their lives or activities. We would all never get out of bed if we adhered to a policy of certainty before doing everything. All actions and policies have environmental costs. There is no free lunch. Doing nothing has its costs, too.

The identification, measurement, and management of risks are a much better standard than the so-called precautionary principle. Consideration of environmental risk identification, measurement, and management are left for another time.

Biodiversity (it used to be "species diversity") is an intuitively appealing concept that has no practical real-world measurement. When biodiversity is a permitting or closure criterion for a mining company it can lead to perpetual

studies, arguments, delays, and costs. There are three reasons why biodiversity is useless as a criterion in the real world.

First, there is no consensus of what it means. Is it the number of species in a defined area? The relative number of individuals in each species? Some measurement of a taxon other than species (e.g., family, order)? In other words, just what is being measured?

Second, why is it being measured? There is no consensus of what it represents. Higher numbers may be better, but how much better is undefined. These numbers are all counts of biological structure (plants and animals usually) that do not tell us anything about the underlying function of the system. A constructed wetland to treat mine waste water might have a very high biodiversity, but not have the most effective species to remove the chemicals of concern. Many structures can have the same function and there is no valid reason why we should think one structure is better than another.

Third, we cannot validly compare one biodiversity value to another, other than that one is greater and one is lesser. No measurement scale assures that all intervals are equal, nor that values from different times or places can be validly compared.

Perhaps we need to educate regulators and politicians on these issues so we do not become mired in them.