APPENDIX I – Details on Processing Changes at the NICO Site for the Fortune Minerals Limited Cobalt-Gold-Bismuth-Copper Project

Case 1: Bulk cleaner tailings regrind-flotation-scavenger circuit

The bulk cleaner tailings will be subjected to regrind (<45 um), followed by further stages of flotation at the reduced grind size. The concentrate produced during the first of these additional cleaner stages will likely be blended with the bulk cleaner concentrate directly, and it will be filtered for shipment. A scavenger flotation circuit will treat the tailings, resulting in a secondary scavenger flotation concentrate that will be recycled to the bulk cleaner flotation circuit. The tailings from the scavenger circuit will be blended with bulk rougher tailings and be sent to the tailings storage facility. In this option, subject to confirmatory testing and optimization, the original flotation circuit would be augmented with further small flotation systems and a regrind mill.

Case 2: Bulk cleaner tailings Carbon-In-Leach circuit

The bulk cleaner flotation tailings from the original flotation circuit will be thickened to approximately 50% solids and exposed to a dilute cyanide solution (500-1000 ppm) in a carbon-in-leach (CIL) circuit. The bulk cleaner tailings will be leached at a pH of 10.5. Recovery of the gold will be onto carbon. No pre-leaching will occur. The slurry will flow into a multi-stage CIL circuit providing a total of 24 hours of residence time. Fresh activated carbon is added to the last tank of the CIL circuit, and the carbon is periodically advanced forward toward the first tank. The gold in the cyanide solution is concurrently leached and adsorbed onto the surface active carbon in the tanks, decreasing in concentration as the slurry moves through each of the stages. Thus, the slurry containing gold in solution is moved counter current to the activated carbon, which is transferred about every 24 hours.

Carbon loaded with gold will be removed from the first tank and passed over a carbon screen and washed. The undersize is recycled back to the first CIL tank. The oversize washed carbon will then be bagged and shipped to the hydrometallurgical facility. At the hydrometallurgical facility, gold on the carbon will be stripped by the elution methods previously described and the carbon regenerated for return to the NICO site. If another gold mine opens in the NT, then the carbon may be treated at that site on a contractual basis depending on if that mine has a complementary elution circuit.

Cyanide Destruction - Inco SO_2-air process

The resulting tailings from the CIL circuit will be filtered to recover the cyanide solution (sometimes called the *lixiviant*) which removes the gold from the solids and puts it into solution where it can be recovered or absorbed by the carbon. Filtering the slurry will reduce cyanide consumption as well as the overall water consumption. The filter cake will be subsequently re-slurried with process water from the tailings storage facility and fed to the cyanide destruction circuit.

The decomposition reaction is called the sulphur dioxide-air process, often referred to as the Inco SO_2-air process (see Chapter 6, *Applicable Technologies for the Management of Mining Effluents in the Northwest Territories*, Department of Indian and Northern Affairs Canada by Lakefield Research in association with Senes Consultants Limited, April 2002).

This process uses sulphur dioxide in the presence of air in a single reaction tank providing 60 minutes of retention time. The sulphur dioxide required is produced using the reagents sodium metabisulphite and sulphuric acid with copper sulphate as a catalyst. The Inco process has been demonstrated in the NICO pilot plant at much greater residual cyanide levels than that projected when leaching the bulk cleaner tails. This same process will be utilized at NICO on the lower residual cyanide concentrations presented by the case 2 option.

Fortune will also evaluate the CombinOx® process for treatment of this stream, where the use of Caro's acid in combination with SO_2-Air may provide faster destruction kinetics and a shorter retention time, resulting in reduced capital and operating costs. An advantage of this process is that copper sulphate required to catalyze the process can be greatly reduced, as well as the "fuel" for the process, metabisulphite. In Combinox®, Caro's Acid (H_2SO_5), is produced by the combination of hydrogen peroxide and sulphuric acid at the location of addition. Sodium metabisulphite is effectively the salt of Caro's Acid, and the treatment mechanism is very similar, but more rapid.

In the event that Combinox® is chosen, hydrogen peroxide would also be stored on site, but metabisulphite and copper sulphate consumptions would be reduced.

<u>Discussion</u>

The bulk cleaner tailings produced after secondary flotation represents 8.4% of the overall plant feed in the original flow sheet submitted in January 2009. In case 1, this would be reduced to approximately 7-7.5%, and the tailings not exposed to any reagents other than those required for flotation.

In case 2, the bulk cleaner tails would represent no change in the overall mass reporting to the tailings storage facility; however, the tailings would be processed for residual gold recovery through a CIL circuit, the leach solution recycled through filtration, and the remaining solid residue treated for cyanide destruction by SO_2-Air or Combinox™.

In case 1, approximately 4.5-5.5% of the overall feed would be packaged for shipment to the hydrometallurgical facility.

In case 2, approximately 3.7-4.0% of the feed would be packaged for shipment to the hydrometallurgical facility. The decision on which circuit will be built will be based primarily on technical considerations, along with economics, and risk.