APPENDIX 1: NanoRiskCat●●●|●● Template

Literature methodology/sources of information

The following sources of information were used to fill out the NanoRiskCat●●●|●● for nanogold:

1. De Jong WH, Hagens WI, Krystek P, Burger MC, Sips AJAM, Geertsma RE (2008) Particle size-dependent organ distribution of gold nanoparticles after intravenous administration. Biomaterials 29(12):1912–1919

2. Johnston HJ, Hutchison G, Christensen FM, Peters S, Hankin S, Stone V (2010) Review of the in vivo and in vitro toxicity of silver and gold particulates: particle attributes and biological mechanisms responsible for the observed toxicity. Crit Rev Toxicol 40(4):328–346

3. Li T, Albee B, Alemayehu M, Diaz R, Ingham L, Kamal S, Rodriguez M, Whaley Bishnoi S (2010) Comparative toxicity study of Ag, Au, and Ag–Au bimetallic nanoparticles on Daphnia magna. Anal Bioanal Chem 398(2): 689–700

4. Sonavane G, Tomoda K, Sano A, Ohshima H, Terada H, Makino K (2008) In vitro permeation of gold nanoparticles through rat skin and rat intestine: effect of particle size. Colloids Surf B 65(1):1–10

Human hazard profile

1. **HARN: Does the nanomaterial fulfill the HARN paradigm?**

   Answer: No

   Arguments and explanation: NanoAu particles exist in many shapes, but to the best of our knowledge nanoAu particles do not fulfill the HARN paradigm

2. **Bulk – "Level A CLP": Is the bulk form of the nanomaterial known to cause or may cause serious damaging effects?**

   Answer: No

   Arguments and explanation: Gold is not classified in the Annex VI of Regulation (EC) No

1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

3. **Bulk – "Level B CLP": Is the bulk form of the nanomaterial classified for other less adverse effects according to the CLP?**

   Answer: No

   Arguments and explanation: Gold is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

4. **Nano – Acute toxicity: Is the specific nanomaterial known to be acute toxic?**

   Answer: No data

   Arguments and explanation: No information available

5. **Are there indications that the nanomaterial causes genotoxic-, mutagenic-, carcinogenic-, respiratory-, cardiovascular, neurotoxic or reproductive effects in humans and/or laboratory animals or has organ-specific accumulation been documented?**

   Answer: No data

   Arguments and explanation:

   a. Genotoxicity and mutagenicity: No information available

      According to Johnston et al. (2012) the ability of gold nanoparticles to bind to DNA is of concern, due to the potential cytotoxic or genotoxic consequences.

   b. Respiratory tract toxicity: No information available

   c. Cardiovascular toxicity: No information available

   d. Neurotoxicity: No information available

e. Reproductive damage: No information available

f. Carcinogenicity: No information available

g. Does the nanomaterial accumulate in tissue and/or organs?:

There are indications that nanoAu might accumulate in tissue and/or organs as De Jong et al. (2008) and Sonavane et al. (2008) have reported observing 10 nm gold nanoparticles in the blood, spleen, liver, testis, lung, and brain in the blood, spleen, liver, testis, lung, and brain of rats 24 h after injection. Distribution in the body of rat was observed to be size dependent.

6. **Overall evaluation of human hazard**

We conclude that the color-code that best reflects the human hazard profile of the nanoAu used is ● as there is scientific evidence indicating at least one nanospecific hazard.

Environment hazard profile

1. **Bulk – "Level A CLP": Is the bulk form of the nanomaterial classified as CLP Acute 1 or Chronic 1 or Chronic 2?**

Answer: No

Arguments and explanation: Gold is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

2. **Nano – LC_{50}<10 mg/l: Is the nanomaterial in question reported to be hazardous to environmental species i.e. LC50 or EC 50 <10 mg/l?**

Answer: No

Arguments and explanation: No studies have been identified that report nanoAu particles to be hazardous to environmental species i.e. LC50 or EC 50 <10 mg/l

3. **Bulk – "Level B CLP": Is the bulk form of the nanomaterial classified as CLP Chronic 3 or Chronic 4 or documented nano-specific effects?**

Answer: No

Arguments and explanation: Gold is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

4. **Nano – LC50<100 mg/l: Is the nanomaterial in question reported to be hazardous to environmental species i.e. LC50 or EC 50 <100 mg/l?**

Answer: Yes

Arguments and explanation: Li et al. (2010) have reported LC50-values ranging from 65–75 mg/L toward *Daphnia magna* and hence nanoAu has been reported to be reported to be hazardous to environmental species i.e. LC50 or EC 50 <100 mg/l

5. **T½>40 days: Is the nanomaterial in question persistent i.e. T½>40 days?**

Answer: Maybe

Arguments and explanation: According to Stone et al. (2010): "By definition metal nanoparticles are not degradable. However, changes in the metal speciation can occur depending on redox conditions, salt content etc. These changes in speciation are as complex as they are for conventional metal forms and no general conclusion can be made in this regard."

6. **Overall evaluation of environmental hazard**

APPENDIX 1: NanoRiskCat●●●|●● Template

Given the fact that nanoAu have been reported to be hazardous to environmental species i.e. LC50 or EC 50 <100 mg/l and T½>40 days, we conclude that the color-code that best reflects the environmental hazard profile of nanoAu is ●