Appendix E. Minerals identified in solution-collapse breccia pipe uranium deposits

[Primary ore and gangue minerals marked by *; others oxidized or supergene (modified after Wenrich and Sutphin, 1988, table 1)]

A. ORE MINERALS

URANIUM
uraninite*
coffinite
tyuyamunite
metatyuyamunite
metazippeite
zeunerite
metazeunerite
metatorbernite
uranophane
bayleyite
uranospinite

VANADIUM
hewettite
vesigneite
volborthite
calciovolborthite
roscoelite*

SILVER
acanthite
naumannite
proustite

GOLD
Native(?)

COPPER
chalcocite
djurleite
digenite
covellite
enargite*
chalcopyrite*
lautite*
bornite
tennantite*
tetrahedrite*
cuprite
tenorite
chrysocolla
azurite
malachite
olivenite
chalcanthite
brochantite
cyanotrichite
chalcoalumite
langite
antlerite
devilline
conichalcite

B. BASE-METAL MINERALS

LEAD
galena*
anglesite
cerussite
wulfenite

ZINC
adamite
sphalerite*
smithsonite
aurichalcite
hemimorphite

COBALT
skutterudite*
Co-gersdorffite*
erythrite
linnaeite*
bieberite

NICKEL
nickeline*
rammelsbergite*
pararammelsbergite*
gersdorffite*
bravoite*
siegenite*
vaesite*
millerite*

MOLYBDENUM
molybdenite*
ilsemannite
jordisite

IRON
pyrite*
marcasite*
arsenopyrite*
siderite*
scorodite
melanterite
limonite
hematite
goethite
jarosite
siderotil
coquimbite

MANGANESE
rhodochrosite

ANTIMONY
stibnite*

C. NON-METALLIC MINERALS

quartz*
chalcedony*
pyrobitumen*
celadonite
illite
kaolinite*
chlorite
fluorite*
calcite*
barite*
dolomite*
ankerite*
anhydrite*
gypsum
hexahydrite
leonhardtite