CHAPTER 11: CONCLUSIONS

Based on the current research results and combining it with previous research on the petrogenesis of the Uitkomst Complex, the following conclusions can be made:

The Uitkomst Complex represents a satellite body related to the larger adjacent Bushveld Igneous Complex (BIC), but was the magma was derived from a separate staging chamber. This resulted in the composition of the Uitkomst magma differing from the BIC magmas. The Uitkomst Complex was emplaced as a conduit, where a significant portion of the complex had been eroded away during the development of the Great Escarpment.

The Uitkomst Complex was emplaced on or near the contact between the Malmani dolomite and the Timeball Hill shale. The first pulse of magma is represented by the Chromatiferous Harzburgite unit, the most mafic of the units in the layered complex. This is indicated by the abundance of chromitite lenses and schlieren in this unit and the more primitive composition of the olivine and clinopyroxene grains. This was followed by the emplacement of the Lower Harzburgite and Main Harzburgite units. The Lower Harzburgite unit is indicated to have stoped downward into the dolomite country rock and the Main Harzburgite upward into the overlying shale. The slight difference in mineralogy between these two units is ascribed to the limited assimilation of dolomite country rock by the Lower Harzburgite. The downward emplacement of the Lower Harzburgite unit in a "passive" pulse-like manner resulted in the formation of the xenolith horizon in the lower third of this unit. Devolitization of the xenoliths and dolomite country rock is suggested to have taken place during emplacement of this magma. It has been suggested that the addition of CO2 to the system resulted in the super saturation of sulphide in the magma, resulting in the observed mineralization in the Chromatiferous Harzburgite and Lower Harzburgite units.

The fluid derived from the devolitization of the xenoliths and country rock migrated upward from the emplacing Lower Harzburgite into the overlying Chromatiferous Harzburgite unit. This deuteric fluid was initially very CO_2-rich, but as the supply of

additional fluids from devolization decreased and was expelled from the system it became more H_2O-rich. The fluid that did not migrate out of the Lower Harzburgite unit was more H_2O-rich and resulted in the retrograde metamorphic assemblages, dominated by amphibolite, observed in this unit.

The fluid that migrated upward was trapped in the overlying Chromatiferous Harzburgite unt. The fluid remained CO_2-rich for a sufficiently long time to stabilize the formation of talc-carbonate assemblages that completely pseudomorphically replaced the precursor mafic minerals in this unit. As the system cooled, the CO_2-content of the fluid(s) migrating in the Basal Unit decreased. This resulted in minor overprinting of the previous alteration events. This last alteration event is reflected by the serpentinization and secondary magnetite replacement in otherwise pristine olivine grains and pockets of chlorite associated with amphibolite. The deuteric fluid was constrained to the Basal Unit, with the Main Unit remaining largely unaffected.