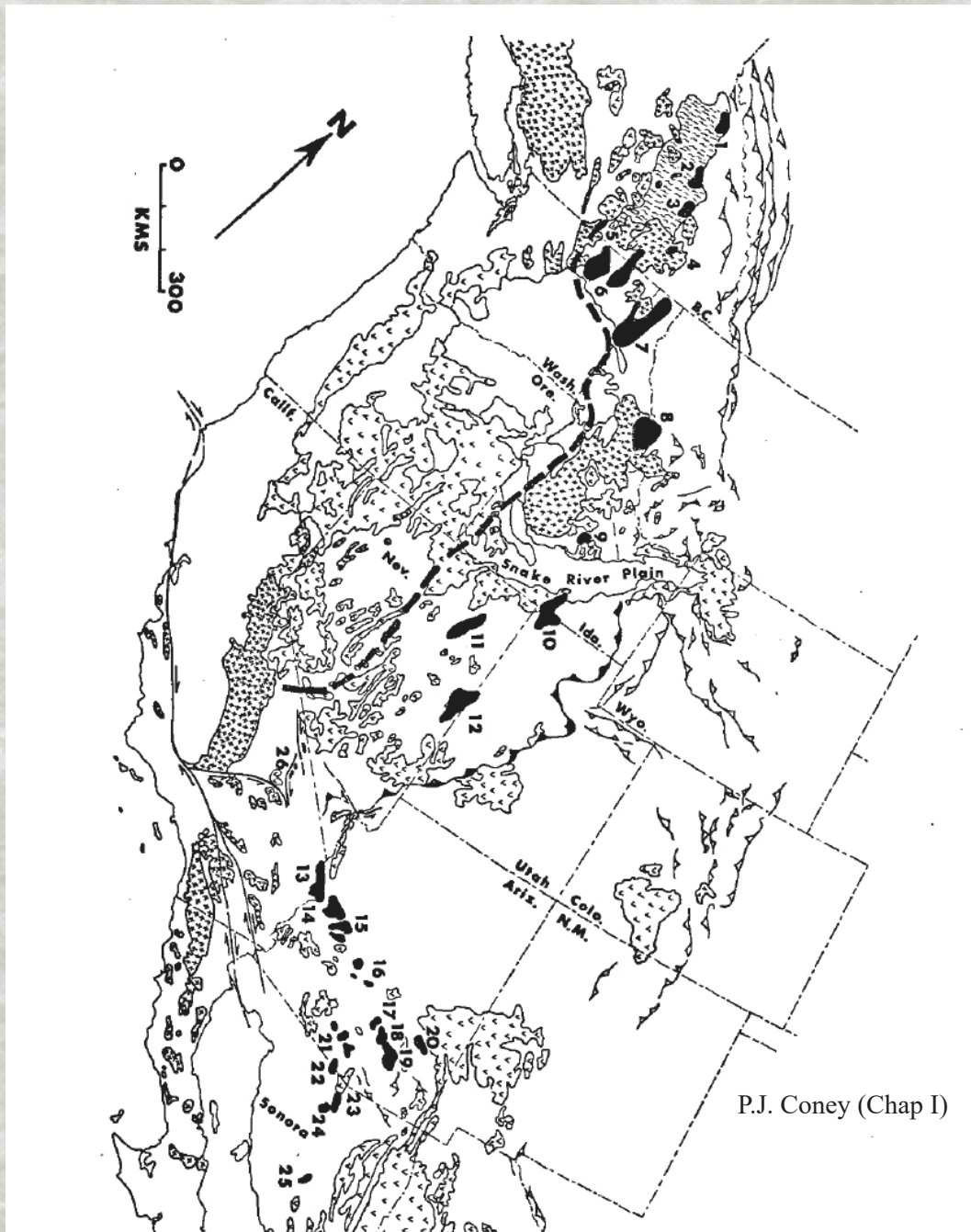


# Cordilleran Metamorphic Core Complexes and their Uranium Favorability – Final Report and Appendices

S.J. Reynolds | Arizona State University



Distribution and general regional tectonic setting of Cordilleran Metamorphic Core Complexes (solid black).

**CONTRIBUTED REPORT CR-20-A**

March 2020

**Arizona Geological Survey**

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# Arizona Geological Survey

Philip A. Pearthree, State Geologist and Director

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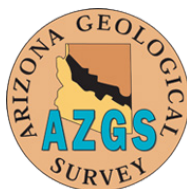
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# Cordilleran Metamorphic Core Complexes and their Uranium Favorability – Final Report and Appendices

Stephen J. Reynolds, President's Professor  
School of Earth and Space Exploration  
Arizona State University

March 2020

This contributed report represents a re-release of a major study of the uranium favorability of Cordilleran metamorphic core complexes. It was funded by the US Department of Energy (DOE) through a subcontractor (Bendix) to Principal Investigators Peter J. Coney and Stephen J. Reynolds, then at the University of Arizona. The report was released in 1980 as DOE report GJBX-258 (80). The availability of DOE reports generated during this time period is variable, so the Arizona Geologic Survey graciously provided the opportunity to include this report in its Contributed Report series. I scanned the original paper version of the report, not an easy task since in those days we taped and pasted photos and other figures directly onto sheets of paper, making use of a sheet-fed scanner a bit of a challenge. But all the pages were eventually scanned successfully.

The impetus for this study was the discovery of the Rossing uranium deposit in Namibia. The Rossing deposit is hosted in a gneissic terrain, interpreted to be part of a gneiss dome. Cordilleran metamorphic core complexes are also partly composed of gneissic rocks and have a domal configuration, so US DOE wanted to assess whether core complexes were favorable for Rossing-type deposits (the answer is not much). As part of the study, tectonic maps were compiled of every major core complex in the western US (the Arizona Geological Survey has a printed copy of each map), and a short synopsis was written for each complex. In addition, I conducted field studies in every core complex, focusing on the uranium and thorium contents, as well as other geochemical aspects, of rocks within the crystalline core. I carried and deployed a large scintillometer and collected samples for later geochemical analysis. The results of these geochemical studies, including all data tables, are contained in their entirety within the report.

The report contains a wealth of geologic and geochemical information about Arizona and other parts of the western United States. Some of the components of this report represent compilation from the geologic literature, but other parts contain important original research, some of which remains unpublished until now. For example, this report contains an important contribution about the geochemistry of granitic rocks in core complexes and contains the first description of the Priest River (Selkirk) metamorphic core complex.

The report is the result of many people besides me, including Peter Coney, George Davis, and Stanley Keith. Individual chapters and sections are individually authored and can be cited as such. Thanks to Michael Conway and Phil Pearthree of the Arizona Geological Survey for helping this report and the contained data become more visible.

S. Reynolds, 2020



DOE Open-file Report  
GJBX - 258 (80), 627 p.

National Uranium Resource Evaluation

# **CORDILLERAN METAMORPHIC CORE COMPLEXES AND THEIR URANIUM FAVORABILITY**

## **FINAL REPORT**

Peter J. Coney and Stephen J. Reynolds

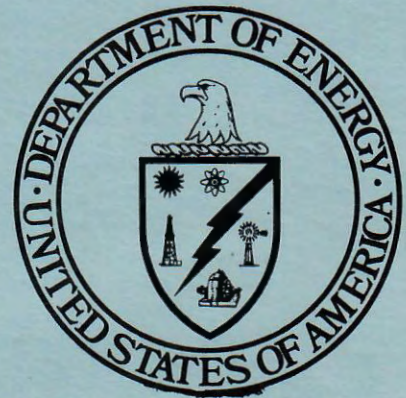
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George H. Davis, Stanley B. Keith, Paula F. Trever, Steven H. Lingrey,  
Charles F. Kluth, Diane C. Ferris, James F. DuBois and James J. Hardy

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November 1980



PREPARED FOR U.S. DEPARTMENT OF ENERGY  
Assistant Secretary for Resource Applications  
Grand Junction Office, Colorado

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\*Appendices and final report are bound in separate volumes.