

Exploration and discovery of the Pine Ridge uranium deposits, Powder River Basin, Wyoming, USA

M. Doelger

Stakeholder Energy LLC, Casper, Wyoming, USA

E-mail address of main author: mjdoelgerbh@bresnan.net

The Pine Ridge uranium deposits are named for a newly identified area between the Pumpkin Buttes and Southern Powder River Basin (PRB) mining districts. This regional prospect, covering nine contiguous townships, is northwest of the Cameco Smith Ranch mine and west of the Uranium One Allemand-Ross project in Converse County, Wyoming.

Surface mapping and 350+ measured sections of well exposed outcrops have identified 250 target sandstones and contributed to a model of the complex braided stream channel architecture within the Eocene Watsatch and Paleocene Fort Union Formations. The uranium-bearing sandstones occur in 3-D bundles of vertically aggrading river systems flowing into the PRB from distant uranium source areas of the Granite Mountains to the west and the northern Laramie Range to the south. Large volumes of mudstone overbank and swamp facies separate the individual river systems laterally, resulting in greater vertical reservoir continuity from sandstones stacking. At least five major paleo river systems have been identified and named.

High organic content, within the host formations, and rising veils of hydrocarbon gases from underlying oil and gas deposits have resulted in classic roll front uranium deposits in individual sandstones and intervals. Mineralization in stacked sandstone bundles several hundred feet thick show a crescent-shaped distribution within the shallow mineralized interval “attic”, the “cellar” at the base of the alteration cell, and the furthest basin-ward “front door”.

World-class uranium resource potential has been identified along 208 miles of redox boundary string length mapped from the 1522 control points consisting of outcrop data, pre-existing uranium drilling, oil and gas wells, and proprietary drilling in 2012 and 2013 by Stakeholder. All data is managed in ARC VIEW GIS with 3-D capability, which will be demonstrated.

Very few restrictions apply to the project area. Uranium holes are permitted solely by the Wyoming Department of Environmental Quality. There are no threatened and endangered species. There have been no surveys required for wildlife or archeological resources. There are only three surface and mineral owners involved in the project area, which are secured by long-term agreements amounting to 68,000 acres of mineral leases and surface use by Stakeholder.

Drilling in 2014 will concentrate on finding new ore bodies, and further definition of the size and quality of identified roll front deposits.