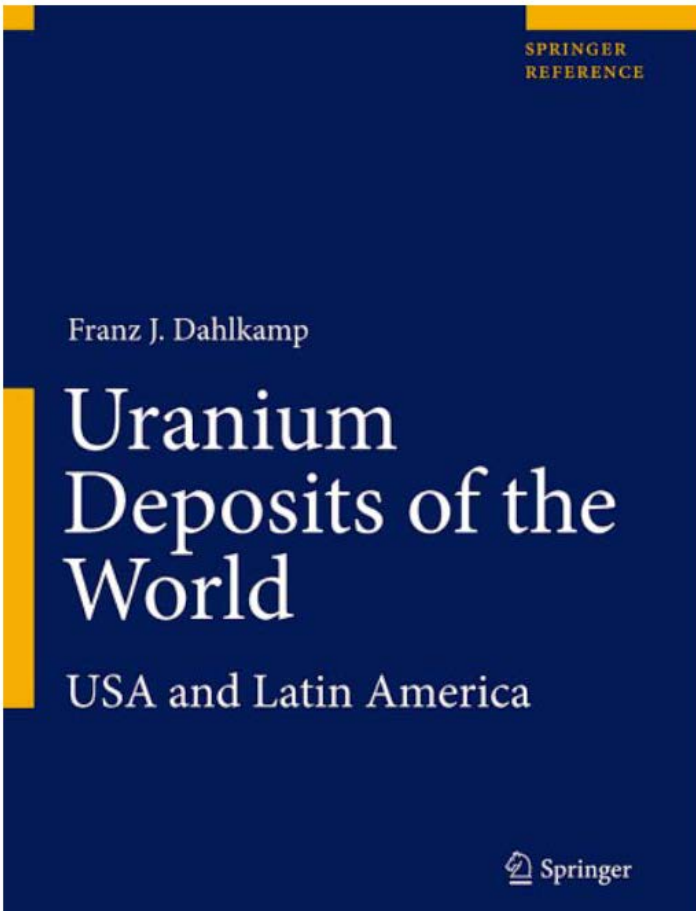
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schroeckingerite, and (d) uraniferous lignite or subbituminous coal (ca. 30 ppm U). Only the first two modes are of economic interest for uranium.

Two main areas with uranium production and resources have been established. They are located in the *Green Mountains* at the northern edge and in the *Sweetwater/Red Desert* area in the central part of the basin (Fig. 2.17). In addition, several U deposits occur isolated in the Great Divide Basin.

Original resources (in situ and mined) of these two areas total an estimated 50,000 t U including about 8,200 t U of production. Mining grades varied between 0.039% U (Sweetwater) and up to 0.25% (Crooks Gap).

Sources of Information. Bailey 1969; Beahm 2006a, d; Boberg 1981, 2007; Childers 1974; Harshman and Adams 1981; Love 1970; Pipiringos and Denson 1970; Sherborne et al. 1980; Stephens 1964; Wallis 2006a, b; Wallis and Rennie 2006; and Pool TC, Personal Communicaton.

Regional Geological Features of the Great Divide Basin

The Great Divide Basin is a topographic basin with interior drainage except for the Green Mountains range on its northern rim. It hosts uranium in sandstones of the Battle Spring Formation, a stratigraphic equivalent to the Puddle Springs Arkose of the Gas Hills on the north flank of the Granite Mountains, and the Wasatch and Wind River formations, all of early Eocene age. Spread along the northern margin of the Great Divide Basin, the Battle Spring Formation is a mountainward facies of the Wasatch Formation. The latter occupies the central part of the basin. The Wasatch and the Battle Spring formations interfinger and intertongue in a belt 25–30 km wide, trending about NW-SE, and located 30–50 km SW of the northern edge of the Great Divide Basin.

The Battle Spring Formation is a fluvial–alluvial unit as much as 1,750-m thick that was laid down on slightly folded, fine-grained rocks of the Paleocene Fort Union Formation and on folded pre-Tertiary rocks. It is, or was, overlain by tuffaceous rocks of late Eocene to Pliocene age.

2.3.1 Green Mountains

The Green Mountains are an uplifted range on the northern margin of the Great Divide Basin. Uranium deposits occur in a stretch, 25 km in length and 4 km in width, from Crooks Gap in the west to Muddy Gap in the east. Deposits are mainly grouped in the *Crooks Gap* and the easterly adjacent *Green Mountain districts*, which combined account for estimated original resources (including production) at over 40,000 t U.

2.3.1.1 Crooks Gap Mining District

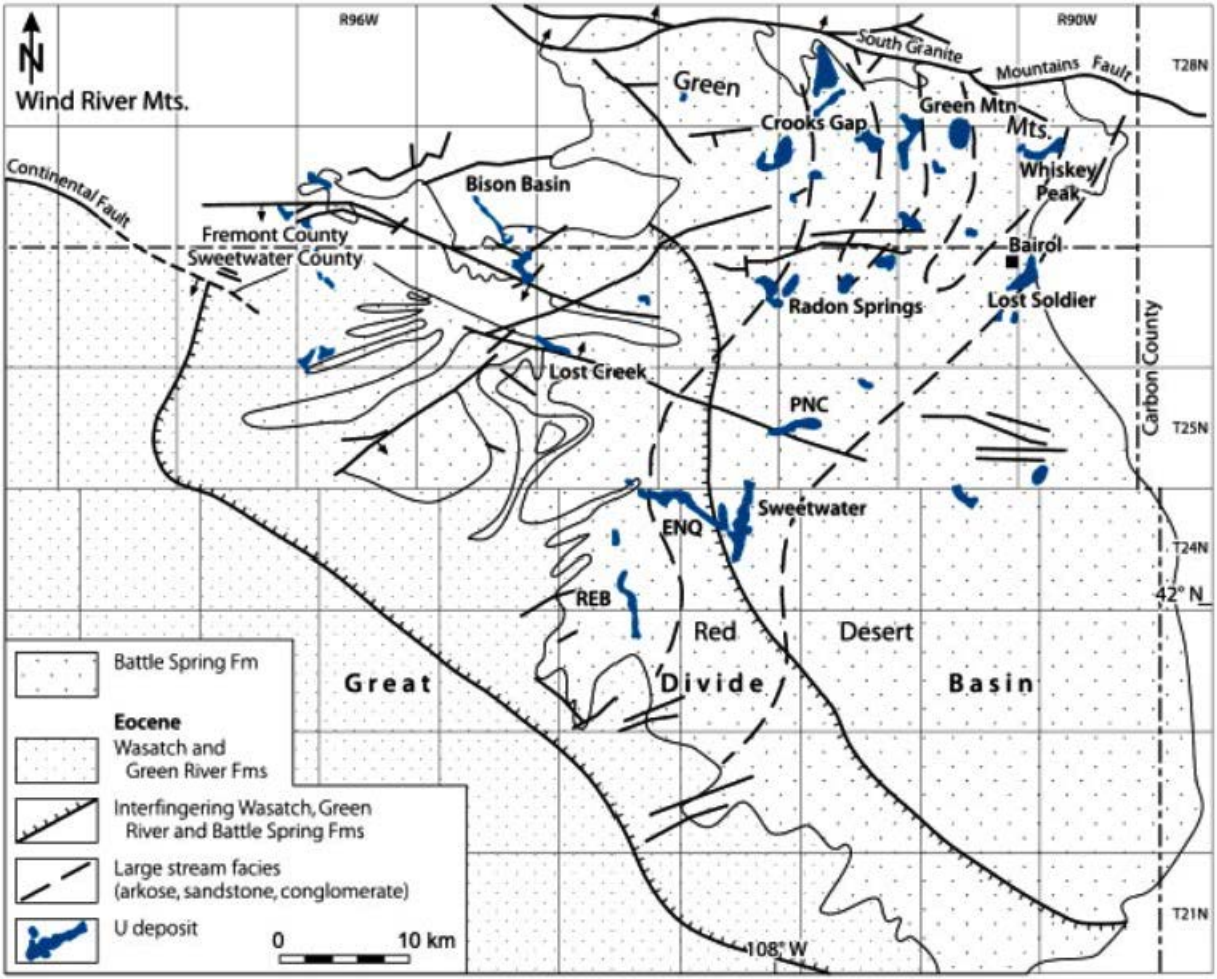
The Crooks Gap district lies in the western Green Mountains in southern Fremont County (Figs. 2.17, and 2.18). Deposits mainly consist of rollfront-type U mineralization, but there are also a few of structurally controlled mineralization. The latter are confined to the northern margin of the district and include the *Sheep Creek* deposit (see chapter 5 Northern Rocky Mountains).

Discovered in 1954, mining of uranium began in the same year and lasted until 1989. Original resources (in situ and mined) were reportedly on the order of 10,000 t U, some 8,000 t U of which were produced by 17 underground mines and open-pit operations. Mining grades ranged from 0.12–0.25% U. Largest mines included *Big Eagle Pit* (1976–1982), *McIntosh Pit*, *Golden Goose*, and *Sheep Mountain*.

Sources of Information. Bailey 1969; Childers 1974; Harshman and Adams 1981; Love 1970; Pipiringos and Denson 1970; Sherborne et al. 1980; Stephens 1964; Wallis and Rennie 2006.

Geological Setting of Mineralization

The Crooks Gap district lies on the northern margin of the Great Divide Basin immediately south of the Archean-Paleoproterozoic granitic complex of the Granite Mountains. Lithologies range from large boulder conglomerate through coarse-grained arkose-sandstone and siltstone to mudstone of

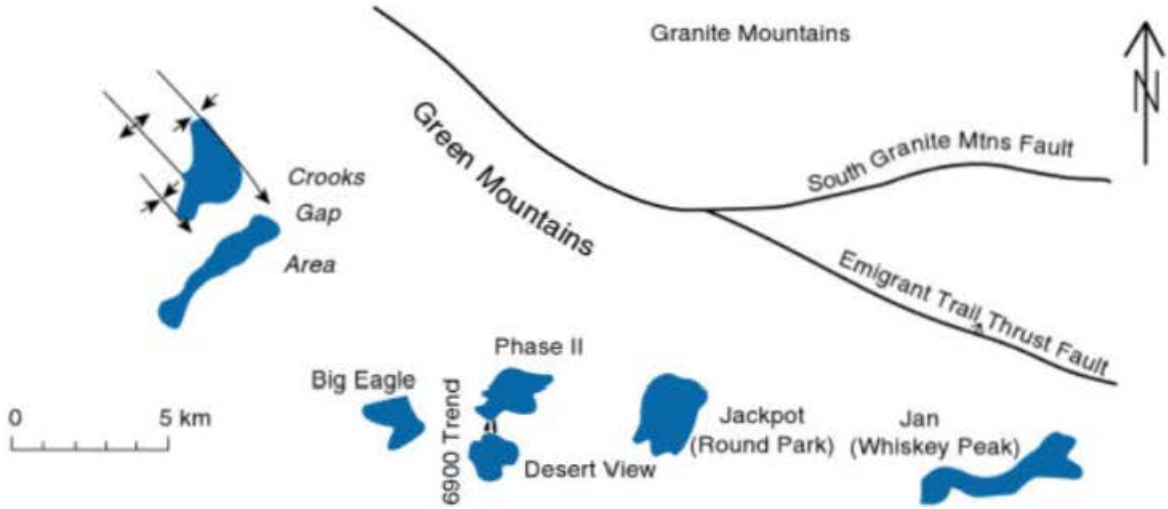


depositional environment. In some areas, however, the Battle Spring sequence contains fluvial sediments that show moderate sorting as well as moderate to good lithologic continuity, and

Altered sandstone tongues are complex and sinuous in plan as well as in section, and terminate in a series of small, irregular, sinuous rollfronts, probably caused by rapid changes in perme-

Fig. 2.18.

Green Mountains, Crooks Gap-Green Mountain-Whiskey Peak area, location of principal uranium deposits, (Courtesy of International Nuclear Inc. 2008, modified)



Coarse-grained sandstone is the preferred host rock. Ore minerals fill open spaces in sandstone, coat sand grains, and partly replace feldspar. Some ore occurs in coarse conglomerate in which it coats pebbles and boulders, as well as in siltstone and mudstone associated with carbonaceous matter, which it partly replaces.

Most ore bodies are more or less of roll shape and concentrate in narrow zones along margins of altered arenite tongues, similar to those in other Wyoming Basins; the Crooks Gap ore

2.3.1.2 Green Mountain District, Wyoming

The Green Mountain uranium district is located in the eastern Green Mountains in Fremont County, central Wyoming. The location is on the northeastern margin of the Great Divide Basin immediately south of the Archean-Paleoproterozoic Granite Mountains (Figs. 2.1 and 2.18).

Several deposits are identified. The large *Jackpot* deposit also known as *Round Park* or *Green Mountain* deposit was discovered

a rollfront and related ore concentrations for more than 10 m from their known positions.

Ore bodies occur at depths from 30 to some 200 m (*Golden Goose* underground workings were at depths between 30 and 120 m). Ore bodies are of modest size. They extend outward from altered tongues for distances of less than 1 m to 10 m, rarely more. Grades range from a few hundreds to as much as 10% U. The highest grade ore may or may not be at the rollfront. In a more regional aspect, mineralization trends roughly parallel to bedding, i.e., it dips at about 10–20° SE. Synclinal structures preferentially appear to be mineralized.

Ore Controls and Recognition Criteria

The position and configuration of the altered sandstone tongue and related ore bodies appears to be controlled more or less by

- Permeable sediments that were deposited along with considerable carbonaceous debris in the channel of one of the major streams flowing from the Granite Mountains southward into the Great Divide Basin and
- The great variety of lithologies, and perhaps post-ore tectonism, which resulted in the extreme irregularity of the interface between altered and mineralized sandstone as well as the poor continuity of ore.

are also known as Pathfinder's *6,900 Trend*). On the eastern extension, in a distance of ca. 7 km is the *Jan* (or *Whiskey Peak*) deposit near Whiskey Peak.

Klingmuller (1989) stresses the difference in morphology of deposits in the Green Mountain district (including Big Eagle) as compared to classical roll-type deposits in other Wyoming Basins. He points to the stratiform nature of uranium mineralization and defines the deposits as limb type.

Resources of this district are estimated at over 30,000 t U. Some 16,000 t U of which at an ore grade of about 0.2% U (based on a cutoff grade of 0.085% U and a minimum thickness of 0.6 m) are attributed to the closely drilled Jackpot deposit.

Source of Information. Klingmuller 1989, unless otherwise noted.

Geology and Alteration

The Green Mountain uranium district is bordered to the north by the interjunction zone of the Emigrant Trail Thrust and South Granite Mountain fault system (Figs. 2.1 and 2.19). The ore-hosting Battle Spring Formation is in excess of 1,500 m thick. Regional dip of the strata is 1–3° NE, i.e., their dip is reversed from the original depositional inclination. Intermixed, impure conglomerates and conglomeratic arkosic sandstones prevail in the upper section, whereas arkosic sandstones and siltstones increase in abundance in the lower section. Conglomerates and