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Valuable Mineral Discovery

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program of providing increased supplies of scarce minerals and metals, has approved a number of loans for uranium exploration.

All of these activities, policies and aids, both by the Commission and other governmental agencies, are a part of the policy and plan of the Commission to procure source materials. It may be concluded that the purpose of the domestic program is to develop production to the fullest extent consistent with a sound economic policy.

MERL B. CASE

VALUABLE MINERAL DISCOVERY

Concern has been expressed with respect to the validity of titles to mining claims in the Rocky Mountain Region. This is due in large part to the lack of a working formula as to what constitutes a valuable mineral discovery sufficient for the validation of a mining claim on the federal public domain. Whether there has been a discovery of valuable minerals becomes vitally important in the following situations: (1) Discovery is an essential element in the location of a valid mining claim;¹ (2) The establishment of the rights of rival claimants to possession;² (3) For the granting of a patent to the land by the Department of the Interior.³ This question is extremely important to prospectors for uranium because of the nature and occurrence of the mineral. Failure to establish that a discovery has been made may lead to loss of valuable mineral land.

A valuable discovery is defined as one sufficient to justify a person of ordinary prudence, whether or not a skilled miner, in expending time and money in exploration and development with a reasonable expectation of making a profit.⁴ This somewhat broad standard is difficult to apply and the purpose of this article is to examine concrete applications of the standard.

The existence of a valuable mineral deposit within the limits of a claim is a prerequisite to valid location.⁵ There must be something beyond

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1. *Chrisman v. Miller*, 197 U.S. 313, 25 S.Ct. 468 (1905); *Kramer v. Sanguinetti*, 33 Cal. App. 2d 303, 91 P.2d 604 (1939); *United States v. Mobley*, 45 F.Supp. 407 (1942); *Pitcher v. Jones*, 71 Utah 453, 267 P. 184, 186 (1928).
 2. *Cameron v. United States*, 252 U.S. 450, 40 S.Ct. 410 (1920); *Erhardt v. Boaro*, 113 U.S. 527, 5 S.Ct. 560 (1885); *Beals v. Cone*, 27 Colo. 473, 62 Pac. 948, 952 (1900). In the absence of discovery the locator can protect himself against relocation by others only by continued actual occupancy and diligently prosecuting work looking to the discovery of mineral, *Smith v. Union Oil Co.*, 249 U.S. 347, 39 S.Ct. 308 (1919).
 3. *United States v. T. J. Rochon*, I. D. Case No. A-26203 (1951); *United States v. J. L. Perkins, et al.*, I. D. Case No. A-26223 (1951); *United States v. F. B. Wheelright, et al.*, I. D. Case No. A-26263 (1952).
 4. *Cameron v. United States*, 252 U.S. 450, 40 S.Ct. 410 (1920); *Castle v. Womble*, 19 L. D. 455 (1894); *Chrisman v. Miller*, 197 U.S. 313, 25 S.Ct. 468 (1905); *In re Yard*, 38 L. D. 59 (1909); *Charlton v. Kelly*, 156 Fed. 433, 436 (1907); *Garibaldi v. Grillo*, 17 Cal. App. 540, 120 Pac. 425, 426 (1912); *United States v. Mobley*, 45 F. Supp. 407 (1942); *Rev. Stat. 2320*, 17 Stat. 91, 30 U.S.C.A. Sec. 23.
 5. *Cole v. Ralph*, 252 U.S. 286, 295, 296, 299, 40 S.Ct. 321 (1920); *Ponton v. House*, 256 P.2d 246, 247 (1953); *Butte & S. Co. v. Clark-Mont. Co.*, 249 U.S. 12, 39 S.Ct. 231 (1919); *Creede and Cripple Creek, etc., Min. Co. v. Uinta Tunnel, etc., Co.*, 196

a mere guess on the part of the miner to establish a valid location. An informed guess based on geological evidence indicating the likelihood of discovery is not sufficient in the absence of an actual discovery of minerals within the confines of the claim.⁶ Discovery is a primary factor in the perfection of a mining location, and once made, it relates back to the location of the claim provided no adverse claimant has established valid rights during the interim.⁷ Proof that a valuable discovery has been made is not, however, established by proof of marking and recording of a claim.⁸ The finding of ore or mineral in commercial quantities is not a necessary incident to discovery but mineral of such character and quantity must be found as will meet the test or standard set out above.⁹

The requisite that a valuable discovery requires that the locator establish the presence of mineralization as distinguished from the possibility thereof places a large number of claims on the Colorado plateau and neighboring environs in jeopardy. During the early stages of the post-war uranium exploration, most locations were made on the rims of the canyons and were based on the discovery of exposed uranium mineralization. As more was learned of the nature and occurrence of uranium bearing ores it became apparent that such mineralization, in many instances, extended back beyond the canyon wall in formations lying at considerable depth. Such deposits could only be discovered by sub-surface exploratory methods. Accordingly, as this information became general knowledge, locations were

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- U.S. 337, 25 S.Ct. 266 (1905); Holding in *Erhardt v. Boaro*, 113 U.S. 527, 536, 5 S.Ct. 560 (1885) that mineral within the limits of a claim is essential to validity thereof, the Supreme Court of the United States said: "There must be something beyond a mere guess on the part of the miner to authorize him to make a location which will exclude others from the ground, such as a discovery of the presence of the precious metals in it, or in such proximity to it as to justify a reasonable belief in their existence." *Shoshone Mining Co. v. Rutter*, 87 Fed. 801, 807, 31 C.C.A. 223 (1898); *Eureka Consol. Min. Co. v. Richmond Min. Co.*, (C.C. Nev.) Fed. Case No. 4548, 4 Sawy. 302 (1877), Affirmed, 103 US. 839 (1880); *Hyman v. Wheeler*, (C.C. Cal.) 29 Fed. 347, 353 (1886); *Book v. Justice Min. Co.*, (C.C. Nev.) 58 Fed. 106 (1893); *Utah Consol. Min. Co. v. Utah Apex Min. Co.*, 285 Fed. 249 (C.C.A. 8th Cir. 1922); *Moulton Min. Co. v. Anaconda Copper Min. Co.*, 23 F.2d 811 (C.C.A. 9th Cir. 1928); *Jones v. Prospect Mtn. Tunnel Co.*, 21 Nev. 339, 31 Pac. 642 (1892); *Grand Central Min. Co. v. Mammoth Min. Co.*, 29 Utah 490, 83 Pac. 648 (1905); *Donnelly v. United States*, 228 U.S. 243, 33 S.Ct. 449 (1913).
6. *United States v. Iron Silver Min. Co.*, 128 U.S. 673, 684, 9 S.Ct. 195 (1888); *United States v. C. E. Etrause et al.*, 59 I. D. 129, 137 (1945); 17 Stat. 91, 30 U.S.C.A. Sec. 23; *Whiting v. Stroup*, 17 Wyo. 1, 95 Pac. 849 (1908); *Noyes v. Clifford*, 37 Mont. 138, 152, 94 Pac. 842 (1908).
 7. *Donnelly v. United States*, 228 U.S. 243, 33 S.Ct. 449 (1913); *Creede and C. C. Min. and Mil. Co. v. Uinta Min. and Transp. Co.*, 196 U.S. 337, 25 S.Ct. 266 (1905); *Omar v. Soper*, 11 Colo. 380, 18 Pac. 443 (1888).
 8. *Smith v. Newell*, 86 Fed. 56; *Cole v. Ralph*, 252 U.S. 286, 40 S.Ct. 321 (1920); *Gemmel v. Swain*, 28 Mont. 331, 72 Pac. 662 (1903); *McPherson v. Julius*, 17 S.D. 98, 95 N.W. 48 (1903); 2 *Lindley on Mines* 764; *Morrison's Mining Rights* 34 (16th ed.).
 9. Rev. Stat. Sec. 2320, 17 Stat. 91, 30 U.S.C.A. Sec. 23; *United States v. Standard Oil Co. of Calif.*, 20 F.Supp. 427 (1937); *Kramer v. Fladding, McBean & Co.*, 30 Cal. App.2d 98, 85 P.2d 552 (1938); *United States v. Mobley*, 45 F.Supp. 407 (1942); Criticism of a Survey Team formed to study the rules promulgated by the Dept. of the Interior (Section IV-D) on this point was to the effect that the Department in many instances seemed to require a commercial discovery. Reversal of this trend is clearly evidenced in *United States v. M. W. Mouat, et al.*, I. D. Case No. A-26181 (Reconsideration) (1954); *U. S. v. The Ohio Oil Co. et al.*, I. D. Case No. A-26479 (Reconsideration) (1953).

staked on the mesas beyond the canyon rims based on the hope and expectation that drilling or other methods of sub-surface exploration would disclose the existence of uranium bearing ores at depth. In some instances geological projection of outcropping uranium bearing formations justifies the belief that the same formations underly the location in question, and drilling may confirm their existence. However, in view of the nature and occurrence of uranium bearing ores, the best that can be said with respect to such claims, in the absence of sub-surface exploration, is that there is a geological possibility that the hoped-for mineralization may underly the tract in question. A substantial percentage of uranium companies offering securities to the public have claims of this nature and are raising money for the purpose of drilling their claims.

From the standpoint of development of our resources the drilling of many of these claims is economically and otherwise warranted. In some instances very substantial ore bodies have been discovered through drilling based solely upon this type of geological data. However, in view of the fact that usually no uranium bearing ore is disclosed on the surface, under existing criteria, there is no discovery until drilling discloses the presence of mineralization at depth. A recent decision of the Director of the Bureau of Land Management contains language which if taken out of context suggests that such geological evidence is sufficient to establish a discovery of valuable minerals.¹⁰

Assuming that the locator establishes evidence of mineralization, geological information then becomes a major source of evidence to support the assertion that discovery of a valuable mineral deposit has been made.¹¹ Information which is of a general nature is not sufficient to support a claim of discovery.¹² Thus, the testimony of four witnesses that a discovery complied with the meaning of the standard was ineffective and failed to establish that a valid discovery had been made.¹³ The opinions of experienced miners and experts in mining and geology are acceptable in establishing the occurrence, quantity, and quality of a mineral deposit.¹⁴ The locator has a wide range of elements from which to select acceptable evidence to support his claim of a valuable discovery.¹⁵ Evidence of mineral character of the land, development work, testing of samples, that samples were representative of the material found on the claim, assays and extent of values, and the time expended in examination were the principal factors

10. *United States v. A. A. H. Arnold*, Bureau of Land Management, Contest No. 978, 1954.

11. *United States v. A. F. Mott*, I. D. Case No. A-26196 (1951); *United States v. M. F. Dorn*, I. D. Case No. A-26194 (1951); *United States v. John L. Perkins, et al.*, I. D. Case No. A-26223 (1951); *Jefferson-Montana Copper Mines Co.*, 41 L.D. 320 (1912); *United States v. M. W. Mouat*, I. D. Case No. A-26181 (1951), Reconsideration (1954).

12. *United States v. A. F. Mott*, I. D. Case No. A-26196 (1951).

13. *Ibid.*

14. *Wilson v. Harnette*, 32 Colo. 172, 75 Pac. 395, 396 (1904); *United States v. Ohio Oil Co., et al.*, I. D. Case No. A-26479 (1953).

15. *United States v. W. L. Ross*, I. D. Case No. A-26941 (1954).

considered in determining the validity of a claim.¹⁶ The Secretary of the Department of the Interior in discussing the factors which a prudent man would consider in determining whether he had made a discovery has stated: "The size of the vein, as far as disclosed, the quality and quantity of mineral it contains, its proximity to working mines and location in an established mining district, the geological conditions, the fact that similar veins in the particular locality have been explored with success, and other like facts, would be considered by a prudent man in determining whether the vein or lode he has discovered warrants a further expenditure or not."¹⁷ The uranium prospector thus should utilize information as to the presence of like geological formations and authentic reports of uranium finds made in those formations. Likewise, the frequency and occurrence of uranium deposits and the possibility that the mineralized area which he proposes to develop may be expected to yield similar results should be considered.¹⁸

The mere fact that deposits of minerals do exist on a claim does not validate the location. A group of claims were held invalid although deposits of gypsum, clay, sand and gravel were openly visible in their natural state. Insufficient exploration and development work had been done to establish that they were in the category of a valuable mineral discovery.¹⁹ Extractive methods and the availability of markets were deciding factors in a case holding that no valid discovery had been made.²⁰ Subsequently, new evidence was produced which validated the claims. This evidence covered methods of extraction, development of a market, proof of a mineral deposit on the claim, and that the claimant had executed a contract for extensive mining development operations.²¹

There are no appellate court decisions or Department of the Interior decisions as yet relating to a valuable uranium discovery. However, in the light of existing precedent, the facts peculiar to the nature and occurrence of uranium bearing ores and methods of discovery, the factors discussed below undoubtedly will be regarded as significant. Establishment of a sufficient discovery may require only one such factor although all may be required in situations where evidence based on one type and source is only indicative of the presence of a valuable mineral deposit.

(1) Geological information derived from the knowledge and opinions of experienced miners and experts in the fields of mining and geology as heretofore discussed.

(2) Radioactivity readings obtained by the use of (a) Geiger-Mueller

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16. *Ibid*; *United States v. J. C. Ternahan*, I. D. Case No. A-26359 (1952); *Monolith Portland Cement Co., et al.*, I. D. Case No. A-26281 (1952); *United States v. Claude Allen, et al.*, I. D. Case No. A-26587 (1953).
 17. *Jefferson-Montana Copper Mines Co.*, 41 L. D. 320 (1912); *United States v. M. W. Mouat, et al.*, I. D. Case No. A-26181 - reconsideration (1954).
 18. *Ibid*; *Burke v. McDonald*, 2 Idaho 646, 33 Pac. 49, 50 (1890); *Shoshone M. Co. v. Rutter*, 87 Fed. 801, 807, 31 C.C.A. 223 (1898); 2 *Lindley in Mines* 774.
 19. *Monolith Portland Cement Co. et al.*, I. D. Case No. A-26281 (1952).
 20. *United States v. M. W. Mouat et al.*, I. D. Case No. A-26181 (1951) (Reversed on reconsideration following submission of new evidence - Case No. A-26181, 1954).
 21. *United States v. M. W. Mouat et al.*, I. D. Case No. A-26181, reconsideration (1954).

counters, (b) scintillation counters on the surface, (c) airborne scintillation counters.

(3) Core drilling operation supplemented by (a) radioactivity readings obtained by the use of probe-type radiometric instruments, or (b) assay of samples taken from cores. Information may thus be obtained on formations as to depth, thickness of veins and deposits, the type of mineralization and estimates of the volume of ore bodies.

(4) Chemical assays of samples obtained from (a) the surface of the claims, (b) excavations—open cuts and shafts, and (c) coring operations.

Radiometric readings from Geiger and scintillation counter recordings are among the primary sources of information leading to discovery of radioactive source materials. Supplementary types of evidence include tests for fluorescence using ultra-violet light, the photographic test using ordinary photographic film, and the electroscope tests which is primarily used in the laboratory.²² Prospecting for uranium has been carried on primarily by the use of Geiger and scintillation counters, the readings of which are significant in determining the location of radioactive ore bodies. However, consideration must be given to the fact that elements other than uranium are also radioactive.²³ In addition these instruments are subject to failure due to defective batteries, malfunction of the mechanism due to rough or improper handling in the field and subjection of the instrument to extreme humidity or cold. Readings obtained when one or more of these conditions are present may result in error. Such erroneous readings could cause needless expenditure of time, effort and money on a worthless prospect as well as cause oversight of a valuable deposit. The Geiger counter and the use of the ultra-violet light have been mentioned in one report.²⁴ However, in view of the uncertainties described above it is believed that additional evidence would be required to establish a valid discovery.

Anomalies (areas of greater than average radioactivity) discovered by the use of airborne scintillation detection equipment are recorded by a gyro-stabilized continuous-strip-film camera. The distance from the ground is measured with a continuously recording radio altimeter. Radio-activity anomalies cannot be interpreted in terms of either radioactive content or the extent of mineralization. Airborne radioactivity measurement does not permit distinguishing between activity due to thorium or that due to uranium. An anomaly may therefore represent radioactivity due to thorium, uranium, both of these elements, or other as yet unknown factors. Only an approximate location of a radioactive anomaly can be made on a map due to errors in base maps in which it is impossible to find and plot recognizable land marks. Any particular anomaly may represent either slightly greater-than-average radioactivity over an area of several thousand square feet, or high radioactivity over an area of a few hundred square feet.

22. Atomic Energy Commission and U. S. G. S., "Prospecting for Uranium" (1951).

23. Ibid.

24. United States v. W. L. Ross, I. D. Case No. A-26941 (1954).

Anomalies suggest areas in which uranium or thorium deposits are more likely to occur but probably would not establish discovery of a valuable uranium deposit.²⁵

Core drilling of small diameter holes to depths of a few hundred feet may serve in the mining industry to block out ores or to help decipher the subsurface geologic structure. A study of the stratigraphy and structure may be made by examination of the core.²⁶ The rock core that is cut in diamond drilling, or by any improved type of core bit in ordinary rotary drilling is by far the best index of the formations penetrated.²⁷ The type of record obtained in drilling is of great importance. Reliability of cores obtained may vary considerably depending upon the proficiency of the operation and the type of drilling equipment used.²⁸ Application of the various methods of testing as previously mentioned, applied to cores, will yield valuable evidentiary data in establishing proof of discovery.

Chemical assays of samples are referred to in many cases where the validity of claimed discoveries of valuable mineral deposits were in issue.²⁹ The weight accorded this type of evidence has to a degree depended upon the method of sampling.³⁰ Therefore sources of samples from the surface of claims, excavations—open cuts and shafts, and from cores, and the results of assays thereof, should be carefully recorded to provide dependable evidentiary data for future reference.

A common sense approach to this problem dictates that it begin with the premise that the miner desires to locate a body of ore having commercial possibilities and from which his efforts will ultimately yield him a profit. The primary factors which the miner will consider in his search are the presence of mineral, the grade of ore contained in the deposit, and the extent of the ore body. It is not, therefore, surprising that all applications of the standard of a valuable mineral discovery involve the consideration of evidentiary data relating to the above mentioned factors. However, since these are all matters involving difficult determinations of non-record facts, mining titles in the absence of patent are fraught with uncertainty. In addition the requirement of an actual discovery, even in the face of geological evidence warranting further exploration, is not conducive to the fullest exploitation of our uranium resources.

ELMER C. WINTERS

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25. Trace Elements Memorandum Report 508, United States Atomic Energy Commission Airborne Radioactivity Survey of Campbell and Johnson Counties, Wyoming, Aug. 21 - Sept. 3, 1952.
 26. Lahee, Frederic H., "Field Geology" p. 579, 5th ed. (1952).
 27. *Id.* at 580.
 28. *Ibid.*
 29. United States v. J. C. Ternahan, I. D. Case No. A-26359 (1952).
 30. United States v. M. V. Dorn, I. D. Case No. A-26194 (1951).