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RE: Paleontological Resources Reconnaissance Letter Report

July 20, 2009

This letter report presents the findings of an informal field reconnaissance, literature review, and fossil locality record search conducted for the Pandora 2009 Project (Project). The Project area of potential effect (APE) for paleontological resources is located in Sections 5 and 6, Township 29 South, Range 25 East, and Section 32, Township 28 South, Range 25 East, San Juan County, Utah. The paleontological work was completed by SWCA Environmental Consultants at the request of Christy Woodward of Denison Mines (USA) Corp. (Project Owner).

Geologic mapping (Doelling 2004) indicates that two geologic units occur within the Project APE. These include the Jurassic-age Brushy Basin Member of the Morrison Formation and the Cretaceous-age Burro Canyon Formation. Both of these units are known to contain locally abundant vertebrate fossils from the Jurassic and Cretaceous periods, respectively. Both units are considered to be highly paleontologically sensitive and have been designated as Class 5 by the U.S. Bureau of Land Management (BLM) using the Potential Fossil Yield Classification System (BLM 2007).

The late Jurassic-age Brushy Basin Member is the uppermost unit of the Morrison Formation, and in the project APE it conformably overlies the Salt Wash Member. The conglomeratic and coarse-grained sandstone facies of the Salt Wash Member have been actively mined for uranium in the Project APE. However, the overlying Brushy Basin Member, which is locally exposed on the surface of the Project APE, is known to contain dinosaurs from elsewhere in Utah and to the west in Colorado. These include well known genera such as *Stegosaurus*, the sauropods *Diplodocus*, *Apatosaurus* (Brontosaurus), *Brachiosaurus*, and *Camarasaurus*, and the carnivorous theropods *Allosaurus* and *Ceratosaurus* (see Chure et al. 1998 for a complete list). Other fossils known include invertebrates such as snails, bivalves (Good 2004), and brachiopods; crocodiles, lizards, snakes, and fish (Chure 1992); pterosaurs (Jensen and Padian 1989); and

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mammals including triconodonts, multituberculates, and eupantotheres (Rasmussen and Callison 1981; Kielan-Jaworowska et al. 2004).

The Cretaceous-age Burro Canyon Formation is the eastern equivalent of the Poison Strip Member of the Cedar Mountain Formation. In Utah, the line of demarcation between the Burro Canyon and Cedar Mountain formations is arbitrarily placed along the Colorado River (Stokes 1952). Lithologically the eastern Burro Canyon Formation is composed predominantly of sandstone, while the western Cedar Mountain Formation is composed predominantly of mudstone. This difference is a result of southeast thickening of the sandstone-dominated Poison Strip Member (Kirkland and Madsen 2007). Together, the Cedar Mountain and Burro Canyon formations contain a diverse fauna of dinosaurs from the middle Cretaceous (Neocomian to Albian; Kirkland 2005). These include the recently described therizinosaurid *Falcarius* (Kirkland et al. 2005) and dromaeosaurid *Utahraptor* (Kirkland et al. 1993), but these formations also contain the ankylosaur *Gastonia*, sauropod *Cedarosaurus*, and small coelurosaur *Nedcolbertia*, as well as a number of iguanodonts and other dinosaur genera (see Weishampel et al. 2004:554). Most of these dinosaurs are found around the San Rafael Swell and north of Arches National Park in Emery and Grand counties. The Oklahoma Natural History Museum Hotel Mesa Site occurs east of the Colorado River, and is within units mapped as Burro Canyon Formation. This site has produced dinosaur bones, including a juvenile brachiosaurid (Kirkland and Madsen 2007). Other fossils from the Burro Canyon Formation include petrified wood, invertebrates, and crocodile and dinosaur trackways (Utah Geological Survey 2008). Exposures of the Burro Canyon Formation in San Juan County have not been extensively surveyed for paleontological resources. The Burro Canyon Formation locally consists of medium- to coarse-grained sandstone beds that form a broad ledge around the project APE. The sandstones weather a yellowish-gray color, and are less well cemented than sandstones in the stratigraphically higher Dakota Formation. Local exposures within the project APE show medium-size crossing bedding indicative of fluvial deposition.

A search of the Utah Geological Survey/Bureau of Land Management electronic locality database found no previously known paleontological localities within a 1-mile radius of the Project APE (on either BLM or U.S. Forest Service [USFS] land). No significant fossils were observed during the field reconnaissance. Non-significant silicified wood fragments were observed weathering out of rocks of the Burro Canyon Formation, indicating that this unit is locally fossiliferous in the general area. The absence of previously recorded fossil localities in the Project APE area is likely the result of the minimal bedrock exposures and extensive soil and vegetative cover in the area.

With the approval of the local BLM Moab Field Office and Manti-La Sal National Forest, exposures of the Morrison and Burro Canyon formations were not surveyed in detail for paleontological localities. No previous paleontological resource surveys have been conducted within the Project APE. In general, impacts to surface fossils resulting from the proposed ground-disturbing actions are anticipated to be negligible due to the surface characteristics (minimal exposed bedrock) of the Project APE. However, impacts to scientifically significant subsurface fossils are possible wherever excavations that disturb bedrock Morrison and Burro Canyon formations take place. If any subsurface bones, teeth, or other potential fossils are discovered by construction personnel during surface-disturbing activities, work within a prescribed buffer zone (50 feet is recommended) should cease, the Project Owner should notify the appropriate agency (BLM or USFS) and a qualified paleontologist should inspect the discovery immediately to evaluate its significance and make further recommendations.

Sincerely,



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