SCIENCE RATIONALE ASSOCIATED WITH THE MARS EXPLORATION ROVER MERIDIANI PLANUM LANDING SITE. Raymond E. Arvidson, Washington University, One Brookings Drive, Campus Box 1169, St. Louis MO 63130 (arvidson@wunder.wustl.edu).

The Meridiani Planum Mars Exploration Rover landing site is located on smooth plains that expose the top stratum of a widespread layered complex that overlies Noachian cratered terrain. This top unit is interpreted from MGS TES spectra to exhibit up to 15% by area of gray crystalline hematite, mixed with basaltic materials. Further, the unit exhibits dark, featureless plains, dark dunes, and inter-dune areas that expose bright underlying strata. Several hypotheses have been developed for emplacement and/or modification of the deposits and the widespread occurrence of hematite. The hypotheses include deposition in a large lake basin in oxygenated waters, accumulation and subsequent hydrothermal alteration of volcaniclastic deposits, and anhydrous oxidation of magnetite during emplacement as volcanic flows. The rover, with its Athena Payload, will be able to characterize the dark and bright materials exposed within a few hundred meters of the landing site, including use of Pancam and Mini-TES to determine the morphology and mineralogy of the units, and deployment of the Microscopic Imager, Moessbauer and Alpha Particle X-Ray Spectrometers onto key targets for in-situ observations. Particular attention will be given to delineating morphologic, textural, and mineralogical evidence to test among and update the hypotheses for the origin and evolution of the deposits, particularly the role of water in formation of hematite.