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DETECTING LIFE IN RETURNED MARS SAMPLES: UPDATING THE DRAFT TEST PROTOCOL

Abstract

Understanding how to detect life in extraterrestrial samples is a key aspect of planetary protection, both to protect the Earth when material is returned and to determine the level of protection appropriate for astronauts visiting the source object. Establishment of a comprehensive life-detection protocol is a necessary precursor to robotic sample-return missions from Mars, which are also desirable as a precursor to human exploration. Experience from previous efforts to detect life in extraterrestrial samples, both the Apollo program and the Viking missions, provide useful lessons-learned regarding how to improve life detection protocols. The 2002 Draft Test Protocol for Detecting Possible Biohazards in Martian Samples Returned to Earth [1] was developed to support international Mars Sample Return efforts, and is currently being updated jointly by NASA and ESA in support of their planetary protection policies [2, 3]. Life detection measurements are relevant both scientific and planetary protection interests; however, the need to demonstrate adequate confidence in the safety of samples prior to release from containment, specifically for planetary protection purposes, will drive regulatory decisions.

Ref. [1] Rummel, J.D et al., eds. A Draft Test Protocol for Detecting Possible Biohazards in Martian Samples Returned to Earth. NASA/CP-2002-211842, 2002. [2] National Aeronautics and Space Administration, Biological contamination control for outbound and inbound planetary spacecraft, NPD 8020.7G, Washington, DC, 2008. [3] European Space Agency, ESA planetary protection requirements, ESSB-ST-U-001, Noordwijk, 2012.