

MARS SAMPLE RETURN – HEALTH AND SAFETY

Health and safety refers to programs, guidelines, and procedures that protect the safety, welfare, and health of persons engaged in particular work or the public. The overall goal of any health and safety program is to create a safe working environment and to reduce the risk of accidents, injuries, and fatalities either on the job or to members of the public. As discussed in Section 3.2 (Incomplete or Unavailable Information) of the Programmatic Environmental Impact Statement, the potential for pathogenic effects from the release of small amounts of Mars samples is regarded as being very low; therefore, within the context of this document, health and safety analyses focuses on the design mitigations and protocols utilized to minimize the potential risk associated with Mars sample release during landing and recovery.

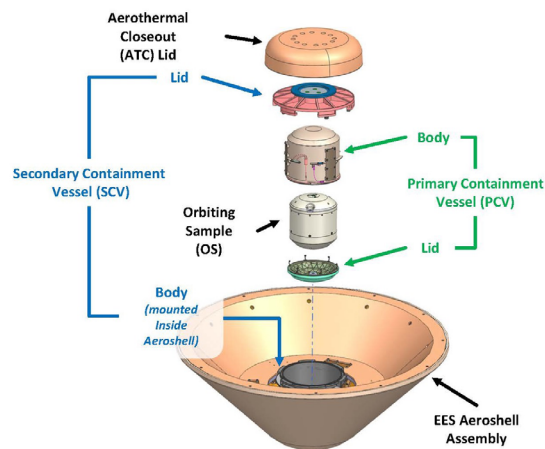
Proposed Action: (see Proposed Action and No Action Alternative Factsheet)

Programmatic Analysis

Significant adverse impacts associated with EES transportation to a Sample Receiving Facility (SRF) are not anticipated. The travel and handling procedures for the EES and the security and functionality of the SRF would be based heavily on the proven techniques used for safely handling biological toxins and known infectious agents used in Earth-based research labs. Potential impacts associated with SRF development and operation would be related to the location, type, and size of the facility.

Site-Specific Analysis (Utah Test and Training Range (UTTR) / Dugway Proving Ground)

Significant adverse impacts at the UTTR or Dugway Proving Ground are not anticipated. During landing site preparation, the potential for unexploded ordnance encounters is small, and during all operations in the area there would be an unexploded ordnance technician with project personnel.



Personnel tasked with debris removal activities would be trained to identify potential unexploded ordnance and removal would be deferred to trained explosive ordnance disposal personnel in accordance with U.S. Air Force requirements. With regard to EES release and landing, the MSR Campaign has established stringent probability targets to drive robust containment engineering. The MSR Campaign selected a target value equivalent to a 99.9999% probability of successful containment. Throughout MSR Campaign element design, NASA will continue to assess numerous factors that may influence Mars material containment and/or sterilization success for each vector. For EES recovery, all personnel involved in recovery operations would be required to wear personal protective equipment (PPE). After the EES has been transferred, in the travel case, from the site to the vault, soil and PPE may be decontaminated. The exact means of potential decontamination has not been determined. However, any decontamination activities would follow standard decontamination protocols for biological hazards.

NASAfacts

Overall Health and Safety Risks

Health and safety risk is addressed through the prevention of backward contamination (i.e., planetary protection), which is provided by the low probability of failure of the engineered containment systems intended to provide containment of the Mars sample material under all circumstances to which it is expected to be exposed. Implementation of actions that are in line with accepted procedures used for the isolation of biohazard materials provides additional protection against the release and spread of such material. Given implementation of these precautions and given that Mars materials are not expected to have significant pathological impacts if released into the Earth's biosphere, on-site mission preparation (to include testing, rehearsals, and landing site preparation), EES landing, and EES recovery operations are expected to have minimal direct or indirect impacts on human health at the UTTR or in general.

No Action Alternative

Under the No Action Alternative, the MSR Campaign would not involve the landing of Mars samples at the UTTR and an SRF would not be developed. Therefore, the No Action Alternative would not result in any additional impacts to human health or safety within or adjacent to the proposed landing site outside of those associated with ongoing and potential future military operations and other activities occurring at the site. Potential impacts associated with development of an SRF would not be realized.