Mars Sample Receiving Project

Mars SRP Environmental Impact Statement NEPA Tier II Approach

Jan Vedanth, SRP Lead (JSC)
Amy Keith, SRP Co-Lead (HQ)
Vicky Ryan, JPL

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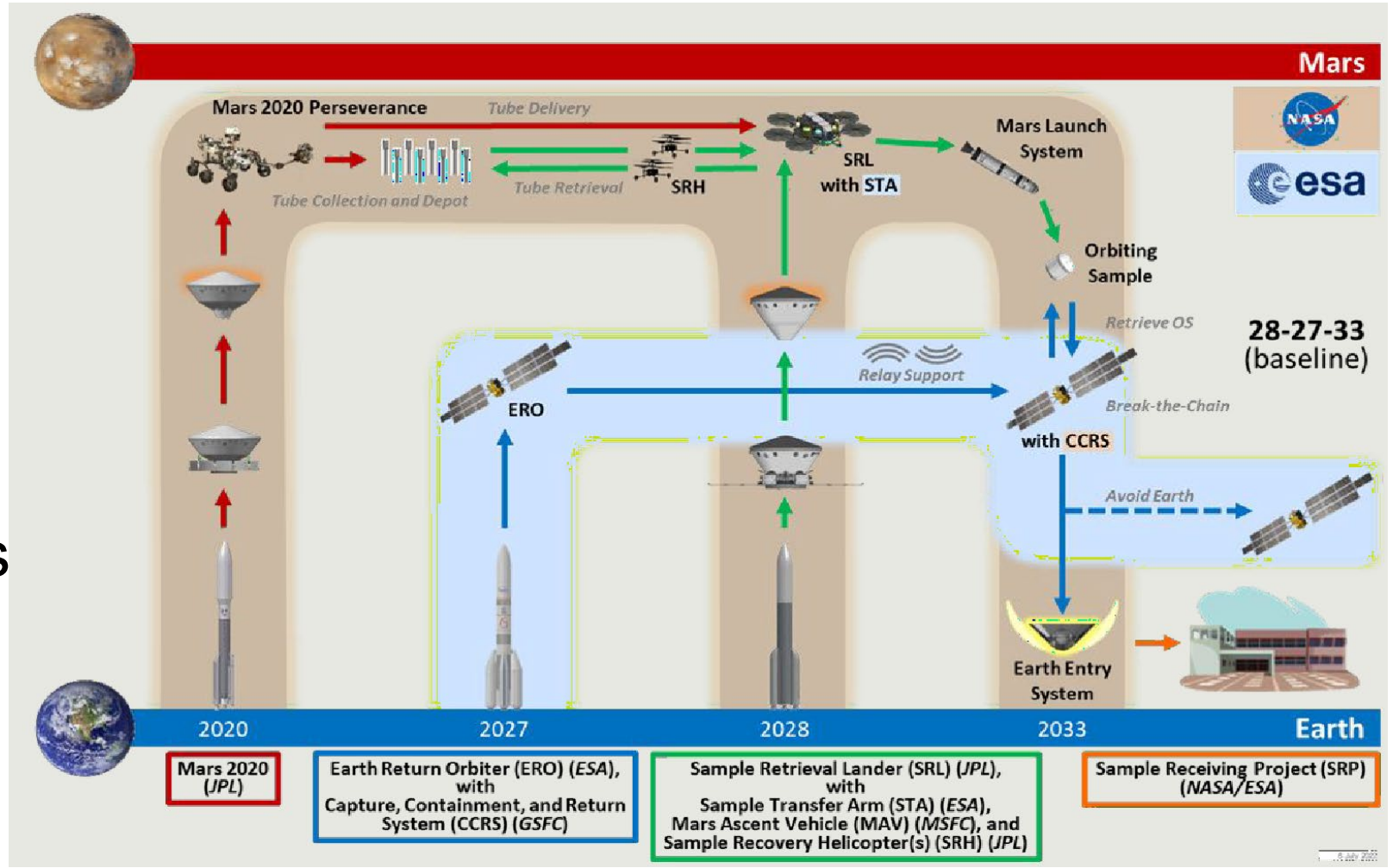
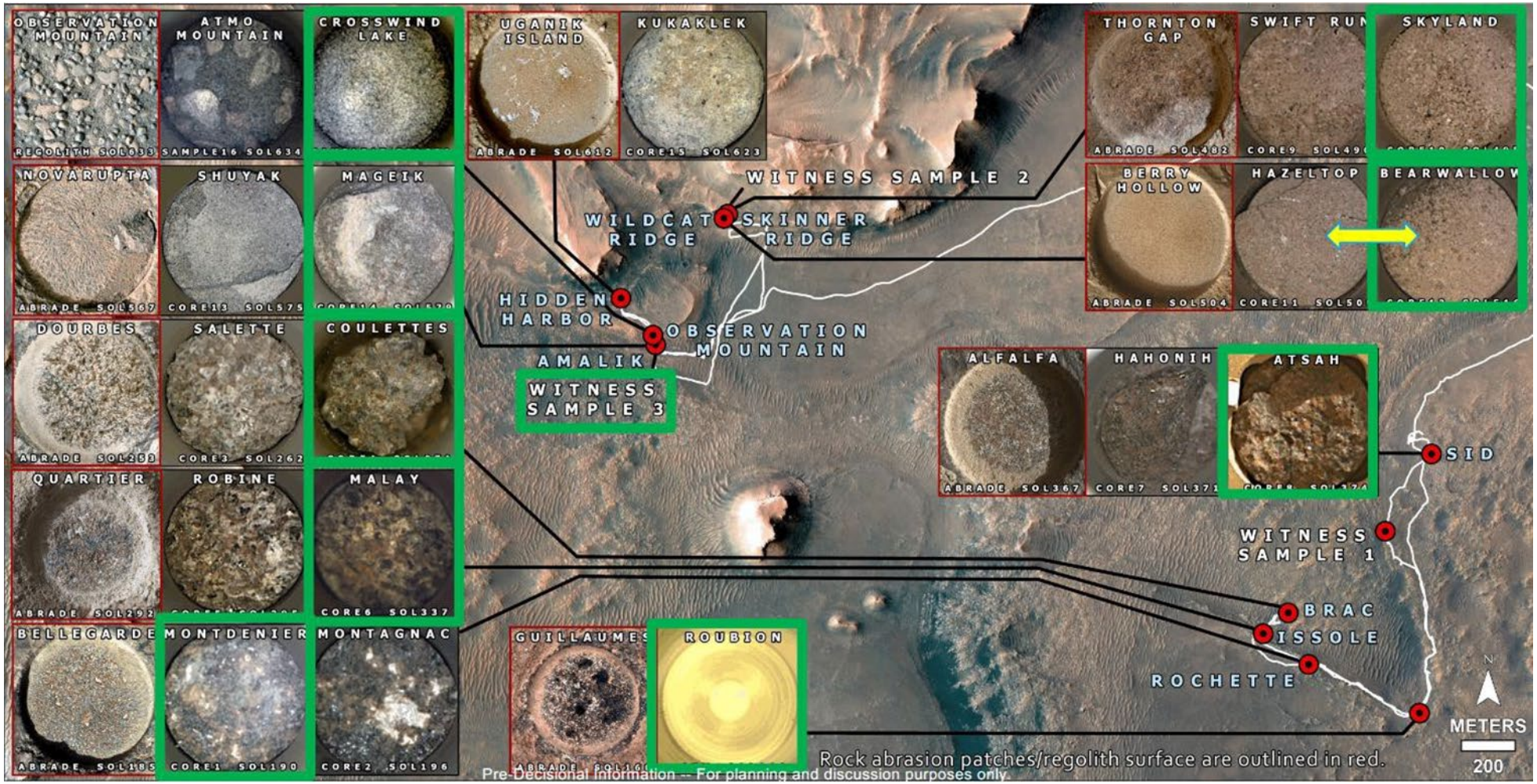
VIDEO-MSR

INTRODUCTION

- Mars Sample Return (MSR) is a joint venture between NASA and ESA.
- The Campaign will notionally return between 10-26 geologically diverse samples (plus witness tubes) able to answer an array of science objectives.



CACHED SAMPLES



Green highlights tubes cached at Three Forks

MSR Campaign Overview

Previously Covered under Mars2020 NEPA

Programmatic Analysis (Flight and Ground Elements)

Tier I – Site Specific Analysis Flight Elements

Tier II – Site Specific Analysis Ground Elements

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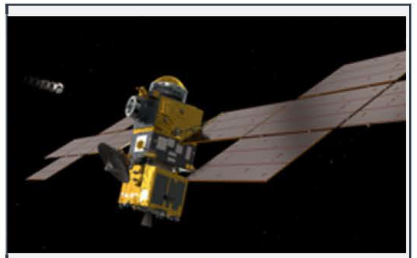
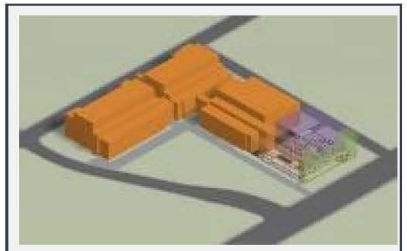
				
Sample Caching Rover (Mars 2020) Operations *Collect samples of rock & sediment and cache for retrieval* • *Sample acquisition* • *Sample (subset) delivery*	**Sample Retrieval Lander (SRL)** *Retrieve samples and launch into Mars orbit.* • *Mars Ascent Vehicle (MAV)* • *Orbiting Sample (OS) container*	**Earth Return Orbiter (ERO)** *Capture and contain samples in Mars orbit and safely return to Earth.* • *Capture/Containment and Return System (CCRS)* • *Earth Entry System (EES)*	**EES Transportation** *Transport contained samples to receiving facility* • *EES transportation to Sample Receiving Facility (SRF)* • *Over the Road (OTR) and/or aircraft*	**Sample Receiving Facility (SRF)** *Safety assessment and sample containment* • *Initial curation and sample science investigations*

MSR Campaign Flight Elements | **MSR Campaign Ground Elements**

NEPA Rationale

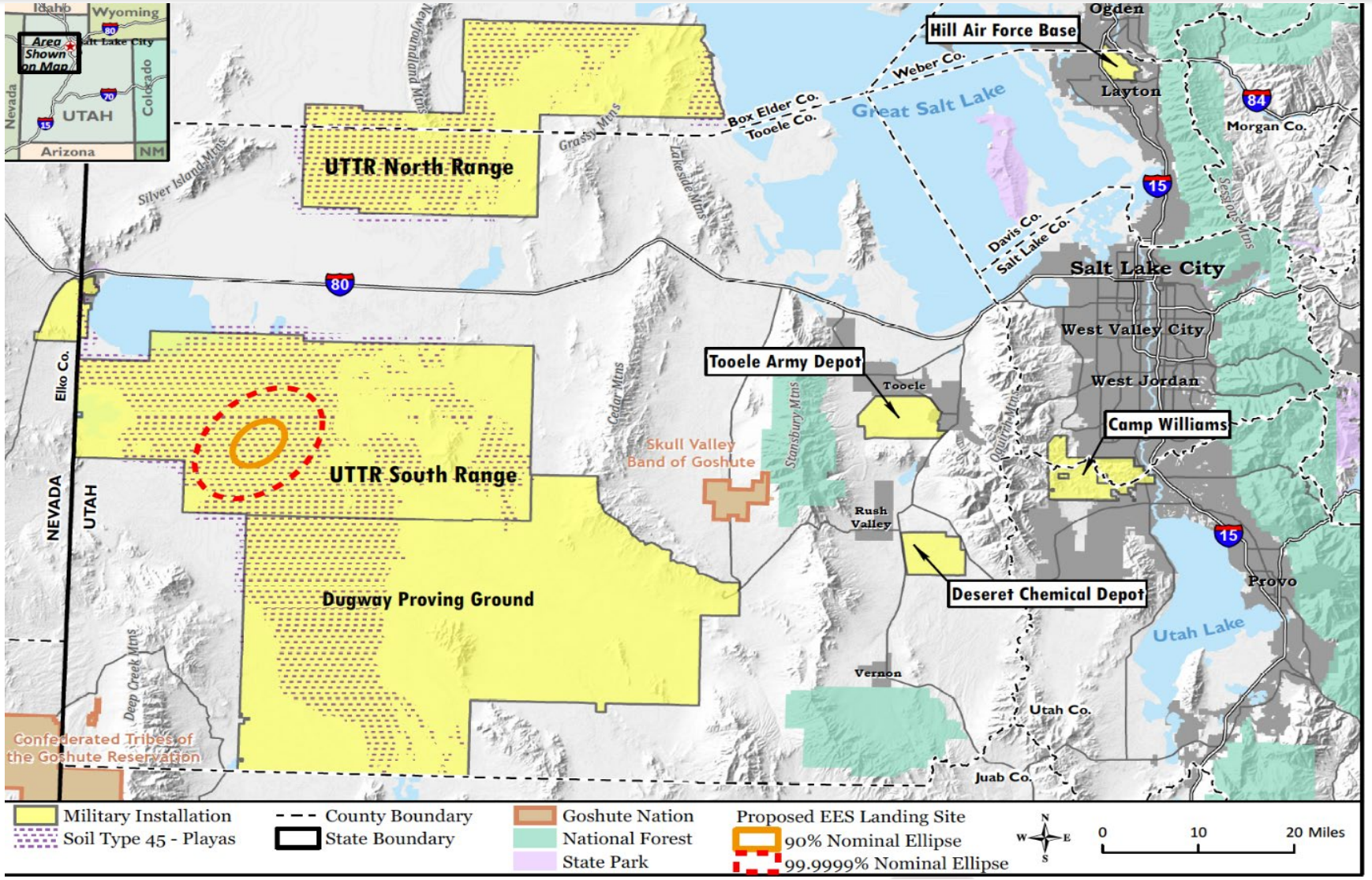
Due to the potential for past or present indigenous life forms on Mars:

- Sample return portion of the MSR Campaign is classified as a Category V Restricted Earth Return (RER) activity;
- Requires an EIS under 14 CFR 1216.306

Two-tiered Programmatic Environmental Impact Statement (EIS) considers potential impacts associated with the return of Mars samples to Earth:

- Tier I focuses on the MSR flight elements SRL and ERO, plus ground recovery;
- Tier II focuses on transportation of samples and the Sample Receiving Facility

SAMPLES LANDING SITE



For Planning and Discussion Purposes

Potential Environmental Impacts Evaluated in Tier I PEIS

Subsequent chapters of the Programmatic EIS includes a discussion of the potential environmental consequences from the MSR Campaign.

- Potential impacts to these resources:
  - Health and safety
  - Land use
  - Water resources
  - Biological resources
  - Hazardous materials
  - Cultural resources
  - Air resources
  - Geology resources
  - Climate change
  - Traffic
  - Socioeconomics

- NEPA process may require consultation with outside agencies:
  - Historic Preservation Office and local Native American Tribes regarding the National Historic Preservation Act
  - U.S. Fish and Wildlife
  - U.S. Corps of Army Engineers
  - Possible cooperating agencies
    - US Air Force: manages launch facilities at CCSFS and proposed landing site at UTTR
    - US Army: responsible for transport via Biological Select Agent and Toxins (BSAT) protocols
    - Centers for Disease Control: invited due to expertise with BSAT possession, use, & handling
    - US Department of Agriculture: invited due to expertise with BSAT transport & protocols

Final Tier I PEIS and Record of Decision

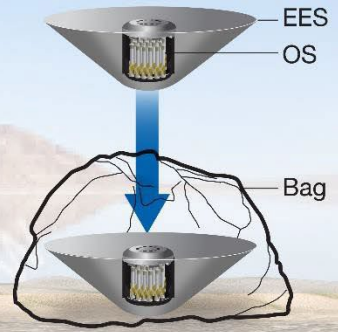
- Notice of Intent Publication: 15 Apr 22
- Public Scoping Period: 15 Apr – 16 May 22
- Public Scoping Meetings: 4/5 May 22
- Draft EIS Notice of Availability Publication: 4 Nov 22
- Draft EIS Public/Agency Review Period: 4 Nov – 19 Dec 22
- DEIS Public Meetings: 30 Nov 22 (virtual) / 6 & 7 Dec 22 (in-person)
- Final EIS Notice of Availability Publication: 2 June 23
  - Signed by Office of Strategic Infrastructure AA Joel Carney
- Final EIS 30-Day Waiting Period: 2 June – 2 July 23
- ROD Signature: NET July ‘23
  - Signed by SMD AA Nicola Fox

Recovery and Containment: Mars Rock Core Samples

PROTECTION LEVELS TUBE (RSTA) | OS (PCV) | EES (SCV) | BAG | CASE | VAULT

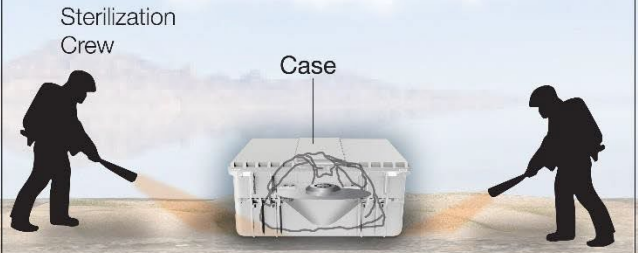
1 Bag enclosure

Earth Entry System **(EES)** containing Orbiting Sample **(OS)** lands in Utah mud flats. EES is bagged.



2 Case enclosure

Bagged EES is stored in **case**. Landing site cleaned using **heat and/or chemical sterilization.**



3 Transport to staging

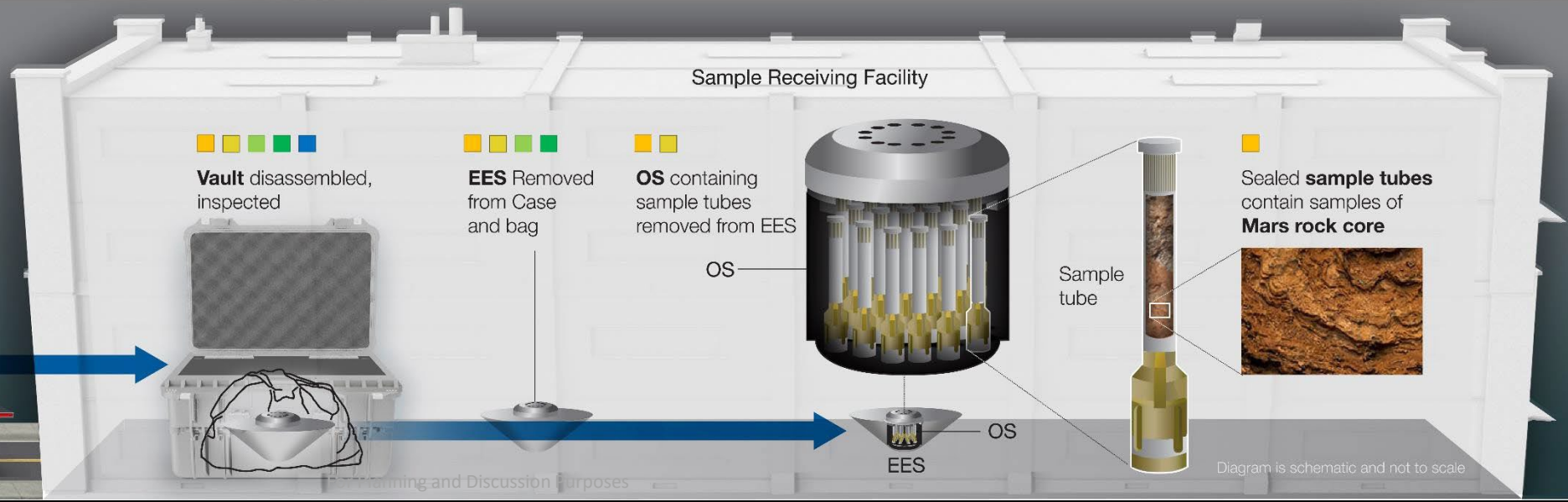
Case containing EES with sample is transported to staging area

4 Vault enclosure

Case containing **EES** is placed in a **vault** and transported to **Sample Receiving facility (SRF)**

5 Sample Receiving Facility

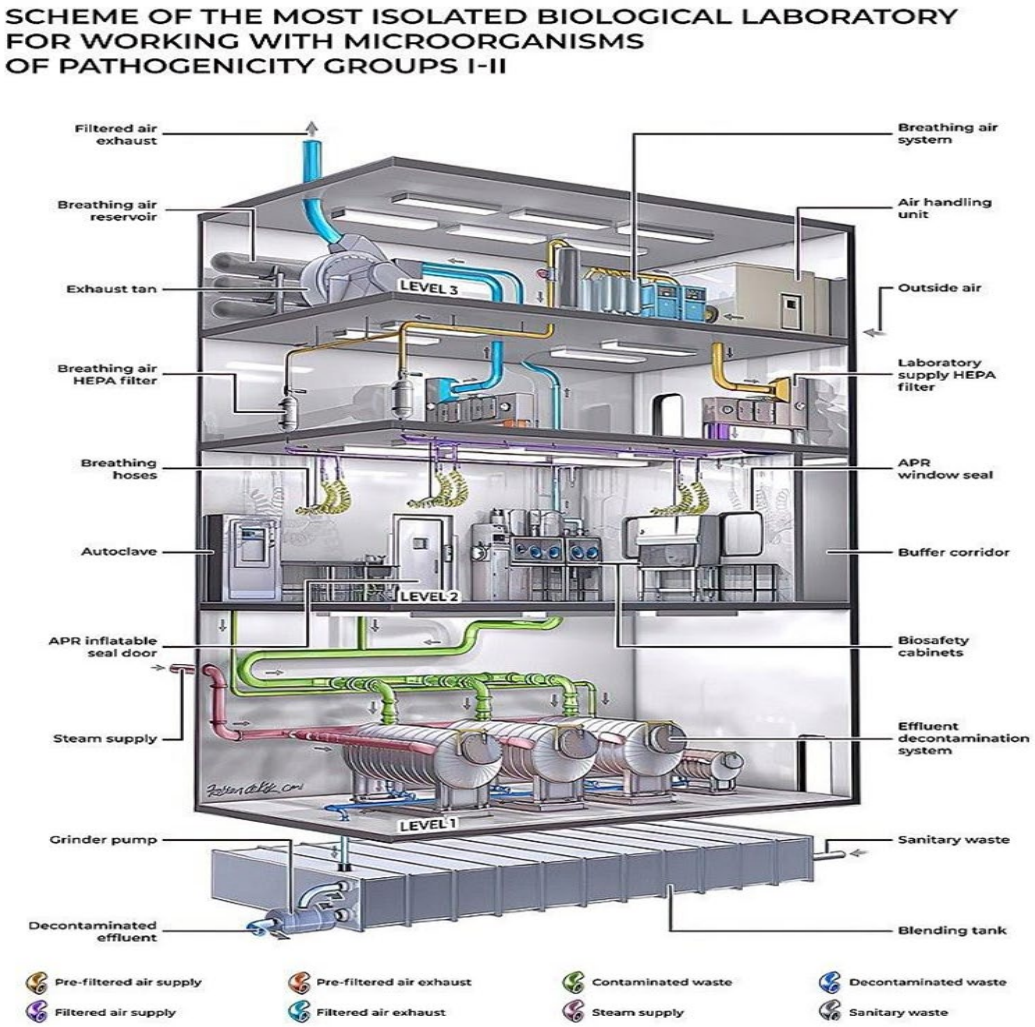
Vault enclosing case containing EES arrives at Sample Receving Facility.



SRF MODALITY OPTIONS

- New Traditional, Fixed High-Containment Facility (Cabinet Lab)
- New Modular High-Containment Facility (Suit Lab)
- Hybrid (New + Existing facilities);(Suit + cabinet)

HIGH-CONTAINMENT FACILITY



MODULAR OPTION

Potential Benefits

- Shorter design/construction/commissioning schedule.
- Flexibility for easier retrofits and future expansion.
- Tailored to SRP's needs.

The modular elements could be installed in a traditional building (existing or new) or shell structure.

Considerations

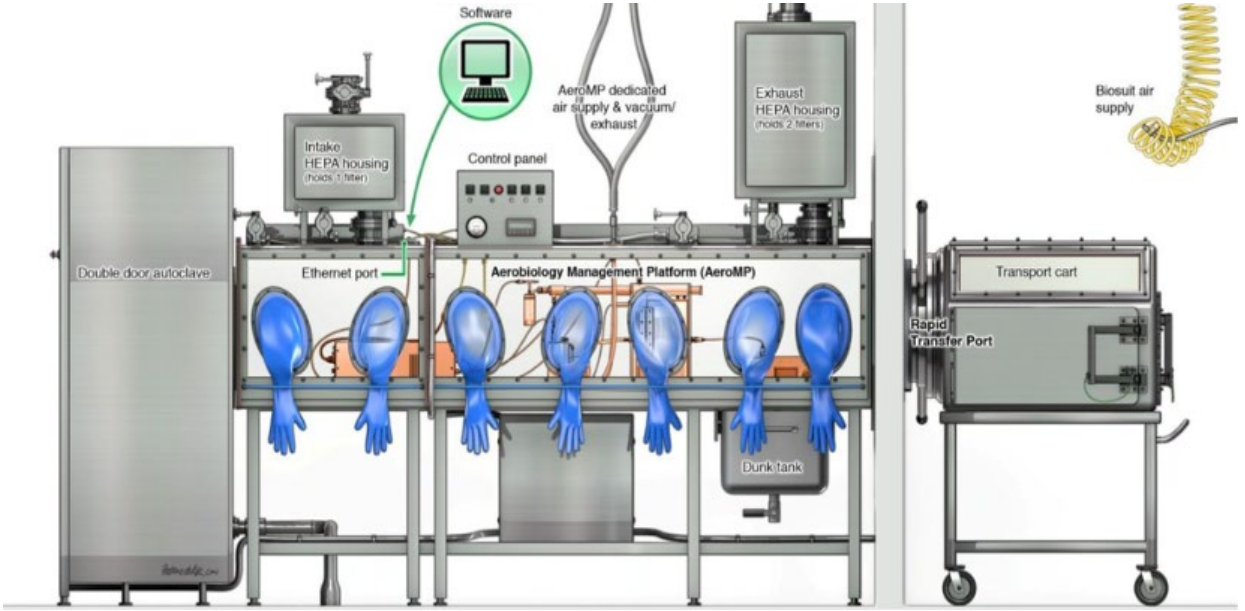
- Modular high containment type facility has never been installed before for this type of action.

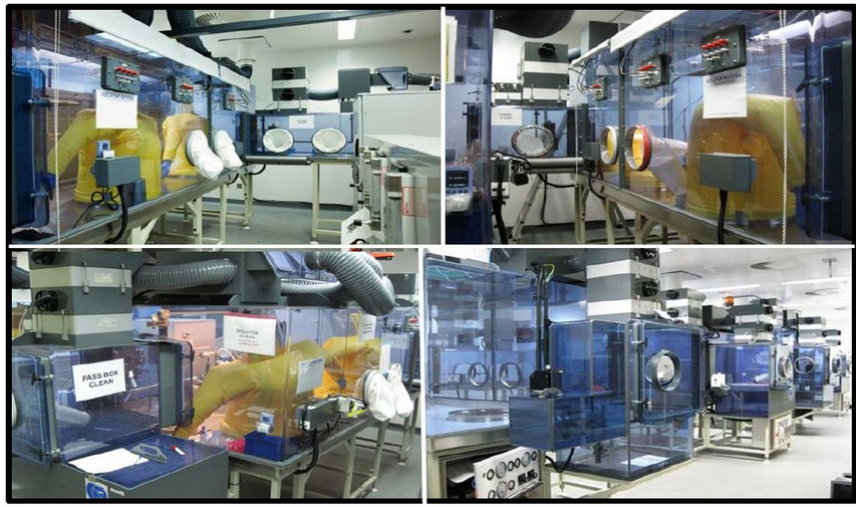
Mars Sample Receiving Project

Traditional Cabinet Lab option

Potential Benefits

- Shorter facility design/construction/commissioning schedule
- Flexibility for easier retrofits and future expansion
- Potential lower cost





Considerations

- Unsure if this model can meet contamination control requirements.
- Unsure if it can meet instrument accommodation requirements.

Hybrid Construction Approaches

Potential Benefits

- Shorter design/construction/commissioning schedule
- Flexibility for easier retrofits and future expansion
- Tailored to SRP's needs
- Leveraging decommissioned existing infrastructure
- Built-in high-containment expertise
- Existing community buy-in
- Relatively lower costs and shorter schedule

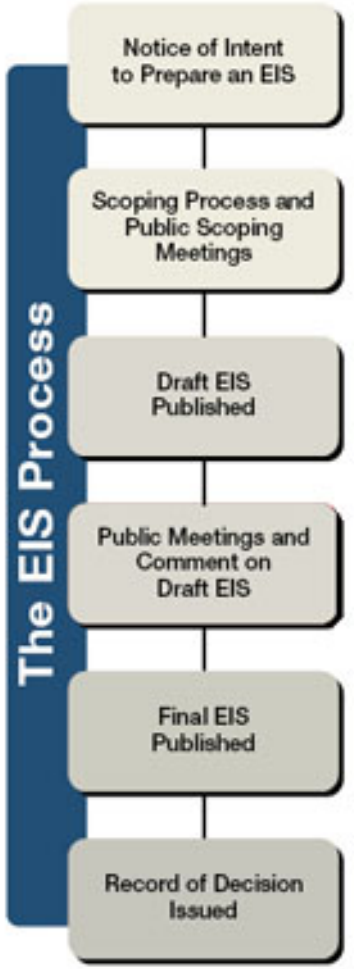
The advantage of a hybrid approach is that the facility could leverage the strengths of each other's approaches

Considerations

- Modular high containment is a relatively new technology.
- Multiple simultaneous construction projects (might impact schedule)

TIER II NEPA SCHEDULE AND KEY MILESTONES (NOTIONAL)

- Notice of Intent (NOI) Publication: January 2024
- Public Scoping Period: January – February 2024
- Public Scoping Meetings: September – February 2024 (at sites that are under consideration)
- Draft EIS Notice of Availability (NOA) Publication: ~February 2025
- Draft EIS Public/Agency Review Period: March – April 2025
- DEIS Public Meetings: April 2025
- Final EIS Notice of Availability Publication: January 2026
- Final EIS 30-Day Waiting Period: January - February 2026
- ROD Signature: February 2026



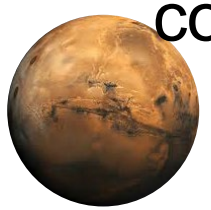
Currently SRP is working on refining program architecture with requirements. Next steps include MSAS 2 study to refine SRF requirements

CLOSING HIGHLIGHTS

- Proper prioritization of the considerations will enable a highly capable, fully operational SRF by October 2033, Uncontained (Long term) curation facility will be at JSC.

- NASA and ESA are taking a “safety first” approach to designing and engineering every step of Sample Receiving Project (SRP).
  - Complementary NASA/ESA SRF studies will inform site-specific design.
  - Site specific design will further inform the NEPA process with regards to alternatives (Modality, Transportation and type of facility)

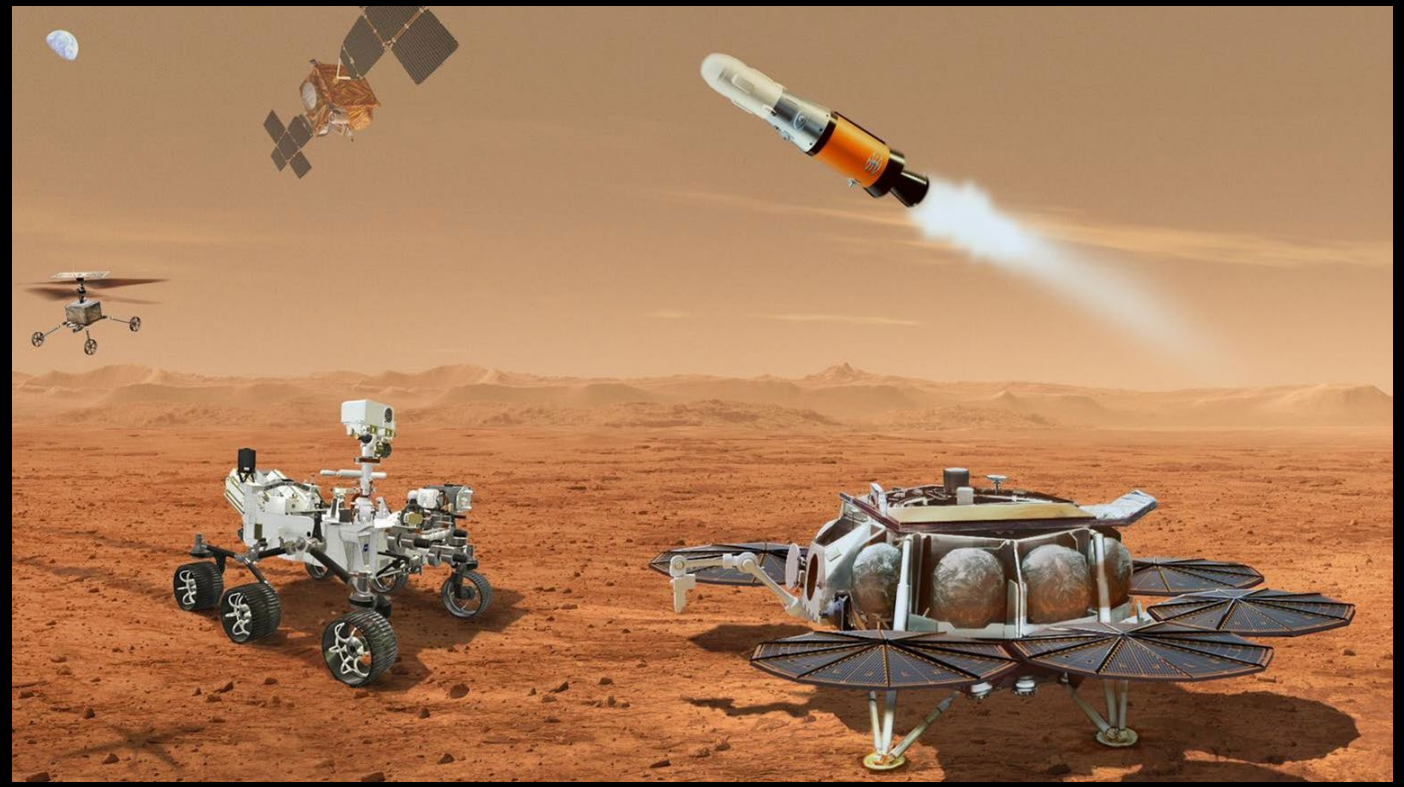
- The nature of SRP planning requires effective communication across Agencies (national and international), Centers, the scientific community, and the general public.



NEPA Team

<u>NEPA Core Team</u>
Jan Vedanth, SRP Lead, NASA JSC
Amy Keith, SRP Co-Lead, NASA HQ
Vicky Ryan, Jet Propulsion Laboratory
Paul VanDamme, Jet Propulsion Laboratory

<u>NEPA Extended Team</u>
Alvin Smith, SRP Project Manager
Andrea Harrington, SRP Curation Lead
Richard Mattingly, JPL SRP Ground Activity Lead
Brian Shirey, JPL PP Lead
Richard Fowler, NASA JSC
Jason Callahan, SMD Program Liaison
Curtis Borland, NASA OGC Attorney



MSR Campaign Risk Communication

Risk Communication for MSR Program NEPA (Tier I)

- Produced a variety of multi-use information products
  - Responses-to-Queries (RTQs)
  - Message Points
  - Fact Sheets: Why MSR? The Safety of MSR. UTTR: Proposed Landing Site
- Supported NEPA public meetings
  - Developed specific Safety message points and RTQs on the NEPA process
  - Coordinated and hosted virtual (on-line) meetings [two for scoping, two for draft EIS] via Webex, including informational slates and provision of prompt meeting recordings/transcripts (via Webex)
  - Supported face-to-face NEPA public meetings in West Wendover and Salt Lake City, Utah
  - Reviewed draft EIS and scoping materials from a risk communication perspective
- Conducted numerous one-day Communications Effectiveness Training sessions
  - Planetary Protection, Science, Mars Ascent Vehicle, CCRS, ESA/Earth Return Orbiter, etc.)
- Provide ongoing guidance to Program management and reviews of Public Engagement and Media materials for appropriate conditional phrasing and consistency of safety-related language

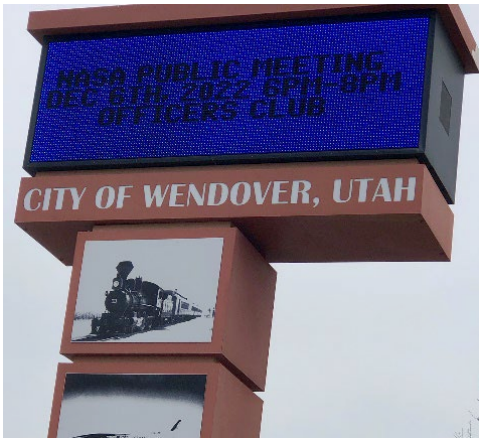
NEPA Public Meetings

Wendover, UT – Brinkman Service Club

Onsite Team

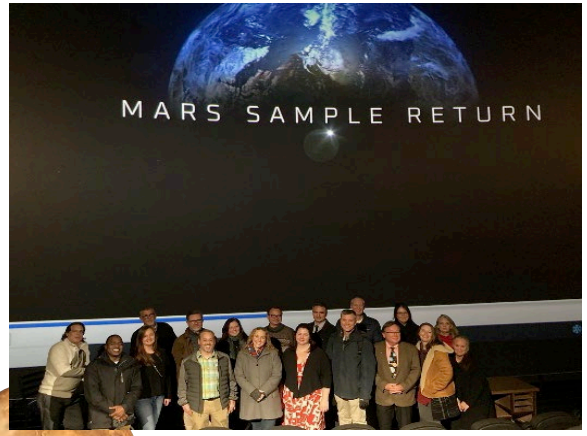
Welcome Table

Presentation



Notice at the City Office

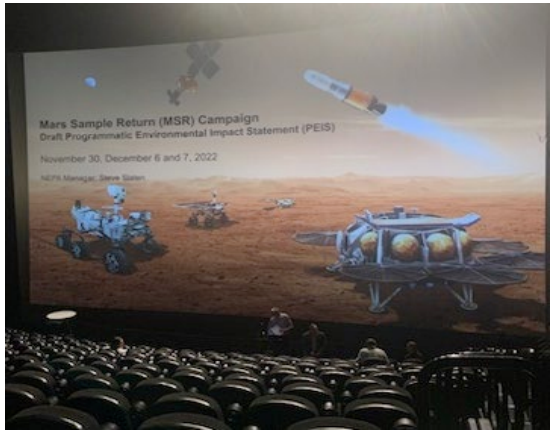
Salt Lake City, UT – Clark Planetarium



Onsite Team

Steve Slaten at NEPA Station

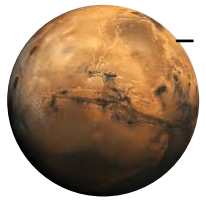
Public on the way to the presentation



Presentation in the theater (practice)

Risk Communication for the MSR SRP (NEPA Tier II)

- Planned tasks include support for NEPA process, ongoing public engagement around potential SRF sites, and contingency planning for Earth Entry System landing/recovery/transportation
  - Best practices in messaging framework and wording choices based on past decade of work on NASA planetary protection topics
  - Contingency planning strategy informed by recent experience with launches of MSL and Mars 2020 (nuclear safety aspects)
- Key deliverables include Risk Communication Plan, Responses-to-Queries, Fact Sheets, and Communications Effectiveness Training for key spokespeople
  - One training session held for cadre from MSR Campaign Science Group-2; second session pending
  - Session(s) for core leadership of SRP planned for summer 2023
- Media activities and public engagement heavily dependent on active participation by NASA JSC Office of Communications
- Support for contingency planning connected to preparation of a Joint Information Center (JIC) per the National Response Framework
  - JIC staff consists of public information officers from key Federal/state/local partner agencies, led by NASA Communications representative
  - Risk Communication role includes assistance with development of operational procedures and public safety messaging, recovery rehearsals, and landing day operations
- Early engagement with Utah community and Hill AFB is underway
  - Helped staff Mars 2020/MSR exhibit at biennial Hill AFB Air Show in June 2022; positive response, plan to continue
  - Intent to attend and observe OSIRIS-REx landing/recovery operations in September 2023



BACK-UP: WHAT IS RISK COMMUNICATION?

- A coordinated approach for communicating about potentially controversial topics with the media, the public, educators, legislators, and governmental bodies.
  - **Major elements**: strategic thinking, advanced planning, cultivating an "open" mindset among project leaders and partners, developing public trust through well-prepared, empathetic, visible spokespersons
  - **Goal**: A shared, sharpened awareness of potential stakeholder concerns about the proposed action
  - **Key Principles**: Be open, respectful, clear, accurate timely, accessible, interactive
- Recognizes the citizen's role in considering the value and safety of major Federal endeavors.
  - Good Risk Communication takes the initiative to create effective information products, and use popular communications channels to facilitate the citizen's role in Federal decision-making processes
  - "Risk communication is successful only if it adequately informs the decision maker." - National Research Council, Committee on Risk Perception and Communication (1989)
- Demonstrates an agency's commitment to proactive, open and informed dialogue between experts and the public about environmental and/or matters of public safety.
  - Promotes better-informed public discussion and (ideally) greater appreciation for agency's decision rationale
  - Done effectively, risk communication builds mutual trust and is a "win-win" for the public and the agency