



U.S. OFFICE OF SPECIAL COUNSEL
1730 M Street, N.W., Suite 300
Washington, D.C. 20036-4505

The Special Counsel

September 28, 2023

The President
The White House
Washington, D.C. 20500

Re: OSC File Nos. DI-21-000239 and DI-21-000325

Dear Mr. President:

I am forwarding to you reports transmitted to the Office of Special Counsel (OSC) by the National Aeronautics and Space Administration (NASA) in response to the Special Counsel's referral of disclosures of wrongdoing by employees at NASA, Washington, D.C. The whistleblowers, Senior Astrobiologist ██████████, who consented to the release of her name, and an anonymous whistleblower, alleged that NASA officials failed to implement required planetary protection protocols for the Mars 2020 mission (Mars 2020). I have reviewed the disclosures, reports, and whistleblowers' comments, and in accordance with 5 U.S.C. § 1213(e), have determined that the reports contain the information required by statute and the findings appear reasonable.¹ The following is a summary of those findings.

The Allegations

The whistleblowers explained that Mars 2020's primary goal is to land the Perseverance Rover on Mars, explore the planet, seek signs of life, collect samples, and return those samples to Earth on the second leg of the mission. The Perseverance Rover landed on Mars on February 18, 2021. ██████████ explained that Mars 2020 is being run by the Jet Propulsion Laboratory (JPL)—which is federally funded through NASA—but managed by the California Institute of Technology. ██████████ alleged that JPL successfully pressured NASA to alter planetary protection policies and committees to make hardware cleanliness requirements less stringent. Further, ██████████ alleged that the Perseverance Rover failed to meet surface cleanliness requirements, did not apply any cleanliness standards to the Ingenuity helicopter, and utilized test tubes that failed testing, in violation of NASA Procedural Requirements (NPR) 8020.12D and the Outer Space Treaty of 1967. ██████████ explained that clean hardware prevents

¹ The allegations were referred to Acting Administrator Steve Jurczyk for investigation pursuant to 5 U.S.C. § 1213(c) and (d). Chief of the Astromaterials Research and Exploration Science Division Eileen Stansbury conducted the investigation. Chief Resilience Officer Melanie Saunders was delegated authority to review and sign the reports.

contamination of outer space with biological and organic material from Earth and ensures a clean environment for scientists to identify and contain potentially harmful biological or organic material that is obtained from outer space. The anonymous whistleblower also alleged that the hexane wash used to clean the Perseverance Rover's sample caching system was ineffective for such use.

The Agency Report

1. The agency found that changes to Mars 2020 planetary protection policies and committees were reasonable and appropriate.

The investigation confirmed that there were changes to planetary protection policies and committees for Mars 2020. The reports explained that prior to July 2017, the Office of Planetary Protection (OPP) held both operational and regulatory responsibilities for planetary science issues. Due to "the ambiguity of returning cached samples," OPP and JPL officials disagreed about the appropriate planetary protection standards. Ultimately, when NASA restructured OPP as a "technical authority" to provide regulatory guidance and approval, JPL created a Planetary Protection Manager in charge of implementing operational requirements, and both were subject to NASA's standard conflict resolution procedures. In 2015, Mars 2020 was categorized as Category V Restricted Earth Return (the most stringent planetary protection standard) due to the returnable sample caching system, in accordance with NPR 8020.12D. However, in 2018, NASA approved a system deviation for the first leg of the mission that changed the hardware cleanliness requirements. Most notably, the requirement to meet total organic contamination level of potential regolith² samples was permitted to exceed the baseline, but not the threshold. The reports explained that the system deviation was reasonable because "Martian environment conditions ... contribute to clean, sterilize, and disperse contaminants" and "transport analysis techniques were used to assess and quantify biological cleanliness gradients."

2. The agency did not substantiate that Mars 2020 failed to meet surface cleanliness requirements, helicopter cleanliness requirements, or that it utilized hardware that failed testing.

The reports provided a detailed summary of NASA's efforts to prevent organic contamination of the rover's various systems and stages during the mission. In sum, the agency found that "Mars 2020 bioburden results are comparable to previous missions." While the agency acknowledged that "there continues to exist room for improvement in general cleanroom training and protocols, communication, and cross-organization team dynamics," the reports found "minimal evidence of erosion of planetary protection requirements or failure to oversee planetary protection testing for the Mars 2020 project." No data was found to be out

² Regolith is a blanket of unconsolidated, loose, heterogeneous superficial deposits covering solid rock.

of compliance during OPP's independent bioburden validation prior to final installation of the Ingenuity helicopter. However, the reports noted that only the blades of the helicopter were tested, rather than 10% of a representative surface area, as generally required by NPR 8020.12D. The investigation found certain sample tubes experienced cracks and sealing failures during testing. Although these sample tubes were replaced, the reports noted that their replacement may not have been communicated to OPP. Finally, the reports acknowledged that the first regolith sample was estimated to exceed the threshold total organic contamination permitted under the system deviation. The reports explained that taking a second sample shortly after the first decreases the total organic contamination below the threshold. The reports further explained that the "failure to meet the baseline total organic does not present a significant threat to planetary protection but potentially affects some Mars sample return science."

3. The agency did not substantiate that the hexane wash used to clean the Perseverance Rover's sample caching system was ineffective.

The investigation found that hexane wash is an "extremely effective solvent" and was only used as a final high purity rinse of intimate hardware components of the sample caching system. While the agency acknowledged that hexane is not effective in removal of fluorinated greases, that is not the purpose of the final high purity rinse. The reports explained that the sample caching system was cleaned and verified clean with various precision cleaning procedures dependent on the specific component—including mechanical, aqueous, solvent, ultrasonic, and vapor degreasing processes.

The Whistleblowers' Comments

The whistleblowers disagreed with the reports' conclusions. ██████████ stated that NASA is ignoring serious concerns about potential Mars biohazards and the reports demonstrate that NASA failed to ensure sufficiently low levels of Earth contamination or maintain detailed records of Earth contamination possibly introduced into Mars samples. ██████████ expressed frustration at NASA's lax attitude about potential sources of contamination, especially given the longstanding international agreements about planetary protection and prior mission failures due to excessive contamination. ██████████ also expressed concern that NASA has not proposed sufficiently independent planetary protection oversight. The anonymous whistleblower disagreed with the agency's conclusion that hexane is an extremely effective solvent and noted that use of hexane in connection with organic contamination measurements can produce false negatives.

I thank the whistleblowers for bringing these allegations to OSC's attention. As required by 5 U.S.C. § 1213(e)(3), I have sent a copy of this letter, agency report and whistleblower comments to the Chairs and Ranking Members of the Senate Committee on Commerce, Science, and Transportation and the House Committee on Science, Space, and Technology.

The President
September 28, 2023
Page 4 of 4

I have also filed redacted versions of these documents and the redacted referral letter in our Public File, which is available at www.osc.gov. This matter is now closed.

Respectfully,

A handwritten signature in black ink, appearing to read "Henry J. Kerner". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Henry J. Kerner
Special Counsel

Enclosures