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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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October 23, 2015

Honorable Gene L. Dodaro
U.S. Comptroller General
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Dodaro,

Over the past half-century, the National Aeronautics and Space Administration (NASA) has relied on nuclear-powered Radioisotope Power Systems (RPSs) to support deep space exploration. By converting heat into electricity, an RPS can provide power to a spacecraft system for decades. Such systems have been used in Apollo-era science experiments on the Moon, in the Galileo mission to Jupiter, and in the Pioneer and Voyager space probes now exiting our solar system. Currently RPSs are being used to power the Mars Curiosity rover, the Cassini orbiter at Saturn, and the New Horizons spacecraft now roaming beyond Pluto. NASA plans to use a RPS to power its next mission to Mars planned for 2020.

The nuclear fuel used in RPSs is a plutonium (Pu) isotope known as Pu-238. Production of Pu-238 is the responsibility of the Department of Energy (DOE). DOE and NASA have a 1991 Memorandum of Understanding for provision of Pu-238 for NASA missions. However, DOE has been unable to produce Pu-238 for over 25 years (production ceased in 1988). As a result, NASA and other government customers have relied on a small and dwindling stockpile of domestically produced Pu-238, as well as Pu-238 purchased from Russia. NASA's plans for future deep space missions, other government demands for the material, and the natural radioactive decay of stockpiled Pu-238 will exhaust existing supplies of the material within the next decade.

In its two most recent NASA authorization bills, this committee highlighted the need for RPSs to support future deep space exploration missions, and this Committee has raised concerns in its most recent NASA Authorization bills about whether the planned production of Pu-238 is sufficient to meet Agency needs and can be done in a cost effective manner. Furthermore, concerns continue to be raised by the scientific community about the availability of Pu-238 to support critical planetary missions in the next decade. For example, in the most recent decadal survey on planetary science conducted by the National Academies of Science, committee members raised alarms about the limited supply of Pu-238 noting that the missions recommended as part of the survey could not be carried out without new production of Pu-238,

that any delay in production would increase costs, and that no alternative exists for powering deep space missions. Recently, NASA has elected to use unproven solar technology to power its planned mission to Europa in part because of concerns about the availability of Pu-238 to meet mission needs.

To meet the continuing need for RPSs, Congress in 2012 directed that NASA provide funding for DOE to resume Pu-238 production. NASA is currently providing about $50 million annually for this effort, and production of small amounts of Pu-238 are expected to begin around 2019. DOE conducts this work through its Work-for-Others program.

DOE's plans for the resumption of Pu-238 production are complex. Three contractor-operated DOE sites are involved in the process, including Idaho National Laboratory (near Idaho Falls, ID), Oak Ridge National Laboratory (Oak Ridge, TN), and Los Alamos National Laboratory (Los Alamos, NM). The three sites are managed by different DOE programs (the Office of Nuclear Energy, the Office of Science, and the National Nuclear Security Administration which is a semi-autonomous DOE agency) and are also managed by different contractors.

Further complicating matters, GAO has documented that DOE projects and programs often run into schedule and cost difficulties. More specifically, GAO has designated since 1990 DOE's National Nuclear Security Administration and its predecessor organization's contract management (both contract administration and project management) as a high-risk area because DOE's record of inadequate management and oversight of contractors has left the department vulnerable to fraud, waste, abuse, and mismanagement.

Given these multiple and complex factors, the Committee has concerns about DOE being able to provide reasonable assurance to NASA and the nation that Pu-238 production will resume in a timely and affordable way. Accordingly, the Committee requests that GAO examine NASA's establishment of deep space power requirements and DOE's plans for the resumption of Pu-238 production in support of these requirements. In doing so, you should address:

1. The validity of the process NASA and DOE have used to determine Pu-238 production requirements;
2. What analyses have been done to assess the cost-effectiveness of the current plans for resuming production of Pu-238 and any alternative approaches to meeting U.S. needs for power to support deep space missions;
3. What the cost, schedule, and key milestones are for DOE's resumption of Pu-238 production and whether these estimates are realistic;
4. How DOE is managing the Pu-238 production effort and the chief internal controls and measures the Department is using to ensure the program meets efficiency, cost, and schedule targets;
5. How NASA and other Federal agencies will preserve the infrastructure and workforce necessary for production of radioisotope power systems and how NASA will ensure

that its reimbursements to DOE associated with such preservation are equitable and justified;

6. Whether DOE's schedule for production of Pu-238 will meet the planned development schedules of NASA missions that will require Pu-238, and the potential implications if the Pu-238 production schedule is delayed;

7. To what extent delays in DOE's production of Pu-238 could impact NASA's ability to meet National Academies of Sciences decadal survey recommendations; and

8. To what extent Pu-238 production is impacting NASA's prioritization and selection of missions?

Sincerely,

Lamar Smith
Chairman

Brian Babin
Chairman
Subcommittee on Space