From: Taylor, Renee **On Behalf Of** McCree, Victor
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To: NRC Employees Distribution <NRCEmployeesDistribution@nrc.gov>
Subject: Innovation and Transformation at the NRC

January 4, 2018

MEMORANDUM TO: All NRC Staff

FROM: Victor M. McCree ***/RA/***
Executive Director for Operations

SUBJECT: Innovation and Transformation at the NRC

In 1991, the Commission established the following Principles of Good Regulation to guide our regulatory activities: *Independence, Openness, Efficiency, Clarity, and Reliability.* Use of the five principles in our regulatory decision-making has enabled us to ensure safety and security while appropriately considering the interests of NRC stakeholders. In the intervening years, nuclear technology has been relatively stable and, apart from the changes noted below, the corresponding revisions to the NRC's regulatory framework, policies, and practices have been relatively modest.

We have a history of changing the NRC's regulatory infrastructure in order to improve our effectiveness and efficiency. Examples include creating centers of expertise, improvements in the backfit process and Project AIM. These initiatives can be characterized as innovative changes (innovation), because each resulted in new, improvised and/or different ways to conduct the identical work. While innovation produces meaningful differences, it also tends to be incremental and inconsistent. The NRC's ability to proactively innovate through Project AIM, and our commitment to continuous improvement, have been acknowledged by our external stakeholders, positioning us favorably in budget and government-wide reform initiative deliberations. More importantly, the willingness and ability to innovate through meaningful yet incremental change is essential to our long term success. This belief is reflected in our recent initiative to create an Innovation Forum, which provides a strategic agency-wide framework to foster improved effectiveness and efficiency in the NRC's existing processes and procedures.

As we look to the future, however, it has become apparent that the introduction and use of new and novel technologies in the nuclear industry will challenge our current regulatory framework. This represents an opportunity to ensure NRC's commitment to continued improvement in regulatory effectiveness, efficiency and agility. Transformative work is not new to NRC employees. Examples of previous efforts include the development and implementation of the reactor oversight process (ROP), as well as the development and application of 10 CFR Part 52 licenses, certifications, and approvals for nuclear power plants. The ROP expanded NRC's use of probabilistic safety assessment tools in our safety oversight of operating reactors providing a more safety focused and objective approach to oversight. 10 CFR Part 52 transformed NRC's approach to the licensing process for new reactors by providing for the issuance of an early site permit, design certification, and combined licenses, thereby ensuring predictability in the review processes.

Although we are already engaging the nuclear power industry to enhance the regulatory guidance for the introduction of digital instrumentation and control in safety-related applications, we recognize that without additional changes in our regulatory approach, some licensees have indicated that they will be unwilling to initiate plant modifications. Past experience in seeking to reform the NRC's regulatory framework in this area has not kept pace with demand or international deployment, despite broad agreement on the potential overall safety benefits. In such instances, the existing regulatory framework can limit our capability to adapt to external factors, and create unnecessarily complex and untimely decision-making. It can also cause stakeholders to view our regulatory approach as unreliable, inefficient, and unclear, contrary to our principles. In addition, the nuclear industry's initiatives involving the use of accident tolerant fuels, new materials and new manufacturing approaches[1], Big Data[2], as well as the development of small modular and advanced reactor designs have created unique and unprecedented opportunities to change our regulatory infrastructure, including our regulations, policies, procedures, training, approaches, and practices.

Therefore, as we continue to strive for excellence in ensuring the safe and secure use of nuclear materials in the 21st century, while keeping pace with the use of new and advanced technologies, we must not only innovate, but also identify and implement transformative change (transformation). Transformation of our regulatory infrastructure will be evidenced by significantly different ways to regulate and is meant to realize marked enhancements in our effectiveness, efficiency and agility. In creating an environment that embraces both innovation and transformation to achieve excellence, and as a means to regulate new and novel technologies, we will continue to fulfill our mission in a manner that demonstrates our principles.

In closing, each of you play a key role in our success and I sincerely appreciate all that you do. So, your active involvement in our efforts to identify, encourage, and implement innovation and transformation to advance our safety and security mission is essential. To accelerate our efforts in the area of transformation, in the next few weeks, I will create a Transformation Team to begin gathering information to inform our thinking and decisions about how to develop NRC's transformation framework. The team will also begin to explore areas for future transformation, including ways to enable the safe and secure use of new technologies. One way of participating in this initiative is to consider applying to the forthcoming OEDO Transformation Team rotational announcement.

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[1] New materials and new manufacturing approaches refer to those novel or perhaps unconventional use of materials other than those typically utilized. For example, materials generated through the use of three-dimensional printing, high-temperature materials, High-Density Polyethylene (HDPE) piping, or advanced steel alloys.

[2] Big Data—broadly considered as datasets whose size, complexity, and heterogeneity preclude conventional approaches to storage and analysis—continues to generate interest across many scientific domains in both the public and private sectors.