Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions

TESTIMONY SUBMITTED BY

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TO THE

SUBCOMMITTEE ON CLEAN AIR, CLIMATE CHANGE AND NUCLEAR SAFETY

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

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Mr. Chairman and members of the Subcommittee, on behalf of the Union of Concerned Scientists, I thank you for this opportunity to present our views on the regulatory processes for existing and potentially new nuclear power plants.

My name is David Lochbaum. After obtaining a degree in nuclear engineering from The University of Tennessee in 1979, I worked more than 17 years in the nuclear power industry, mostly at operating reactors in Georgia, Alabama, Mississippi, Kansas, New Jersey, Pennsylvania, New York, Ohio and Connecticut. I joined the Union of Concerned Scientists in October 1996 and am the Director of the Nuclear Safety Project. Since nearly its beginnings in May 1969, UCS has maintained an interest in nuclear power plant safety. UCS is neither an opponent nor a supporter of nuclear power – our interest is that of a nuclear safety advocate.

In a prior oversight hearing, Chairman Voinovich impressed upon the Nuclear Regulatory Commission the need to improve its processes for assessing safety culture at nuclear power plants. The NRC got the message and undertook a series of public meetings with internal and external stakeholders to develop methods to regulate safety culture that will be implemented in the near future. I participated in the public meetings conducted by the NRC and sincerely believe the proposed revisions will provide effective regulatory assessment of safety culture. Chairman Voinovich and this Subcommittee deserve credit for calling the NRC's attention to the safety culture gap in its regulatory processes. Likewise, the NRC deserves credit for avoiding the temptation of merely applying a band-aid to the gap and instead devoting the resources needed to prepare an effective permanent fix. (Attachment 1 provides a fuller explanation of our position on the NRC's revised safety culture processes.)

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The safety culture gap had significant safety and economic consequences. The March 2002 discovery of serious degradation to the reactor vessel head at the Davis-Besse nuclear plant in Ohio has been attributed to its owner having placed production ahead of safety. Ten years ago, both reactors currently operating at the Millstone nuclear plant in Connecticut began long outages to restore margins caused by its owner having an improper safety focus. Nearly twenty years ago, both operating reactors at the Peach Bottom nuclear plant in Pennsylvania began long outages to restore margins also caused by its owner having an improper safety focus. While no one died from any of these events, operation of the reactors in the months and years prior to discovery of their extensive safety impairments exposed nearby communities to unnecessarily elevated risks. In addition, allowing the safety impairments to grow to epidemic levels resulted in unnecessarily high restoration costs to ratepayers and stockholders.

The revised regulatory processes soon to be adopted by the NRC have great potential. But even if that potential is fully realized, future safety impairments like those that afflicted Peach Bottom, Millstone and Davis-Besse will likely continue to occur at existing – or new – nuclear power plants unless two other steps are taken. One step should be relatively easy for the NRC to take. It merely involves expanding the scope of its generic communications program to include safety culture issues. The NRC's generic communications program uses an array of communication documents (e.g., Regulatory Issue Summaries, Information Notices, Generic Letters, and Bulletins) to help its licensees learn lessons from safety problems experienced here and abroad. Upon receiving generic communications from the NRC, owners incorporate applicable lessons into training programs and procedures at their plants. Literally thousands of generic communications issued over the past four decades are posted on the NRC's website at http://www.nrc.gov/reading-rm/doc-collections/gen-comm/. A small handful of these numerous generic communications deal with safety culture problems. For example, the NRC issued Information Notice 2002-11 (available online at http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/2002/in02011.html) to alert plant owners to the reactor vessel head degradation found at Davis-Besse. The NRC never issued a single generic communication document about the determination that production had been placed ahead of safety at Davis-Besse, even though it caused the extensive reactor vessel head degradation and several other equipment problems. **The NRC must issue generic communications when safety culture problems are identified so that other plant owners can incorporate applicable lessons into their training programs and procedures like they do for equipment related problems.**

The other step the NRC needs to take requires more effort. I recently completed an assessment of the times when nuclear power reactors had to shut down for a year or longer to restore safety levels. My research focused on the causes of these year-plus outages. The NRC's current regulatory processes were then back-tested against the outages causes. My work, which will be documented in a report issued by UCS in the near future and respectfully submitted to this Subcommittee at that time, concluded that the leading cause for year-plus reactor outages remains ineffectively regulated today. More than 70 percent of the year-plus outages at U.S. nuclear power reactors over the past four decades have been caused by quality assurance program breakdowns. The NRC's regulations[1] require plant owners to have effective quality assurance programs that find and fix problems in a timely and effective manner. But time and again, those quality assurance programs utterly failed and the NRC did not detect the breakdowns until the sheer volume of problems missed or inadequately repaired eroded safety

[1] 10 CFR 50, Appendix B, "Quality assurance criteria for nuclear power plants and fuel reprocessing plants." Available online at http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appb.html.

levels so far that the reactors remained shut down for longer than a year while overdue corrective actions were finally taken.

The NRC's ineffective enforcement of its quality assurance regulations at Davis-Besse illustrates the problem. In March 2001, the NRC informed Davis-Besse's owner that its inspection team "*concluded that problems were properly identified, evaluated, and resolved within the problem identification and resolution programs*."[2] Problem identification and resolution programs are the current nuclear industry terminology for quality assurance programs. Less than a year later, extensive degradation to the reactor vessel head was identified at Davis-Besse. In August 2002, the NRC identified a long list of tasks to be completed before it would permit Davis-Besse to restart.[3] The first item listed by the NRC in a section titled "Adequacy of Safety Significant Programs" was "Corrective Action Program," the very same program determined by the NRC to be fully adequate in March 2001. The NRC's 2001 determination was completely erroneous. The quality assurance program did not conform to federal regulations in March 2001 or for several years prior to that date. The NRC failure to enforce its quality assurance regulations contributed to the depth and breadth of the problems plaguing Davis-Besse.

Nothing in the past five years leads us to suspect, yet alone believe, that the NRC's process for evaluating whether its quality assurance regulations are being followed is any more effective today. The recurring tritium spills at the Braidwood nuclear plant in Illinois and the recurring steam dryer damage at the Quad Cities nuclear plant in Illinois share a common cause – defective, pitiful quality assurance. The NRC's vision impairment to quality assurance program failures continues.

The NRC, or actually the NRC's predecessor the Atomic Energy Commission, promulgated its quality assurance regulations in June 1970.[4] Embarrassing quality assurance breakdowns at many nuclear power plants such as Zimmer in Ohio and Midland in Michigan prompted the NRC and the nuclear industry to adopt the terminology "corrective action programs" in the late 1980s to get away from the stigma that had become linked with "quality assurance programs" at nuclear plants. Embarrassing corrective action program breakdowns at many nuclear power plants such as Sequoyah and Watts Bar in Tennessee, Browns Ferry in Alabama, Indian Point in New York, and Millstone in Connecticut prompted the NRC and the nuclear industry to swap to "problem identification and resolution programs" in the late 1990s to once again avoid a stigma. Unless the NRC effectively enforces its quality assurance regulations, another stigma evasion swap will be needed towards the end of this decade because of embarrassing problem identification and resolution breakdowns at nuclear power plants such as Davis-Besse, Salem and Hope Creek in New Jersey, Palo Verde in Arizona, and Braidwood and Quad Cities in Illinois. **The NRC must consistently and effectively enforce its quality assurance regulations to avoid chronic erosion of safety levels that have led to dozens of year-plus reactor outages and which could someday factor in a tragic nuclear plant accident.**

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[2] Kozak, T. J. 2001. Davis-Besse nuclear power station NRC inspection report no. 50-346/01-05(DRP). Letter to Guy G. Campbell, vice president, nuclear, FirstEnergy Nuclear Operating Company, March 27. Thomas J. Kozak is chief, projects branch 4, division of reactor projects at the Nuclear Regulatory Commission.

[3] Dyer, J. E. 2002. Transmittal of NRC inspection manual chapter 0350 panel restart checklist. Letter to Lew Myers, chief operating officer, FirstEnergy Nuclear Operating Company, August 16. James E. Dyer is regional administrator at the Nuclear Regulatory Commission.

[4] Atomic Energy Commission, 1970. Quality assurance criteria for nuclear power plants. *Federal Register* (Vol. 35, No. 125, pp. 10498-10501), June 27. Washington, DC.

This second step requires greater effort by the NRC than the first step of expanding the scope of its generic communications program to include warnings about safety culture problems. But my research into year-plus reactor outages leaves me confident that the NRC can rise to the challenge. Year-plus reactor outages caused by events (e.g., the 1966 partial meltdown at Fermi Unit 1 in Michigan and the 1975 fire at Browns Ferry Units 1 and 2 in Alabama) and by damage to large components (e.g., the steam generator repairs at Turkey Point Unit 3 in Florida in 1981 and at Maine Yankee in Maine in 1995 and the piping replacements at Nine Mile Point Unit 1 in New York in 1982 and Pilgrim in Massachusetts in 1983) have essentially been eliminated due to successful regulatory actions by the NRC. There has not been a year-plus reactor outage caused by an event or damage to a large component in over a decade. But there have been 11 year-plus reactor outages caused by quality assurance program breakdowns in the past decade. Based upon the findings from my research, it is my firm conviction that year-plus reactor outages caused by quality assurance program breakdowns could be significantly reduced – if not outright eliminated – by proper regulatory attention from the NRC.

In closing, thanks largely to this Subcommittee and its Chairman, the NRC is about to implement revisions to its regulatory processes that should significantly reduce safety culture problems at nuclear power plants. The NRC needs to complement those changes by expanding the scope of its generic communications program to include safety culture problems when they are identified. And the NRC needs to supplement these measures by regulatory process changes that enable the agency to consistently and effectively enforce its quality assurance regulations.

On behalf of the Union of Concerned Scientists, I thank you for conducting this hearing and for including our perspective.