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To: U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001
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Chairman Gregory B. Jaczko
Commissioner Kristine L. Svinicki
Commissioner George Apostolakis
Commissioner William D. Magwood, IV
Commissioner William C. Ostendorff

Subject: Regulation of Nuclear Power Activities

Lady and Gentlemen:

I am a 'nuclear cowboy,' to use an industry phrase that I do not particularly like. Allow me to present myself.

I am Perry C. Cooper, born January 4, 1933 in West York, Pennsylvania. I received my bachelors degree in electrical Engineering from Columbia University in 1957 after two and one half years of study at that institution. My first two and one-half years of college were spent at the United States Naval Academy in Annapolis, Maryland. I passed a course in reactor engineering, at Columbia, prior to graduation.

After graduation from Columbia, the Electric Boat Division of General Dynamics Corporation, Groton Connecticut hired me . My first assignment was to the Knolls Atomic Power Laboratory's site in West Milton, N.Y., where Electric Boat was constructing the S3G prototype power plant for the USS Triton, SSN(R)586. After writing the installation procedures for and directing the installation of the main cooling pumps, I was assigned to assist another engineer, with previous reactor experience, named Jim Day, to write the assembly procedures and direct the assembly of that reactor.

Admiral Hyman Rickover interviewed me while we stood on top of that reactor while a fuel cell was being lowered into the reactor vessel. The vessel was filled with the moderating water. The core designer was a Dr. Luce, if I remember the name correctly. Luce monitored the inverse neutron multiplication rate as the increase in reactivity of that first time live core assembly occurred. When the reactor was completed, early summer of 1958, I had directed a first assembly of a nuclear reactor within one year of graduating from college.

Jim Day and I then directed the assemblies of the two S4G reactors in the SSN(R)586. When autoclave testing determined that the bolts connecting the lead screws to the control rods could fracture if the

reactor was scrammed dry or with steam, the first of those two reactors was disassembled and the fuel replaced. The replacement was performed in two weeks, start to finish. The same crew of tradespeople who had performed the three previous assemblies was used. When the reactors were complete, I was assigned the task of writing the initial power range testing sequence for the two reactors to obtain the operational data with the fewest possible changes of power level. I manned the operations control desk for one shift of that testing. In 1959, two reactor power plants had not been previously operated simultaneously, to my knowledge.

Responsibility for all reactor work within the Electric Boat operations department was then assigned to me. The first duty was to assemble the S5W reactor in the the SSBN 598. This first submarine that was to fire ballistic missiles from underwater was an extremely fast track project. When I reviewed the previous assembly of that reactor design, in the SSN585, it occurred to me that time could saved if most of the reactor head assembly could be accomplished onshore rather than inside the submarine. The suggestion was accepted. Jigs were designed and the work accomplished. After explaining the technique to other shipyards, it became standard practice in the submarine industry. The procedures I wrote became a chapter in the NavShips manual for that reactor. The technique reduced the delivery time for that ship by four weeks, others delays excluded. The Project Manager later informed me that the technique cut in half the cost of the reactor assembly.

Following assembly of the 598 reactor, I directed the assembly of S5W reactors in the SSBN599 and the SSN589. During the first of those assemblies, I trained the Rolls Royce engineer who had been selected to direct the assembly of the S5W reactor in HMS Dreadnaught, England's first nuclear submarine. I then assembled an S2C reactor in the USS Tullibee.

I was Senior Refueling Engineer for the USS Skate. That was an S4W reactor. I implemented the use of computer scheduling, PERT or CPM, for a refueling of the USS George Washington and once again explained the process to other shipyards and the Bureau of Ships. Electric Boat loaned me to Westinghouse as a project engineer for the dis-assembly of a steam generator removed from the S1W reactor at the National Reactor Testing Station, west of Idaho Falls. The work was performed in the Naval Expended Core Facility. There were myriad other repairs to reactors and facilities engineering projects.

What is described above was done between 1957 and about 1963. Four reactors were assembled during one twelve month period. During those years, I had de facto, not legal, responsibilities for ten reactor cores, new and spent.

An incident occurred, when cooling water from a spent fuel shipping container, was overflowing on a dock in a river. Three times, a representative of Adm. Rickover told me to do nothing to control the situation. Knowing full well that I was defying the US Government, I personally stopped the overflow to assure contaminated water would not reach the river, by opening a valve to dump fuel cooling water to a collection tank piped for that purpose. I did not drop the level of the cooling water to its prescribed level, only sufficiently to prevent additional overflow. I suffered no consequences for my actions and never heard any mention of that incident after it occurred, by persons who were present or others. That was the best decision that I ever made. Do not understand me to be writing that I approve of nuclear personal taking actions into their own hands. I cannot! But, all needs for action cannot be foreseen and it is essential that knowledgeable persons who can act be present when such needs occur.

Procedures offer no protection from the unexpected. Other incidents occurred that I anticipated and was bureaucratically told to ignore. One involved the possibility of an earthquake occurring while a container, while hanging from a crane hook, was transferring spent fuel from a reactor to a shipping container. Not allowed to write contingency planning into a procedure for such an event, I developed a personal, undocumented, unused plan of action for such an incident that included sacrificing a submarine by flooding a graving dock, if a transfer container should fall, capsize and lose fuel cooling water.

On another occasion, I recommended returning a submarine to the water when it proved not possible to completely decontaminate radioactivity from its external, stern surfaces. The ship had screwed up by improperly dumping demineralizer resin for primary, cooling water at sea, in violation of an international agreement, signed three months previously. It was satisfying to chide the customer about the mess. The surface contamination could be removed, however resin fines had entered the paint and would leach from the paint into overnight dew that condensed on the hull. The radioactivity of the leaching fines was sufficiently low that dilution in seawater was safer than bagging the submarine and workers to remove the paint by sandblasting.

A number of the tradespeople with whom I worked in those days were loaned to decontaminate a building in Chalk River, Canada. While I am not certain of all the details, the seal door on a container transferring spent fuel from a research reactor to a spent fuel pool jammed in an open position. The fuel overheated, melted, caught fire and dripped from the container before the entire container could be placed in the pool. Radioactive smoke covered the interior walls of the building, in addition to the fuel that dripped onto the floor and into the pool. I know nothing about that which was not contained.

Some of those same trades people had also been involved in the dis-assembly of S2G NaK cooled reactor in the shipyard. I was fortunate to have such experienced workers available to educate me in those days. In the event that you do not know about it, the reactor vessel, part of the hull and all piping containing NaK were place in a kerosene filled compartment of a vessel scuttled into the Atlantic Ocean, to sing into the mud. I am ignorant of any measurements following the scuttle.

Mud is incredibly encapsulating. Available oxygen is rapidly consumed. The mud is deep offshore of tectonic subductions where the seafloor has spread and accumulated sinking materials for many millions of years. It should be investigated for the disposal of nuclear waste. The location can be far from human activity and capable of encapsulation for multiple plutonium half-lives prior to subduction or scrapings by the basement rocks of continents.

A time and cost estimate for design and construction of a conceptual, unique, deep diving submarine for which I was a planner, was prepared after four PM, one afternoon and communicated at eight the next morning to Adm. Rickover in a congressional hearing room in Washington. The assumptions I was told to use were unrealistic and absurd. The Admiral arbitrarily shortened the submitted time and cost estimate to fifteen months and fifteen million dollars in testimony to obtain funding. I was irate! The admiral's testimony was fraudulent. While the testimony to obtain the funding was contrary to my ethics, the United States obtained a very valuable and necessary asset. The ship, the NR-1, was built at a cost of about $109,000,000. I do not regret its construction.

Just prior to 1970, I left the industry. While performing long range, life cycle planning for a new class of submarines, I decided that the United States and the Soviet Union had enough weaponry and

equipment to destroy the earth about ten times over and that I was not afraid to die a second time. By that time, I had had enough responsibility for one lifetime and I desired a gentler existence. It was time to learn something new.

About 1963, Westinghouse and General Electric began promoting their reactor knowledge to the electrical power generating industry. The corporations pitched proposals as "Turn Key," we build it and you turn it on and run it. From my experiences, I knew that this was irresponsible marketing. My belief at that time, and still, is that the decision makers for such enterprise should live on or near to the site of the reactor for which they are responsible, with their wives and children. All decision making, especially that of maintenance, should be removed from the influence of marketers and bean counters. Persons that are not trained and have not been involved in the construction or operation of nuclear reactors should not be allowed to manage nuclear reactors. Have any of you commissioners directed the detail operation of a reactor? Academic knowledge of reactors is an introduction useless without hands on experience.

I am a proponent of nuclear power. BUT, I cannot approve of operating some of the earliest reactor designs until they fail for financial reasons. Entergy and other corporations do not give a damn about what happens until their plants cost them more money than they will or can earn. The allegiance of the nuclear power industry is not to their country, the United States of America. In their effective view, public safety is secondary to their primary responsibility of profits for private interests. The larger the corporation, the greater the bullshit and the larger the number of liars and deceivers it can buy.

The operation of the Vermont Yankee plant has been unsatisfactory, in my opinion. Entergy's incompetence and irresponsibility is obvious when tritium leaks from unknown underground pipes. That is inexcusable. Someone at Entergy should lose their job for not knowing the plant they were supposed to be managing. Being unaware of the condition of cooling towers until collapse is not paying attention. For corporations, if others have to die for their profits, that's ancillary and so be it.

Corporations do not ask sufficient risk questions for responsible operation of nuclear power plants. Business people equate risk with profits. Such an attitude is anathema to the safe operation of nuclear reactors. Profit and and the unforgiving nature of nuclear power do not mix. With nuclear power, every question of 'what if?' must be addressed and resolved. The screw-ups at the Fukushima plants seem to be without end.

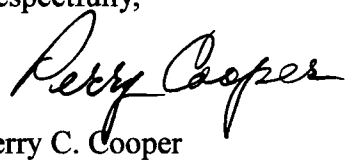
Your commission is not nearly as hardheaded and demanding toward the nuclear industry as required by the public's and my expectations with regard to the regulation of nuclear power activities. Your Commission must have command of the reactors, similar to the U.S. Navy's nuclear operations. I recommend that your commission be converted to a federal authority to be managed in military style. The authority could be staffed by ex-navy personnel with nuclear operations experiences.

Federal statutes would need to be changed. I ask that you propose the necessary changes to the Congress. Industry will fight you. Those opposed to all nuclear power will fight you. If this viable source of power is to be available for future energy needs, your commission must be transformed.

The nuclear genie is out of the bottle. Time never runs backwards. Mankind has never forgotten how to use a source of power after it has been discovered. The greater the physically concentrated energy of a source, the greater will be the risk of inadequate management. An organization of more controlled and

responsible management of nuclear power must be developed! In my opinion, the current management of nuclear power by businessmen is unsatisfactory, world wide.

Respectfully,



Perry C. Cooper

P.S.: Never have I seen other than a rectangular spent fuel pool. Spent fuel pools in Idaho were rectangular, when I was there. It is earthquake country near Yellowstone National Park. The spent fuel pools at the Fukushima reactor plant in Japan appear to be rectangular. Such pools should always by circular in all aspects to prevent stress concentrations at corners from ground distortions, whether due to frost, earthquakes or any cause. Nuclear power requires the reexamination of the most fundamental of human practices.

Cc: Senator Patrick Leahy
Senator Bernie Sanders
Representative Peter Welch