
IN THE UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

CASE NO. 21-1134

GEORGE BERKA

vs.

NUCLEAR REGULATORY COMMISSION

PLAINTIFF'S BRIEF

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I. STATEMENT OF THE PRINCIPAL ISSUES

With regard to the Commission's order, dated 03-May-2021:

1. Whether the "absence of a genuine safety or security concern" truly exists, and whether it constitutes sufficient reason to not implement the ideas outlined in this petition?
2. Whether acting on the ideas in the petition would indeed not be "a prudent use of resources?"
3. Whether there really is a "lack of sufficient interest from the industry" for the ideas expressed in this petition?
4. Whether the ideas expressed in this petition can truly be "accomplished within the existing regulatory framework?"

These issues are addressed and discussed further throughout this brief.

II. TABLE OF AUTHORITIES

1. *Denial Letter for Petition PRM-50-117*, issued by the NRC on May 3rd, 2021.

2. *PRM-50-117, "Petition to Simplify the Process for Returning Shuttered Nuclear Power Reactors to Service,"* submitted by Petitioner to the N.R.C. on 26-Dec-2018.

III. STATEMENT OF THE NATURE OF THE PROCEEDINGS

On December 26th, 2018, the Plaintiff had submitted, to the Nuclear Regulatory Commission, a petition that would permit shuttered nuclear power reactors to re-start

and be returned to service, essentially “as they were,” without the need for excessively costly upgrades. The goal of this petition was to streamline and simplify the path for shuttered reactors to be returned on-line. The impetus behind the petition is “two-fold”, both environmental, and for grid reliability. The Petitioner believes that returning shuttered nuclear power reactors to service represents the most economical and cost-effective means to deal with the pressing, imminent, and existential threat of climate change, and to return our vulnerable, electrical grid to the robust status that it once had. A public hearing was held on the petition on February 25th, 2020 to solicit input from the public. The comments received from the public were generally positive, and many people were supportive of the idea of returning shuttered nuclear power reactors to service. Of the 33 total comments that were received, 30 were in support of the petition, and 3 opposed it. Then, on May 3rd, 2021, the N.R.C. issued its denial of the petition. It stated that its main reasons for the denial were, supposedly, a lack of sufficient interest from the industry, the absence of a genuine safety or security concern, and an excessive expense for developing the regulatory framework proposed in this petition, which it identified as “not a prudent use of resources.” The N.R.C. had also mentioned that the Petitioner’s proposal can “already be accomplished within the existing regulatory framework.” This brings us to this appeal.

IV. AGRUMENT

Background

The Petitioner will hereby attempt to refute the rationale for the N.R.C.’s denial, beginning with the supposed “absence of a genuine safety or security concern.” It is

true that the Petition did not cite anything such as serious technical issue at a reactor, an imminent accident, or a danger of a meltdown. However, this petition was written due a broader safety or security concern – climate change. With each passing year, the evidence in support of this specter mounts, and its effects are becoming more obvious. The latest string of wild fires that occurred in California last summer, and the prolonged drought there, are perhaps the most prominent examples. The N.R.C. considers these issues of "clean energy, climate change and reactor economics" to the "outside the scope of its regulatory authority." It is true that historically, the scope of the N.R.C. has always pertained to the more technical aspect of reactor operation and the handling of nuclear fuel. However, in light of the grave danger that climate change now poses to our society, and in light of the fact that nuclear power reactors are one of the best solutions for it, perhaps it would be appropriate for the N.R.C. to revise its scope and jurisdiction? Climate change is no longer an "abstract, high level concern," but a real and tangible condition with physical consequences. The N.R.C. has a real opportunity here to help deal with this situation, not unlike the ability that our armed forces have to deal with, say, an imminent military threat from a hostile foe. It should rise to the challenge!

Other safety or security concerns, more appropriate to the N.R.C.'s scope, experience, and authority, could arise if an operator were to seek to return a long – shuttered plant to service. Here, the possible degradation of certain critical plant components, such as the internal corrosion of steam generators, for example, could come into play. These items would have to be thoroughly evaluated on a case by case basis, through detailed inspections and testing, conducted as part of the re-licensing and start up procedure.

These could be conducted should the need ever arise, since every plant, and its overall condition, would likely be different. This is one area in which a framework, developed as suggested in this petition, would be of value to the plant operator and the general public.

Next, the Petitioner will touch on the economic aspects of implementing the petition, including the comment that it would supposedly not be a "prudent use of resources." The Petitioner is not asking the N.R.C. to immediately embark on a massive campaign to overhaul its entire regulatory structure. He is simply asking that the "door be left more open" for operators to try. While it is technically feasible to re-license a shuttered plant within the existing regulatory framework, this is considered so complex, daunting, and cumbersome, that it is generally seen as "cost prohibitive," "not viable," or "not a realistic option." A revised, more streamlined framework to re-license shuttered reactors could initially be developed only on a case by case basis, and only if there were any applicants. If no applicants came forward, then no expenditures would have to be devoted to the effort. If at least one applicant came forward, then he would serve as the "test case," and resources could be carefully allocated toward working with him to return his plant to service. These costs would likely be borne by the applicant, just as licensing costs currently are, so the N.R.C. would likely not incur any additional costs from this. It would be important, however, for these costs to be *modest and reasonable*, so that the applicant is not forced to incur any unnecessary expenses. That is why this petition seeks to allow the shuttered plants to re-start largely "as they were," and to only meet the standards that were in place at the time the plants had last operated. This first case would serve as a good example of the level of effort, time, and expense required

to return a shuttered plant to service. Wisconsin's Kewaunee plant would be a good example of such as "test case." Since its shut down in about 2013, it had been placed in a "safe store" condition, and may therefore still be largely intact. If it is found to be in sufficiently good condition, it could potentially make a prime candidate for a "fast tracked re-start program" with minimal expenditures, involving perhaps only a safety inspection. Instead, [and unfortunately], it has recently been slated for accelerated decommissioning.

In another example, California's San Onofre plant could show what one of the more involved cases might look like. While some decommissioning work has already commenced there, it was mostly related to ancillary structures. The critical plant components, such as the reactor pressure vessels and the containment domes, are believed to still be undamaged. Therefore, San Onofre could still also potentially be a candidate for a re-start, although some structures may have to be re-built, and some repair work may have to be done. Given the importance of this vital plant, however, California would be wise to do so. If it was still on line, the blackouts that California had experienced last August, due to a combination of over-reliance on natural gas and intermittent renewables, would likely not have occurred.

Perhaps the difficulty involved is why no one has ever tried to return a shuttered nuclear power reactor to service, which brings us to the N.R.C.'s next objection, about the supposed "lack of interest" from the industry. This is a classic example of the "chicken versus egg" situation. If a streamlined, simplified, less cumbersome, and more affordable process was already available, then perhaps there would be more interest

from the industry. To paraphrase the film, “Field of Dreams,” maybe, “if you build it, they will come.”

An Example of How the Plaintiff’s Petition Could Benefit Existing Plants

The case of Southern California’s San Onofre Nuclear Generating Station, or “SONGS,” provides a good example of the benefits that “more flexible oversight” at the NRC could bring. The demise of San Onofre began with a flaw in one of its steam generators, where the small tubes that channeled the steam vibrated excessively at a full power setting. This vibration was considerably reduced at lower power settings, however, and virtually disappeared when the power for that reactor was reduced to about 70%. Hence, it would have been possible to safely operate one reactor at full power, and the other at 70% power, indefinitely. At these power settings, the plant would have still been profitable, and could have continued to produce reliable and carbon-free power, perhaps even today. The plant’s owner, however, had not sought an exception from the NRC to operate the plant in this fashion, because this would have supposedly required a “design change”, which was believed to be too involved, cumbersome, and expensive for the owner to pursue. Instead, Southern California Edison chose to simply retire the plant, leading to the loss of the region’s single most powerful and carbon-free, dispatchable (reliable) generator.

Now, if the suggestions in this petition had been incorporated into the NRC’s governance philosophy, perhaps this scenario could have unfolded differently, as follows. Southern California Edison could have simply approached the NRC with a request to operate the unaffected reactor at full power, and the affected reactor, with the

defective steam generator, at a permanently reduced, 70% power setting. In response, the NRC could have simply requested for SCE to monitor the plant's systems at the reduced power setting for several months, or perhaps years of operation, to check for any anomalies. It is believed that the reactor itself could have continued to operate perfectly normally at 70% power, and that only the long-term performance of the steam generator would have had to be evaluated. If the steam generator had demonstrated satisfactory performance after, say, two years of operation, then the NRC could have simply amended San Onofre's operating license to permanently approve this new mode of operation, at the reduced power setting. If this had occurred, Southern California would have still had its largest source of carbon-free power to back up its intermittent renewables, with a resulting lower dependence on carbon-emitting methane. It is also safe to say that if San Onofre had still been in service, even at its reduced power setting, the blackouts that occurred in California last summer, caused by an over-reliance on natural gas and intermittent renewables, would not have transpired. It has been said that Canada's approach to nuclear regulation is more flexible, in that it makes it easier for plant operators to substantiate proposed changes, whether by test or by analysis. The U.S. approach, however, is more rigid and "cookbook based," relying instead on stricter procedures, and affording plant operators less flexibility. The petitioner is simply advocating for a more "flexible approach" at the NRC.

New York's Indian Point is another example of a plant that can potentially benefit from the ideas in the Plaintiff's petition. It is not too late to physically re-start Indian Point, though it would be very difficult under the existing regulatory structure, since the operating license for the plant has already been surrendered. If the NRC's regulatory

structure were amended as proposed in this petition, however, the re-start process for Indian Point could be simplified considerably. Re-starting Indian Point is actually not an unreasonable proposition, now that plant's main obstacle (Governor Cuomo) is gone. It is unfortunate that the Governor was not forced to resign sooner; if he was, then perhaps this valuable plant would have remained in service. Implementing the proposals in this petition may potentially "pave the way" for this carbon-free generator, and others like it, to be returned to the grid easily and expeditiously.

Numerous other examples abound as well. In Illinois, the Byron and Dresden plants may face early closure this fall, along with several (possibly seven) other plants around the country, in the next few years. Everything in our power should be done to stop this disturbing trend, especially given what we now know about the ability of these plants to mitigate the disastrous effects of climate change.

The Difference between the AEC and the NRC

Before the Nuclear Regulatory Commission, there was the Atomic Energy Commission, which was created at the dawn of the nuclear age, just as a new, nascent nuclear industry was taking shape. At that time, the role of the AEC was more than regulatory; it was also meant to be advisory and supportive. The underlying philosophy at the AEC, it's "mission statement," so to speak, was to not only regulate the safety of nuclear energy, but to also *encourage its use*, and to *not impose excessive requirements that would inhibit the growth of the industry*. That all changed in 1974, when the Atomic Energy Commission was renamed as the "Nuclear Regulatory Commission." With this name change, a shift in attitudes and the governing philosophy at the agency also

followed. The word *"Regulatory"* in the name change said it all. Gone were the earlier commitments of "encouraging nuclear energy's use" and "not imposing excessive requirements that would inhibit its growth." The agency was no longer "a friend" of the industry, and at times was possibly even adversarial.

As we shall see below, due to the adoption of the inaccurate "L.N.T. Model," excessive requirements were imposed that certainly did inhibit the growth of the industry. New nuclear builds were rendered so cost-prohibitive, that we have only built one new plant in the last 30 years. As a result, our once world-class expertise has waned, and we have ceded our leadership in this important field to adversaries such as Russia and China. This is not only an environmental and economic, but also a serious national security issue.

The Folly of the L.N.T. Model

In 1956, one of the first scientific panels was appointed to study the effects of atomic radiation on humans. Known as the "Biological Effects of Atomic Radiation" (BEAR-I), this committee of the U.S. National Academy of Sciences was, unfortunately, funded in a large part by the Rockefeller Foundation, when it was tasked to investigate the harm that various doses of radiation were capable of inflicting on people. The results of this early research culminated into what we now know as the "Linear No Threshold," or L.N.T. Model. As its name suggests, this mathematical model aims to quantify the biological harm inflicted on humans by increasing levels of radiation. Knowing [from the Hiroshima and Nagasaki bombings] that very high levels of radiation caused significant harm, the authors simply drew a straight line from zero to this "high dose" data point, and assumed that it correctly represented the bodily harm that occurred at lower

radiation levels as well. It was further assumed that there was “no threshold”, or “no safe dose”, below which radiation did not cause any harm at all.

However, this model had many shortcomings, not the least of which was its failure to account for the ability of the body’s immune system to deal with low levels of radiation. It is now more accepted that lower doses of radiation have a similar effect on the body as anti-oxidants or moderate exercise; though mild and temporary stressors, they are stimulants which are not harmful, and from which the body can readily recover. Interestingly enough, this response was actually more accurately documented in earlier studies done on the biological effects of radiation in the 1930’s.

The researchers in 1956 were simply unable to obtain any concrete data to correlate the results of their model at lower radiation levels. The real trend actually seemed to approximate more of a “hockey stick curve,” in which the slope of the line hardly rose at all until a certain [fairly high] radiation level was reached, at which point it began to rise more sharply. This finding was significant because it suggests that at lower radiation levels, the biological harm to humans is virtually non-existent, and it actually takes a great deal of radiation to harm us. Incidentally, this “hockey stick curve” seems to actually be gaining wider acceptance now, as the accuracy of the original L.N.T. Model has increasingly been called into question by academia and the experts. Unfortunately, much financial damage has already been inflicted upon the nuclear industry and public opinion by this overly – conservative L.N.T. Model.

The aggressive push to promote the findings of the 1956 study by some of the researchers, combined with the source of funding for the study [The Rockefeller Foundation], has led to more than speculation about the validity of the L.N.T. Model.

Many of the researchers acknowledged that they were "bitterly divided over the findings," that they "did not believe the findings to be accurate," that some "could not recommend them," and that the evidence for harm caused at lower radiation levels was "extremely tenuous." Nevertheless, some of the lead researchers were promised significant compensation in the form stipends, grants, and tenures, if the findings were published and accepted. One has to wonder if this was more than a coincidence, and if a conspiracy may have been at play to weaken or eliminate a new competitor [the nuclear industry] to the powerful Rockefeller oil monopoly? If so, then the plan worked brilliantly, as it burdened the nascent nuclear industry with excessive regulations since its inception, which translated into large, and largely unnecessary, construction expenses. It is the chief reason why new plants are so enormously expensive to construct today, and why the nuclear industry has never risen to its full potential. Today, the L.N.T. Model is still the "official guideline" used to establish the [excessively conservative] standards that modern nuclear plants must meet. It creates such a stranglehold on new construction that it often makes new nuclear builds an unattractive proposition indeed. It has also been the source of much of the fear mongering during the past few decades. If only the correct, "hockey stick model" had been accepted decades ago, instead of the inaccurate, L.N.T. Model, perhaps it would have led to the realization that low doses of radiation are not harmful to humans at all. Consequently, perhaps the anti – nuclear movement would not have occurred, or would have been much smaller in its scope, enabling nuclear power to be used as an effective tool against climate change much earlier. Many of the core assumptions used to create the original L.N.T. Model were refuted in the Department of Energy's "Low Dose Radiation

Research Program," which ran from about 1998 until 2008. The findings of this program are documented by Dr. Antone Brooks, its Chief Scientist, in a well-written book entitled "Low Dose Radiation." As described in this book, the key "takeaway" from this program was that,

"At low doses, biological reactions are unique and often unrelated to those that occur at high doses. The influential linear-no-threshold model--which predicted that damage from acute exposures can be extrapolated linearly to low dose exposures--was flawed. Small doses of radiation can have an adaptive protective effect. "Hit theory," the idea that radiation only affected cells it directly traversed, yielded to "bystander theory," which hypothesizes that cells communicate with each other and a dose to one affects others surrounding it."

Based on the findings from this program, perhaps it is time to update this important, underlying assumption, which forms the foundation of many regulations at the NRC, to more accurately reflect modern science.

The "Opportunity Cost" of the L.N.T. Model

It would not be inaccurate to say that, at least in this country, no one has ever been harmed or killed by a radiation release, or by an accident at a commercial nuclear power plant*. Three Mile Island had only demonstrated the robustness of our plants because, even though it had resulted in the loss of the plant, not a single person had been harmed. At Fukushima in Japan, as unfortunate as it was, not a single person was harmed by the release of radiation either.

*An unfortunate accident that claimed the lives of the three operators at the SL-1 reactor in Idaho in 1961, a small, military research reactor, is thought to have been possibly caused by sabotage. This was the only fatal nuclear accident in the U.S.

Thousands of people, however, perished as a result of the *unnecessary and hasty evacuations*, resulting from an unfounded fear of radiation. One example was the needless removal of patients on life support from their ICU's, and placing them in high school gymnasiums. One may also be able to argue that the Cernobyl accident, though tragic, might not be directly applicable here, as it is "in a class by itself." The reactor design was inherently unstable, numerous safety protocols were ignored during the ill-fated test, and safety systems were deliberately disabled. The U.S. accident record only speaks to the inherent safety of our nuclear industry. Nevertheless, it is no secret that many nuclear power plants have been forced to shut down prematurely as a result of these exaggerated fears of radiation. In the Petitioner's local region, Shoreham and Indian Point have been among them. The question to ask should be if we are letting our unfounded fears of radiation force us to squander a real opportunity to reverse the dangers of climate change?

A "More Flexible and Open" NRC

The Petitioner now draws a comparison to the aviation world, with which he has some experience and familiarity. In the past, when it came to punishing pilots for violations they committed while flying, the Federal Aviation Administration was often seen as "excessively harsh" in its enforcement practices. Lengthy suspensions or revocations of pilots' certificates were common for even seemingly minor infractions. In the mid-1990's, however, a "paradigm shift" is said to have occurred within the FAA. The formerly "heavy handed" agency became a "kinder and gentler" FAA, when it came to enforcement actions against pilots. Suspensions and revocations of certificates were

replaced with warnings and opportunities for “remedial training,” which, upon completion, allowed a pilot to keep his certificate. The “NASA Report” was also created which, if timely filed, effectively shielded the pilot from FAA enforcement action, with certain exceptions. This was done in an attempt to reduce the potential for future accidents, by allowing the pilot to thoroughly explain his involvement in the situation. The insight gained by analyzing the situation from the pilot’s perspective sometimes made it possible to improve existing operating procedures, and to discover new ways to make flying safer.

Like with the FAA, perhaps it would be beneficial if a similar “paradigm shift” were to also occur within the NRC. While not specifically related to enforcement actions or punishments imposed on nuclear operators per se, the Petitioner is referring to the granting of greater flexibility in how nuclear power reactors are operated, and returned to service. The above example, in which the San Onofre plant could have continued to operate at 70% power with one defective steam generator, is only one such instance. This approach could potentially be applied to many other changes as well. On course, the impact on safety would have to be thoroughly evaluated, but this could be done using the more open “scientific, innovative, and engineering-oriented [Canadian]” approach, instead of our existing, prescribed, un-innovative and sometimes stifling, “cookbook-based” approach. This “more open” approach would have certainly been more aligned with the “spirit and intent” of the original Atomic Energy Commission, and, if adopted, could do a great deal of good in helping us deal with our existing climate emergency. It would accomplish this by making it easier for previously-shuttered nuclear power reactors to be returned to service. Abandoning the flawed L.N.T. Model

as the primary basis for nuclear safety, and replacing it instead with the more accurate "Hockey Stick Model," would be a good start for the NRC. Per this model, the maximum allowable radiation doses should be increased, to be closer to the inflection point on the hockey stick curve; i.e. the point where the slope begins to steepen, with a conservative safety factor built in. The philosophy governing radiation protection requirements should also be changed from the current "ALARA," or "As Low as Reasonable Achievable" to "AHARS," or "As High as Reasonably Safe." This would greatly reduce the "severity assumptions" for any future nuclear accidents. These reduced severity assumptions could, in turn, have far-reaching, beneficial effects on future design requirements and the costs of building new plants. Construction expenses and the sizes of exclusion zones could be considerably reduced, without compromising public safety. The excessively conservative [and not necessarily accurate] assumptions used today lead to excessive and unsustainable costs for the nuclear industry. In so doing, they prevent this important industry to be fully deployed in our efforts against climate change.

V. CONCLUSION

The events that occurred in Texas this past February – a prolonged winter storm, combined with an over-reliance on natural gas and weather-dependent renewables – were responsible for over 100 people freezing to death, in addition to other widespread suffering and millions of dollars in economic damages. It is safe to say that, if more nuclear reactors had been in the "electrical mix," these events would not have occurred, or would have been much less severe. In short, returning shuttered nuclear power

reactors to service remains the “lowest hanging fruit” to accomplish these dual objectives of improved grid reliability and significant reductions in carbon dioxide emissions.

This latest trend in premature nuclear plant closures is disturbing and very counter-productive to our climate goals. Plants that many still be returned to service with reasonable ease, such as California’s San Onofre, or Wisconsin’s Kewaunee, have instead been slated for accelerated decommissioning. Here are very valuable assets, that have been paid for and proven out, that have generally functioned remarkably well, that have at least 40 years of useful operational life left in them, and that can significantly help us with our climate goals, just being needlessly wasted. Given the dire climate situation that the country finds itself in, this does not make any sense. If this petition were acted upon by the N.R.C., or this Court, it may actually help to alleviate this unfortunate situation.

The 90% (30 out of 33) positive comment rate that this petition received from members of the public during the public comment period should corroborate the validity of the ideas in this petition. And so the Petitioner hopes that this Court will also receive this petition with the same support and enthusiasm as the public had, and see what could be done at the NRC to return these precious, reliable and carbon-free electrical generators to service, especially at this time of great need.

Respectfully Submitted,

George Berka
Plaintiff – Apellant