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Congress of the United States
House of Representatives
Washington, DC 20515-1401

March 2, 2015

The Honorable Stephen Burns
Chairman
Nuclear Regulatory Commission
Mail Stop O-16G4
Washington, D.C. 20555

Dear Chairman Burns:

I write on behalf of Mr. George Smolka, a resident of Indiana's First Congressional District.

Mr. Smolka has contacted me to express his concerns regarding nuclear power plant security. Specifically, Mr. Smolka is concerned about the security of nuclear power plants in the face of certain extreme events, including solar storms and electromagnetic pulses, and he is concerned that certain electrical systems, especially those controlling and powering certain pumps, have not been hardened. Enclosed, please find a copy of the material that Mr. Smolka has prepared for my office. I would appreciate your addressing his concerns.

Thank you in advance for your serious attention to this issue. Do not hesitate to let me know if you have any questions or need any additional information.

Sincerely,

Peter J. Visclosky
Member of Congress

PJV:khs
Enclosure

Short Presentation to Mark Lopez
Regarding Danger to Nuclear Power Facilities from
Coronal Mass Ejections or Electromagnetic Pulse Weapons

I . Background

A. During the early development and testing of nuclear weapons an effect was noticed on electrical and electronic equipment. Because there were no transistorized systems at that time, the effect was minimal. As time progressed and transistorized equipment became commonplace. More serious interferences were noted. Eventually it was recognized that the detonation of a nuclear device would knock out electronic equipment within a range of the explosion. Further research established that it was an electromagnetic pulse (EMP) generated by the thermonuclear reaction that destroyed electronic gear.

B. In 1859 a strange event occurred in which all telegraph lines, poles, and equipment caught fire, or sparked, alarmingly, some operators were injured in various ways and all telegraph equipment in the US and elsewhere was so affected. Much of the equipment was damaged so severely that it had to be replaced. This was later tied to a remarkable solar storm event (now generally referred to as a Coronal mass Ejection, CME). Because the only large scale electrification of western society at the time was telegraphy, the disruption was minimal and short lived. Today a similar event would cost .6 to 2.6 Trillion dollars and take from 1 year to 10 years to repair. We had a near miss of a similarly sized storm in 2012 (scale G5 or higher) and a scale G3 event (serious but not deadly) centered north of us in Canada on Jan. 14, 2015 . A CME centered in Quebec Canada in 1989 caused a power outage for 9 hrs but the Canadians were prepared.

II. Nuclear Tests Effects Studies

A. As nuclear weapons testing continued, many factors associated with such events both expected and unexpected were investigated. Such as the exact cause, duration and strength of the EMP effect. These investigations determined that the effect was an incidental outgrowth of the progression of a thermonuclear propagation linked to the effect on the air and ground or water in which the event took place. At or near ground level, the rapidly changing electrical and magnetic field created in the explosion generate an EMP pulse which then induces damaging current and voltage surges in electrical equipment. Transistorized, especially micro circuit transistorized systems are very vulnerable to irreparable damage by such surges.

Other testing on high altitude nuclear explosions determined that when a thermonuclear device is detonated from 150 to 200 miles above the earth, a massive EMP effect is created by the interaction of a pulse of gamma rays with the mid stratosphere within the line of sight of the detonation over a very wide area.

B. Our highly sophisticated, micronized culture is becoming more and more, vulnerable to such EMP's. as electronics become smaller and smaller. This led the military and weapons makers

EMP's. as electronics become smaller and smaller. This led the military and weapons makers to theorize that EMP's might be created by non nuclear devices. Such research has been ongoing for about 50 years and yet, except for a few science fiction treatments very few of the US public understands these facts. Many nations have been researching EMP devices other than HEMP (high altitude nuclear EMP devices) including the US, India, Russia, China , Iran and Pakistan. Most of them have ongoing EMP programs. The US, India, Russia , China, and Iran have long range missiles. Iran has been testing launching of Intermediate Range Ballistic Missiles (IRBM's) off of the decks of freight ships.

A single Nuclear missile aimed and detonated at a point 150-200 miles above Kansas would affect the entire US and other parts of North America. There would be no discernible explosion, no heat, no flash of light, no sound to show that anything had happened. No dead bodies, no shattered buildings. For the average citizen the only sign would be that in a few minutes or seconds all electrically powered machines would stop. And stay down. Many vehicles would stop. Only those people near power stations or transmission lines would see the chaos.

Because there would be no or few functioning pumps, and most of the valve controls would not function, WATER,GAS, and FUEL would run out in very short order.

All of our distribution networks are controlled by SCADA's (Supervisory control and data acquisition) Many of these are very vulnerable to EMP damage and there are only a limited number stockpiled as replacements plus they have to be compatible with the systems they are controlling.

III. The Core Problem

The potential for natural or engineered wide spread mischief encompassing our electrical grids and other distribution components, should be clear to anyone now, but I am focusing on one threat that non have thus far enunciated. The threat to our unprotected Nuclear Power Plants. That these can fail disastrously, has been all too well documented by disasters at Three Mile Island, Chernobyl, and Fukushima.

In every case a failure of cooling water has been implicated at some point. The danger is not only to the active reactor but to the storage pools used to house the spent fuel rods. Should pumps or pipes fail, any of our design Nukes, would be at high risk of going critical.

There are 105 Nuclear Power Plants in the US.

If all these go critical- it would be a planet killer

To the best of my knowledge, non of these have been hardened against an EMP or CME.

Their electrical systems , especially those controlling and powering the crucial pumps have not been hardened.

It is highly likely in the event of an EMP or CME that very few workers will report for work other than the ones on the active shift. So there will too few to affect serious repairs and limited or no transport to get parts or machines.

It is possible that there will be limited or no communication. Most phones, or all phones, will

be out depending on conditions at telephone substations and the condition of our communication satellites.

With water no longer being pumped into water pipes at the municipal level, water will be in short supply.

Automatic control boards or computers will not be functional, some or all will be burned out.

Crisis control teams will either be not reachable or unable to report.

Local Fire departments will have their hands full because of the lack of water, if their machines are still mobile.

Even before any meltdown, fear of radiation will keep people away who might otherwise help.

IV. MELTDOWN

How dangerous is radiation contamination? I will give you only one example. There are hundreds of potential daughter nuclides.

You may remember the poisoning of the Russian Alexander Litvinenko in England where he fled for protection. He was poisoned with a very small amount of Polonium specifically ^{210}Po , (otherwise written Polonium 210) with less than 1 microgram.

How much is a microgram?

An av. Oz = 28.35 g(rams) therefore 1 g ~ 1/30 oz 1 milligram = 1/1000 of a gram therefore ~

1/30,000 of an oz 1 microgram= 1/1000 of a milligram or 1/30,000,000 of an oz

Thats right he was poisoned with approximately 1 thirty millionth of an ounce

While different animals have different susceptibilities to radiation poisoning, all life can be killed by radiation. If 1 thirty millionth of an ounce can kill a full grown man, how little will it take to kill a child if 105 Nukes go critical? Also where will there be a safe place? Answer= Nowhere!! So no matter how deep the hole, or where it is, sooner or later you in that hole will be poisoned. No matter how good your air filtration system is, filters will need to be changed, and filters will be radioactive. Polonium 210 has a half life(when half the radiation in a sample has disappeared) of only ~138 days but Plutonium ^{238}Pu has a half life of about 88 years and another common isotope ^{239}Pu has a half life of 24,100 years

I only have a rule of thumb estimate of ~2 billion dollars for the cost of hardening all of our Nuclear Power Plants, but will get hard numbers should it get to that stage.