

**ACE MEMBERS PREPARED THE ATTACHED PACKET
FOR LIMERICK'S NRC OFFICIALS 5-21-15
BECAUSE OUR INVESTIGATIONS SHOW:**

NRC HAS LOST TOUCH WITH REALITY

- **NRC'S OWN STAFF IDENTIFIED MANY DANGEROUS PROBLEMS AT LIMERICK. ACE MEMBERS DISCOVERED UNFIXABLE DESIGN FLAWS. BUT, NRC'S MIDDLE MANAGEMENT DISMISSES EVERYTHING.**
- **INSTEAD OF FINING EXELON FOR FAILING TO MAKE LIMERICK SAFER, NRC HAS ALLOWED EXEMPTIONS, EXCLUSIONS, RELIEFS, EXPERIMENTS, AMENDMENTS, DEFERMENTS AND DANGEROUS DELAYS.**

PROBLEM: NRC DOESN'T CARE ABOUT SERIOUS AND GROWING THREATS TO THE ENTIRE GREATER PHILADELPHIA REGION FROM LIMERICK NUCLEAR PLANT OPERATIONS

- **ACE IS URGING LIMERICK'S NRC OFFICIALS TO ANALYZE ACTUAL RISKS IDENTIFIED IN THIS ATTACHED 40-PAGE REPORT, THEN REVOKE LIMERICK'S OPERATING LICENSES TO PROTECT THE HEALTH, SAFETY, AND FINANCIAL INTERESTS OF MILLIONS IN THE GREATER PHILADELPHIA REGION**
- **ACE REQUESTS THE ATTACHED 5-21-15 PACKET BE POSTED ON NRC'S WEBSITE FOR PUBLIC REVIEW**

LIMERICK NUCLEAR PLANT WOULD HAVE TO CLOSE IF NRC WOULD DO THE FOLLOWING:

- 1. ADMIT THE TRUTH ABOUT LIMERICK'S UNPRECEDENTED EARTHQUAKE RISKS**
- 2. TEST FOR EMBRITTLEMENT USING LIMERICK'S OWN SURVEILLANCE CAPSULES**
- 3. ELIMINATE DANGEROUS EXPERIMENTS TO BAND-AIDE DECADES-OLD EQUIPMENT RISKS**
- 4. UPDATE LIMERICK'S SAMA**
- 5. EXPAND LIMERICK'S EVACUATION ZONE**
- 6. REJECT EXELON'S EVACUATION PLAN**
- 7. END DELAY TACTICS ON SAFETY ISSUES**
- 8. STOP HIGH-BURN FUEL USE**
- 9. REQUIRE RADIATION FILTERS FOR VENTS**
- 10. REQUIRE IMMEDIATE INSTALLATION OF SPENT FUEL POOL INSTRUMENTATION**
- 11. REQUIRE ALL LIMERICK MONITORS TO REMAIN OPERABLE 24/7 INCLUDING SEISMIC AND RADIATION MONITORS**
- 12. REQUIRE LIMERICK TO REDUCE POWER WHEN THE SCHUUYLKILL RIVER WATER OVERHEATS**
- 13. REQUIRE FILTER FOR OUTFALL 001**

- 14. REQUIRE FILTER FOR TOXIC MINE WATER**
- 15. REQUIRE BOREHOLE TESTING OF SOIL NEAR REACTORS, FOLLOWED BY CLEAN-UP**
- 16. REQUIRE TESTING OF ALL 46 RESIDENTAL WITHDRAWAL WELLS WITHIN 1 MILE OF LIMERICK REACTORS**
- 17. REQUIRE INDEPENDENT 24/7 REAL-TIME MONITORING FOR EACH OF LIMERICK'S OVER 100 RADIONUCLIDES RELEASED INTO OUR AIR AND WATER**
- 18. REQUIRE IMMEDIATE SUPPRESSION POOL RE-COATING DUE TO CORROSION**
- 19. STOP ACCEPTING AND STORING HIGH LEVEL RAD-WASTE FROM OTHER SOURCES**
- 20. REQUIRE TRACKING OF LIMERICK'S LOW-LEVEL RAD-WASTE VOLUME**
- 21. TAKE ACTION FOR PREVENTION INSTEAD OF TELLING THE PUBLIC TO FILE DEAD-END PETITIONS**
- 22. REQUIRE EMERGENCY EQUIPMENT FOR MELTDOWNS TO BE DEPLOYABLE 24/7, ESPECIALLY AFTER A TORNADO OR BOMB TRAIN EXPLOSION / FIRE**

FOR DETAILS

See: www.acereport.org

**14 REPORTS ON NRC'S FAILED OVERSIGHT
AT LIMERICK NUCLEAR PLANT
SUMMARIZED BY ACE 5-21-15**

5-21-15

**To: Fred Bower, Branch Chief for Limerick Nuclear Plant
and Other NRC Officials Responsible for Limerick Safety**

**From: The Alliance For A Clean Environment, ACE
1189 Foxview Road Pottstown, PA 19465
aceactivists@comcast.net**

**Re: NRC ACTIONS SHOW NRC DOESN'T CARE ABOUT PUBLIC SAFETY.
NRC IS MISSING IN ACTION WHILE LIMERICK'S THREATS ARE INCREASING.**

EVIDENCE AND REALITY REFUTE NRC'S UNSUBSTANTIATED CLAIM THAT SAFETY IS A TOP PRIORITY.

- Evidence shows that NRC is allowing Exelon to delay and even avoid costs for vital protections.
- Costs to Exelon trump safety in all NRC decisions for Limerick - It's about money not public safety.
- Despite unprecedented and growing risks to the public from catastrophic Limerick meltdowns, NRC is failing to require immediate action to reduce risks. Instead, NRC is allowing Exelon and its lobbyist, NEI, to make a mockery of NRC's regulatory process.
- NRC has decreased safety and oversight, while dismissing and denying Limerick's unprecedented threats, harms, and unfixable problems. NRC weakened and/or eliminated its regulations and standards.
- When Limerick violates its operating permit and/or NRC regulations, NRC weakens and even eliminates them.
- NRC fails to enforce its regulations and never fines Exelon for Limerick violations, despite risks to the health, safety, and financial interests of millions of people in the Greater Philadelphia Region.
- NRC uses unsubstantiated assumptions and denials to dismiss serious public concerns.
- A body of evidence suggests that if NRC's top priority was safety, NRC would close Limerick Nuclear Plant to protect the public's health, safety, and financial interests. Limerick can't continue operating safely. NRC doesn't care.

ISSUES ADDRESSED IN THIS PACKET INCLUDE:

- 1. NRC REFUSES TO TEST LIMERICK'S REACTORS FOR EMBRITTLEMENT MICRO-CRACKING**
- 2. LIMERICK'S "AGING MANAGEMENT" PROGRAM DOESN'T WORK SO NRC REMOVED THE TEST**
- 3. LIMERICK IS NOT SAFE. NRC IS MISSING IN ACTION.
EXPERIMENTS FOR DECADES OLD PROBLEMS ARE INCREASING SAFETY RISKS AT LIMERICK**
- 4. LIMERICK'S RADIATION RELEASES AND RISKS ARE INCREASING**
- 5. NOT ENOUGH WATER AVAILABLE TO DEAL WITH MELTDOWNS**
- 6. FUEL POOL INSTRUMENTATION TO AVOID MELTDOWNS - STILL NOT INSTALLED**
- 7. HARDENED VENTS DELAYED - NO RADIATION FILTERS REQUIRED TO PROTECT THE PUBLIC**
- 8. TERRORIST THREATS INCREASING - NO ADEQUATE PROTECTION**
- 9. EARTHQUAKE RISKS - UNDERESTIMATED BY NRC**
- 10. TORNADO HAZARD - EMERGENCY EQUIPMENT NOT GUARANTEED TO BE DEPLOYABLE.**
- 11. CRUDE-OIL BOMB TRAINS SHOULD NOT TRAVEL THROUGH LIMERICK NUCLEAR PLANT'S PROPERTY**
- 12. SAFE EVACUATION IS IMPOSSIBLE**
- 13. NRC PARED DOWN EMERGENCY AND EVACUATION PLANS AND PRACTICE DRILLS**
- 14. NRC'S FLAWED PETITION PROCESS: A DEAD-END FOR THE PUBLIC**

ADDITIONAL ISSUES OF MAJOR CONCERN WHICH NRC IS DISMISSING AND/OR IGNORING:

LIMERICK'S DEADLY HIGH-LEVEL RADIOACTIVE WASTES

- TONS MORE PILING UP ON-SITE, IN OUR BACK YARD, WITH NO LONG-TERM SAFE SOLUTION
 - MORE DANGEROUS STORAGE AND TRANSPORT DUE TO LIMERICK'S USE OF HIGH BURN FUEL
- NRC: WE DON'T CARE

4 YEARS AFTER FUKUSHIMA MELTDOWNS - EXELON IS STILL FAILING TO REDUCE MELTDOWN RISKS AT LIMERICK

- NRC is failing to require Exelon to implement Post-Fukushima lessons learned for up to another 4 years.
- NRC is allowing Exelon to make a mockery of NRC's 2012 post-Fukushima recommendations to avoid meltdowns and protect public health.
- Limerick's meltdown threats are increasing, yet Exelon didn't even complete 'plans' to comply with NRC's 2012 post Fukushima recommendations to minimize Limerick meltdown risks.

NRC: WE DON'T CARE

RADIOACTIVE CONTAMINATION AND DEPLETION OF VITAL DRINKING WATER RESOURCES FOR ALMOST TWO MILLION PEOPLE FROM POTTSTOWN TO PHILADELPHIA

NRC: WE DON'T CARE

MASSIVE PM10 AIR POLLUTION (MORE DEADLY THAN OZONE) RELEASED FROM LIMERICK'S COOLING TOWERS

NRC: WE DON'T CARE

LIMERICK NUCLEAR PLANT HAS NEVER BEEN SAFE AND IT IS GETTING WORSE

- Limerick's Construction Was Faulty
- Limerick's Reactors and Fuel Pools Were Built Directly Over Fault Fractures
- Aging Has Caused A Weakening Of Limerick's Structures, Creating An Additional Layer Of Concern
- Limerick's Licensing And Relicensing Both Ignored Reality - An Updated SAMA is Vital

NRC RESPONSES TO LIMERICK'S ENORMOUS RISKS HAVE BEEN ABYSMAL.

NRC officials responsible for Limerick safety act as defenders of Exelon's profits while ignoring and dismissing valid public concerns. They have hidden important information from the public, abandoned public safety, and supported and defended Exelon on every issue of concern, despite the fact that Limerick Nuclear Plant operations could destroy life in the Greater Philadelphia Region and beyond for generations, possibly forever. Despite a broad range of extraordinary risks, Limerick's NRC officials, including Fred Bower, Paul Krohn, and Rick Ennis, have repeatedly failed to provide the public with full, accurate, and timely disclosure and fail to take protecting the public's interests seriously enough to work toward closing Limerick.

Time after time, immediately after each of many Limerick accidents / radiation releases, and other problems, NRC officials, especially PR official Neil Sheehan, rush to the media saying, "There's no danger to the public". This statement is made before they themselves know exactly what has happened. How can the public be expected to have confidence in anything NRC says when NRC officials repeatedly make absurd unsubstantiated statements that defy logic?

Lack of integrity among Limerick's NRC officials has been appalling. It is not clear whether NRC officials for Limerick have been lazy, inept, or intentionally deceptive. In any case, they have failed in the mission of the NRC agency to protect the public from Limerick Nuclear Plant operations. If NRC officials don't have the courage to stand up against Exelon's self-serving demands and the moral compass to close Limerick to prevent a catastrophic disaster, then those officials should resign.

ACE IS URGING NRC OFFICIALS RESPONSIBLE FOR LIMERICK SAFETY TO REVIEW ATTACHED ISSUE SUMMARIES AND WORK TO CLOSE LIMERICK AS SOON AS POSSIBLE TO AVOID CATASTROPHIC LIMERICK MELTDOWNS AND MINIMIZE RADIATION EXPOSURE.

LIMERICK MUST BE CLOSED! NRC'S RECKLESS DISREGARD MUST STOP!

- OVER 8 MILLION PEOPLE LIVE WITHIN 50 MILES OF LIMERICK.
- IF LIMERICK MELTS DOWN LIKE CHERNOBYL AND FUKUSHIMA MANY OF THESE PEOPLE COULD LOSE EVERYTHING.

EVIDENCE IN THE ATTACHED REPORTS SHOWS NRC'S OVERSIGHT HAS BEEN AN ABJECT FAILURE AND A DREADFUL WASTE OF TAXPAYER DOLLARS.

NO EMBRITTLEMENT TESTING WAS EVER DONE AT LIMERICK - NRC HAS REFUSED TO TEST IN THE FUTURE.

- **NRC HAS NO INTENTION OF DOING LIMERICK-SPECIFIC REACTOR TESTING, DESPITE MORE THAN ENOUGH EVIDENCE SUGGESTING LIMERICK'S REACTORS MOST LIKELY HAVE SIGNIFICANT EMBRITTLEMENT AND MICRO-CRACKING AFTER THE STRESSES OF 30 YEARS OF CONTINUAL OPERATION.**
- **NRC HAS NO INTENTION OF DOING LIMERICK-SPECIFIC REACTOR TESTING, DESPITE THE FACT THAT BELGIUM OFFICIALS CALLED FOR IMMEDIATE WORLD-WIDE TESTING OF REACTOR VESSELS, AFTER BELGIUM'S TESTING REVEALED 16,000 CRACKS IN TWO BELGIUM REACTORS.**

LIMERICK HAS SURVEILLANCE CAPSULES IN ITS REACTORS,

- **YET NRC IS USING TESTING OF "REPRESENTATIVE" MATERIALS FROM "OTHER" REACTORS INSTEAD OF FROM LIMERICK'S REACTORS.**

THAT IS INSANITY:

- It's like having someone else's brakes checked to determine your car brakes are safe.
- It's like having someone else's lungs x-rayed to determine if you have cancer.

WHY IS LIMERICK REQUIRED TO HAVE SURVEILLANCE CAPSULES IF THEY ARE NOT REQUIRED TO BE TESTED?

IF NRC WAS PROTECTING PUBLIC SAFETY:

- **NRC WOULD REQUIRE IMMEDIATE EMBRITTLEMENT AND MICROCRACKING TESTING OF LIMERICK'S SURVEILLANCE CAPSULES**

Rick Ennis, NRC Senior Project Manager for Limerick, said in a letter to ACE, May 5, 2015:

- None of the surveillance capsules in the Limerick RPVs have been removed to date.
- Instead, the limiting weld and plate materials for the Limerick RPVs are monitored through representative material specimens that are exposed to irradiation in other boiling water reactors.
- Destructive testing has not been performed on the material specimens in the Limerick RPV surveillance capsules.
- Destructive testing has been and will continue to be performed, for material specimens representative of the materials in the Limerick RPV.

LIMERICK NUCLEAR PLANT SHOWS SIGNS OF EMBRITTLEMENT, WHICH AFFECTS REACTOR PRESSURE VESSELS, AND AT LIMERICK HAS SHOWN ITSELF IN MANY WAYS, NOT THE LEAST OF WHICH ARE CIRCUMFERENTIAL CRACKS AROUND THE WELD TOES.

- Embrittlement of Limerick's reactor pressure vessel occurs partly due to the effects of high level radioactive bombardment during the fission process all day, every day year-round.
- NRC has no proof to back up its acceptance of Exelon's assumed 5% erosion rate increase into Limerick's 20-year period of extended operations (page 4, in section 4.6.4.2 of NRC's' 2012 "safety evaluation report with open items related to the license renewal of limerick":
- NRC accepted Exelon's assumption that during the extended 20 years of operations, there would only be an additional erosion increase of 5% based on Exelon's margin bounding assumptions and calculations that project additional erosion of only 5% in the "Steam System Piping Break Outside of Primary Containment".
- However, Limerick's BWRs may present variances in the total integrated mass leaving the reactor vessel, and at present, there is no confirmation possible to confirm Exelon's assumptions are, as NRC notes, "conservative."
 - This is uncharted territory and, in usually, the longer equipment is in service, the more it works, the faster it breaks down.

- This calculation, since it is merely theoretical, may be convenient for relicensing, but may prove to be not conservative at all.
- At this stage in Limerick's already seriously degraded condition, it seems dangerous to assume any predictable dependability, given Limerick's degraded MOV system needed to cool the core and Limerick's embrittled, defective GE Mark II BWRs (which NRC postulates have a 65% probability of failure in an accident).

NRC'S REFUSAL TO REQUIRE LIMERICK REACTOR EMBRITTLEMENT TESTING RESULTS IN UNDETECTED EMBRITTLEMENT-INDUCED CRACKING THAT CAN LEAD TO MELTDOWNS.

- **BASED ON REPORTS ABOUT REACTOR CRACKING CALLED "MATERIAL FATIGUE", ACE REQUESTED "MATERIAL FATIGUE" TESTING AT LIMERICK NUCLEAR PLANT.**
- **"MATERIAL FATIGUE" TESTING IS CRITICAL TO PREVENTING CATASTROPHIC REACTOR FAILURE AT LIMERICK.**

EMBRITTLEMENT- INDUCED CRACKING HAS MAJOR IMPLICATIONS FOR LIMERICK NUCLEAR PLANT.

Embrittlement occurs partly due to the effects of high level radioactive bombardment during the fission process 24/7, occurring every day at Limerick for 30 years. Embrittlement subjects the reactor vessel to cracking at any time.

- Evidence from NRC Safety Inspection Reports suggests that Limerick's reactors have likely experienced substantial "Material Fatigue", over the past 30 years, especially due to Limerick's long list of shutdowns (scrams).
- Major concerns about Limerick's reactor embrittlement were repeatedly expressed to NRC by many people including experts and engineers, yet NRC repeatedly ignored and dismissed them.

EMBRITTLEMENT CONCERNS ARE COMPOUNDED BY LIMERICK'S INHERENTLY DEFECTIVE REACTORS. REACTOR VIBRATIONS PLUS THE INTENSE PRESSURES CREATED BY THE COOLING PROCESS AND NEUTRON BOMBARDMENT AT LIMERICK FOR 30 YEARS ARE OF MAJOR CONCERN IN LIGHT OF NEW UNDERSTANDINGS ABOUT EMBRITTLEMENT.

- In April, 1972 a GE Mark II BWR caused a nuclear accident due to the fact that the reactor design could not hold up to the intense vibrations in the reactor created by the cooling process.
- All GE Mark II boiling water reactors, including Limerick's, are inherently defective.
- Unlike Limerick, some nuclear plants scrapped their plants or sued GE due to this reactor defect.
- However, on November 15, 1972 the first component of Limerick's defective GE Mark II BWR arrived on site.
- Supports added to Limerick's reactors to reduce its vibrations would not reduce the vibrating forces inside the reactors.

LIMERICK HAS BEEN PLAGUED WITH A LONG HISTORY OF SCRAMS THAT COULD HAVE SUBJECTED ITS REACTORS TO SUBSTANTIAL "MATERIAL FATIGUE".

Limerick history of SCRAM events (automatic shutdowns or trips off line) shows a tremendous amount of stress was placed on the entire reactor system and supporting equipment. These are serious events that challenge nuclear safety systems, endangering public health and safety.

JUST A FEW EXAMPLES OF LIMERICK SCRAMS THAT COULD HAVE IMPLICATIONS FOR "MATERIAL FATIGUE" INDUCED CRACKING INCLUDE:

NRC's 1-31-12 RAI reveals that there were 14 Limerick scrams in 2011. Examples include:

- 2-25-11 - Unit 2
- 4-2-11 - Unit 2
- 5-29-11 - Unit 2
- 5-30-11 - Unit 2
- 6-3-11 - Unit 1

Records show that Exelon has a pervasive history of failing to properly analyze, determine, and correct the root cause of many of the 2011 scram events. This undermines our confidence in safe operations of Limerick's reactors.

Examples: A few other Limerick scrams

- 7-11-12 - Unit 1
- 7-18-12 - Unit 1 - scram and explosion
- 7-27-12 - Unit 2
- 8-31-12 - Unit 1
- 3-5-14 - Unit ?
- 3-11-14 - Unit 1
- 2-24-15 - Unit 1 - automatic forced scram into hot shutdown
- 4-13-15 - Unit 2 - scrammed scram

The 7-11-12 scram revealed reactor fatigue cracks.

- In 1984, it was reported that hundreds of Limerick's safety-related welds were not properly welded by the Bechtel Power Corp. welders and that welds were not properly inspected by Bechtel and NRC inspectors..
- This is especially alarming due to the fact that the 7-11-12 scram was caused by the inoperability of two independent reactor channels, indicating they were subject to vibration.
- Fatigue cracks were observed along the weld toe due to reverse bending. Yet NRC granted Exelon "Relief Requests" for weld inspections, irrationally counting relief as compliance for relicensing. In essence, NRC is allowing elimination of a requirement to be a substitute for compliance.

The 2-24-15 automatic forced scram - into hot shutdown

- NRC was notified by Exelon as a result of a "Main Steam Isolation Valve" unexpectedly closing due to a leak in the nitrogen gas supply line.
 - Limerick has a hydraulic system that uses nitrogen gas to operate the valve.
 - As a result of the valve closure, reactor pressure rose higher than allowed which automatically resulted in "hot shutdown", described by NRC as " idling" : fission stops occurring, but the reactor is ready for quick startup.
 - Water kept the reactor idling, supplied by the steam bypass valves and Limerick's once motor-operated feedwater system valve system (MOVs), but which broke down in 2011, resulting in a "white" violation issued by NRC.
 - The failure may have been associated with the "experiments" described in the "Safety section of this packet (date: December 23, 2014).

The 4-13-15 "scrammed scram" resulted after Unit 2 was kept running until spring refueling, well beyond the date NRC originally designated for new set point implementation.

- The 4-13-15 Event Report stated that a preplanned scram for Unit 2 refueling could not be completed and a manual full scram had to be initiated.
- This event followed NRC's emergency 2-18-15 public notice of Exelon's request and NRC's intent to amend the set point implementation date in the "Classifieds" section of the Mercury.
 - The proposed extension would allow Unit 2 to appear to be in compliance, although it did not comply with the implementation date. This would avoid the appearance of being in violation of regulations that would automatically put Unit 2 in a higher risk "configuration". The higher risk would result from equipment that would have to be de-energized and taken out of service to reset the setpoints (would this mean that Unit 2 would have had to shut down for the re-set?).
 - NRC'S announcement in the classifieds gave little time for public response (the usual public response time is 30 days, if NRC publishes its proposals in the Federal Register, as required unless there's an emergency))
 - NRC explained that the emergency action was needed because if NRC didn't extend the date of implementation, Unit 2 would be in violation of regulations.
 - So, NRC's proposal was to amend a previous 12-29-14 amendment requested by Exelon to revise Exelon's date for implementation of new set points.
 - ACE submitted its recommendation to close Unit 2 down for the sake of public safety,, knowing that NRC would grant Exelon's request, because, although public safety is always mouthed by NRC and Exelon, NRC finds ways to accommodate Exelon at public expense.

NRC ELIMINATED THE TEST TO PROVE LIMERICK'S AGING MANAGEMENT PROGRAM WORKS

NRC STATED THAT, WITHOUT PERFORMING THE TEST REQUIRED BY COMMITMENT NO. 46, IT WOULD BE IMPOSSIBLE FOR NRC TO VERIFY THE ADEQUACY OF EXELON'S PROGRAM FOR AGING MANAGEMENT AT LIMERICK.

- **YET, NRC FAILED TO REQUIRE THAT TEST BY ELIMINATING IT THOUGH AN AMENDMENT TO LIMERICK'S LICENSE RENEWAL APPLICATION.**

From Rick Ennis 5-5-15 Letter to ACE -

ACE raised a concern about elimination of Commitment No. 46 from Limerick's re-licensing application.

- Rick Ennis inaccurately claimed that Commitment No. 46 testing was not eliminated, when his own letter proves testing was eliminated and replaced with "plans for plans in the future".
- **COMMITMENT NO. 46 WAS A TEST THAT WAS IN FACT REPLACED WITH A NEW REGULATION TO BE SUBSTITUTED FOR TESTING, THAT ALLOWED A LIST OF "PLANS FOR PLANS IN THE FUTURE", INSTEAD OF ACTUAL TESTING.**
- **FUTURE PLANS THAT REPLACE COMMITMENT NO. 46 TESTING IS NOT AN ENHANCEMENT AS SUGGESTED BY MR. ENNIS, IT IS AN ELIMINATION OF THE NEED FOR EXELON TO COMPLY WITH ACTUAL TESTING.**

As a substitute for Commitment No. 46, Rick Ennis said Exelon committed to "enhance the Limerick operating experience program relative to aging and age related degradation" - in other words eliminate testing. Based on Exelon's history, NRC should NOT assume Exelon will fulfill its commitment as stated in the plans.

NRC REMOVED COMMITMENT NO. 46 FROM LIMERICK'S LICENSE RENEWAL APPLICATION BY AMENDMENT AT EXELON'S REQUEST.

We believe NRC could NOT have re-licensed Limerick if actual Exelon testing revealed the degree of degradation of Limerick's equipment and systems.

- Whenever NRC refers to Exelon's "enhanced" programs, the enhancement appears to be window dressing that reduces Exelon's responsibility to comply with safety regulations.
- Words like "review, establish criteria, establish identification coding, require communication, review operating experience, and provide training", constitute paperwork without proof, which is the hallmark of NRC's safety expectations, not real-world compliance that actively demonstrates safety.
- Due to NRC's deference to Exelon, NRC cannot prove that Limerick's aging is not accelerating faster than Exelon can cope with it.

NRC'S ELIMINATION OF COMMITMENT NO. 46 PER EXELON'S REQUESTED AMENDMENT ALLOWED UNIDENTIFIED WEAKNESSES IN AGE DEGRADED EQUIPMENT AND SYSTEMS TO BE GRANFATHERED INTO RELICENSING WITHOUT THE ACTIVE TESTING REQUIRED TO DEMONSTRATE SAFETY OF AGING EQUIPMENT ISSUES.

- It is clear that there are serious overlapping issues connected to the aging of Limerick's inherently defective equipment, which include:
 - Limerick's inherently defective GE Mark II Boiling water Reactors, due to too weak a design for the extraordinarily strong vibrations produced during ordinary operations.
 - Limerick's inherently defective Motor Operated Valve system, known to be vulnerable to its "hammering" effect since 1985, are not operating as intended and present new unknown challenges to routine operations and to the personnel expected to control Limerick's nuclear process.
- NRC keeps weakening its regulations and giving up regulating on regulating Limerick on behalf of public safety. ✓
 - NRC seems like a bystander at Limerick, rather than the authority in charge of regulating Limerick on behalf of public safety and the environment.
 - Millions of people in the Greater Philadelphia Region are being dangerously jeopardized by NRC's lack of enforcement of regulations that should result in phasing Limerick out of operations, not allowing the

Band-Aide approach to the inexplicably dangerously degraded condition of Limerick's inherently defective and age-degraded systems and equipment.

ONCE AGAIN, NRC ALLOWED EXELON TO WIGGLE OUT OF AN EXTREMELY IMPORTANT SAFETY REGULATION.

- Exelon's "plans for future plans" put the public at extreme risk.
- Exelon's plans are not acceptable as a surrogate for Commitment No. 46.
- Since Exelon could not demonstrate that its equipment management complies with Commitment No. 46, NRC should have shut Limerick down.
 - NRC weakens and eliminates regulations at Exelon's request.
 - The fact that Exelon's non-compliance does not show up in Exelon's reports or in Exelon's data base, doesn't mean that Exelon is in compliance with NRC regulations.
 - Regulations are just words on paper unless there is enforcement action against Exelon when compliance is impossible.
 - The latitude that NRC has allowed for Exelon is shamefully unprotective.

LIMERICK IS NOT SAFE. NRC IS MISSING IN ACTION.

NRC IS ALLOWING FAR TOO MANY SIGNIFICANT SAFETY ISSUES AT LIMERICK TO BE OVERLOOKED FOR LONG PERIODS OF TIME. UNSAFE CONDITIONS OFTEN HAVE GONE UNIDENTIFIED OR UNRESOLVED, SOMETIMES FOR YEARS.

NRC'S FAILED OVERSIGHT AND FAILED ENFORCEMENT ARE INCREASING LIMERICK'S ALREADY HIGH RISK FOR MELTDOWNS.

INCREASINGLY DANGEROUS LIMERICK SAFETY ISSUES, IDENTIFIED IN THIS REPORT, SUGGEST THAT AFTER 30 YEARS OF OPERATION, LIMERICK'S REACTORS, AND SUPPORT SYSTEMS ARE BREAKING DOWN, CREATING DANGEROUS CONDITIONS:

- **IF NRC CARED ABOUT PUBLIC SAFETY:**

NRC WOULD REQUIRE EXELON TO TAKE IMMEDIATE ACTION TO COMPLY WITH SAFETY REGULATIONS, INSTEAD OF PROVIDING EXELON WITH:

- EXEMPTIONS
- EXCLUSIONS
- RELIEFS
- EXPERIMENTS
- AMENDMENTS
- DEFERMENTS
- DANGEROUS DELAYS
- PLANS FOR PLANS

- **IF NRC CARED ABOUT PUBLIC SAFETY:**

NRC WOULD ENFORCE ITS OWN ORIGINAL STANDARDS AND REGULATIONS.

HOWEVER, FROM THE START, NRC WEAKENED ITS REGULATIONS TO APPROVE LIMERICK'S OPERATING LICENSE AND WEAKENING REGULATIONS IS THE WAY NRC IS REGULATING LIMERICK TO THIS DAY.

- **IF NRC CARED ABOUT PUBLIC SAFETY:**

SOME OF THE SERIOUS PROBLEMS DISMISSED TO LICENSE LIMERICK IN 1984, ARE STILL UNRESOLVED AND CAUSING EQUIPMENT BREAKDOWNS AND OTHER PROBLEMS THAT IMPACT SAFETY. IN 1984, NRC'S SECTION CHIEF STATED THAT THERE WERE FOUR PROBLEMS HE WANTED HIS STAFF TO CLEAR UP BEFORE LICENSING LIMERICK:

1. IMPROPER PROCEDURES
2. INCOMPLETE SAFETY MEASURES
3. FAULTY VALVES
4. A DEFECTIVE HYDROGEN REMOVER

- **IF NRC CARED ABOUT PUBLIC SAFETY:**

NRC WOULD HAVE SHUT LIMERICK DOWN IN 2011 AFTER ITS DEFECTIVE MOV VALVE SYSTEM BROKE DOWN.

- NRC SHOULD NOT HAVE CHANGED MOV TECHNICAL SPECIFICATIONS
- NRC SHOULD NOT HAVE ELIMINATED COMMITMENT NO. 46 FROM LIMERICK'S LICENSE RENEWAL APPLICATION
- NRC SHOULD NOT HAVE ALLOWED EXELON TO EXPERIMENT WITH MAKING PLANT MODIFICATIONS THAT INCREASE LIMERICK'S RISK OF FAILURE.

ACE STRENUOUSLY OBJECTS

**TO NRC'S 2014 APPROVAL OF
"CHANGES, TESTS, EXPERIMENTS, AND PERMANENT PLANT MODIFICATIONS"**

IT IS THREE DECADES TOO LATE AND FAR TOO DANGEROUS FOR EXELON TO BE TRYING OUT "BAND-AIDE FIXES ON THE CHEAP" FOR LIMERICK'S AGE-DEGRADED EQUIPMENT AND SYSTEMS. NO EXPERIMENT CAN CORRECT LIMERICK'S MOST DANGEROUS UNFIXABLE DEFECTS, ESPECIALLY ITS FAULT-RIDDLED SITE AND SUBSTANDARD CONSTRUCTION.

On January 19, 2015, ACE contacted NRC's Paul Krohn who, after relicensing, notified Exelon of NRC's approval of its "Changes, Tests, Experiments, and Permanent Plant Modifications." ACE objected.

- Mr. Krohn's response failed to provide justifiable evidence to defend this dangerous NRC decision.
- Mr. Krohn was unwilling to acknowledge Limerick's apparently unfixable safety issues known 30 years ago, that were obviously part of the recurrent problems for which NRC is allowing dangerous experimental trials to keep Limerick operating, when in fact Limerick should be closed.
- At issue are the unresolved issues of 1984 (listed on the preceding page) and Limerick's two primary, but inherently defective, systems required for safe operations:
 1. Two defective GE Mark II BWRs - which NRC refuses to check for embrittlement
 2. Limerick's water delivering system (MOV) which finally broke down in 2011 after three decades of enduring the "hammering" defect NRC has known about since 1985.
- In his response to ACE, Mr. Krohn did everything he could to hide from the facts about the seriousness of these problems, just as NRC and Exelon do.
- Mr. Krohn replied that he could not afford to assign his staff to investigating 1984 issues that he said were "adjudicated":
 - First, "adjudicated", in our view, means NRC conveniently dismissed their significance.
 - Second, we didn't ask for an investigation - the facts are what they are. NRC may be trying to hide from the reality that these issues were not resolved before licensing Limerick and are at the root of many significantly dangerous problems for which there is no way to keep Limerick operational, except by experimentation, so NRC got out of the way: experiments were allowed.
- Limerick's defective reactors, deficient MOV system, and pervasive history of improper procedures stem from NRC's willful blindness, showing that NRC's priority is NOT public safety.

These experiments appear to be an effort to attempt Band-Aide maintenance on Limerick's failed water delivery system that is essential for core fission-reaction control:

- In 2011, NRC cited Limerick for a violation of a "legally binding requirement" (law) when its Motor Operated Valve (MOV) failed and stuck, cooling water was lost and did not reach the core for "longer than NRC specifications allow". NRC identified this very serious accident as a "weakness in maintaining long term plant stability" at Limerick.

NRC STATED THAT IT WOULD INCREASE ITS OVERSIGHT. INSTEAD, NRC TOOK A HANDS-OFF APPROACH TO REGULATING LIMERICK:

- **In 2011**, those 1984 problems ballooned until Limerick's water delivery system for the core resulted in an accident. As a result of the accident, NRC cited Exelon with noncompliance of a legally binding requirement involving the "failure of a feedwater Motor Operated Valve (MOV) which resulted in loss of Core Isolation Coolant (RCIC) for longer than specifications allow according to Technical Specifications (TS)." The NRC cited Exelon with a "white" violation: a "Weakness In Maintaining Plant Stability".
- **In 2012**, Exelon requested an amendment taking the MOV out of Technical Specifications (TS), under NRC regulatory control, and moving the MOV into the Technical Manual (TM), under Exelon's control and not under the same NRC regulations.
- **In 2013**, the NRC inexplicably granted Exelon's request! The NRC contacted an unnamed state official for comment on this amendment prior to its approval. It is far from routine for the NRC to ask a state official for comment on its amendment approvals. The NRC stated, in its approval, that the unnamed state official had no comment. (However, at TMI, on March 28, 1979, the immediate cause of the loss-of-coolant accident that allowed the uncovering of the core and the melting of about half of it was a valve that stuck open and allowed large volumes of water to escape).
- **In 2014**, NRC issued an evaluation of new "Changes, Tests or Experiments, and Permanent Plant Modifications" which included cutting power to loss-of-power/overload alarms and removing them from service that are part of the MOV system. Power has been removed from the RCIC valve motors with the valves in the open position. Some other valve motors and alarms also have no power, and the valves are set in an open or shut position

THIS EXPERIMENTAL PROCESS IS UNACCEPTABLE. THE EXPERIMENTAL MODIFICATIONS OUTLINED IN NRC'S DECEMBER 23, 2014 LETTER IRRESPONSIBLY ALLOWS EXELON TO KEEP LIMERICK OPERATING DESPITE INOPERABLE EQUIPMENT

NRC'S ACTION MATRIX

SHOWS THAT NRC IS NOT PROTECTING PUBLIC SAFETY

NRC's color code may minimize the perception of risk but, in fact, increases public risks.

NRC'S ACTION MATRIX FOR THE FIRST QUARTER OF 2015 SHOWS CHARTS OF "GREEN" PERFORMANCE INDICATORS THAT SEEM TO INDICATE SIGNIFICANTLY LESS-THAN-DESIRABLE EQUIPMENT AND/OR PERFORMANCE LEVELS.

"GREEN" is one of NRC's colors indicating a violation of NRC regulations. NRC identifies "GREEN" violations as being "of very low safety significance."

ACE assumes that, as usual, the Action Matrix results are based on Exelon's data, not on independent NRC analysis. However, the matrix charts show the vast number of systems, structures, and components that would need to perform perfectly to protect public safety.

- The problem is that Limerick licensing was held up for years due to the experimental \$6.84 billion "fix" rigged to control the intense vibrations of Limerick's defective reactors during routine operations.
- An additional factor of risk is because, although Limerick has operated for 30 years, its equipment is actually 1960's technology. The first component of Limerick's reactors arrived on site aboard a 90-wheel truck in 1972, followed by six more 9-wheel truck deliveries.
- That means that the events and activities identified below, result are impacted by equipment that is actually 50 years old:

LIMERICK UNIT 1 - Action Matrix Violations 2014:

MOST SIGNIFICANT INSPECTION FINDINGS

- 3Q / 2014 - "Green"- Emergency Preparedness
- 2Q / 2014 - "Greater Than Green"- Security Safeguards

"GREEN" PERFORMANCE INDICATORS:

- **Initiating Events:**
 - Unplanned Scrams
 - Unplanned Power Changes
 - Unplanned Scrams With Complications
- **Mitigating Systems:**
 - Safety System Functional Failures
 - Emergency AC Power System
 - High Pressure Injection System
 - Heat Removal System
 - Residual Heat Removal System
 - Cooling Water System
- **Barrier Integrity (Reactor Safety)**
 - Reactor Coolant System Activity
 - Reactor Coolant System
- **Emergency Preparedness (Reactor Safety)**
 - Drill / Exercise Performance
 - Emergency Response Organization Drill Participation
 - Alert and Notification System
- **Occupational Radiation Safety**
 - Occupational Exposure Control Effectiveness
- **Public Radiation Safety**
 - RETS / Offsite Dose Calculation Manual
(Is RETS an acronym for Radiation Environmental Transport System?)
- **Security (Safeguards)**
 - Protected Area Equipment

LIMERICK UNIT 2 - Action Matrix Violations 2014

MOST SIGNIFICANT INSPECTION FINDINGS

- 4Q / 2014 - "Green"- Initiating Events (Reactor Safety)
- 3Q / 2014 - "Green"- Emergency Preparedness (Reactor Safety)
- 2Q / 2014 - "Green"-Barrier Integrity (Reactor Safety)
 - "Greater than Green"- Security (Safeguards)

"GREEN" PERFORMANCE INDICATORS:

- **Initiating Events:**
 - Unplanned Scrams
 - Unplanned Power Changes
 - Unplanned Scrams With Complications
- **Mitigating Systems:**
 - Safety System Functional Failures
 - Emergency AC Power System
 - High Pressure Injection System
 - Heat Removal System
 - Residual Heat Removal System
 - Cooling Water System
- **Barrier Integrity (Reactor Safety)**
 - Reactor Coolant System Activity
 - Reactor Coolant System
- **Emergency Preparedness (Reactor Safety)**
 - Drill / Exercise Performance
 - Emergency Response Organization Drill Participation
 - Alert and Notification System
- **Occupational Radiation Safety**
 - Occupational Exposure Control Effectiveness
- **Public Radiation Safety**
 - RETS / Offsite Dose Calculation Manual
(Is RETS an acronym for Radiation Environmental Transport System?)
- **Security (Safeguards)**
 - Protected Area Equipment

RECENT 2015 LIMERICK UNIT 2 SHUTDOWN PROBLEMS

1. FEBRUARY, 2015 - NRC ISSUED AN AMENDMENT OF AMENDMENT 174 BECAUSE UNIT 2 HAD DIFFICULTIES COMPLYING WITH NRC'S SETPOINT IMPLEMENTATION DATES

ACE wrote to NRC opposing NRC staff's proposal to amend Limerick's Unit 2 operating license yet again. Amendment No.174 was just issued on December 29, 2014, only two months after NRC relicensed Limerick.

It is incomprehensible that Exelon can't comply with an amendment it requested just two months ago. More disturbing is the fact that NRC states that this new amendment request is "due to unforeseen difficulties associated with calibration of a temperature indicating switch" and newly identified problems with an inoperable key pad.

This equipment is essential to the implementation of new setpoints and thermal calibrations and is required to be implemented within 60 days of the issuance of Amendment 174. (February 27, 2015).

NRC should not allow an amendment to Amendment 174 just because Exelon cannot or will not comply with it. NRC should issue a violation. Exelon's new amendment request acknowledges inoperable equipment inoperable and equipment is the reason Amendment 174 mandated shutdown of Unit 2 as of February 27, 2015 or be in violation of its LGS Unit 2 operating license unless it shuts down.

2. 4-5-15 - A FIRE DISABLED UNIT 2'S HIGH PRESSURE COOLANT INJECTION SYSTEM

- a. A fire damaged an electrical cabinet and the power supply for the unit 2 high pressure coolant injection condensate pump motor.
- This fire caused a UNIT 2 ALERT for the reactor building that it was in.
- The fire damaged the power supply for a pump motor that supports the operation of the water system.
- This fire affected a water system required to deliver water to the core.
- It required that back-up safety systems be available.
- This electrical fire could not be extinguished with water.
- It appears power was interrupted because of the electrical panel damage.
- Carbon dioxide fire extinguished were needed.

3. 4-13-15 - UNIT 2'S PROBLEMS CULMINATED IN THE SCRAM OF A SCRAM

- A "scrammed scram" resulted after Unit 2 was kept running by an amendment of amendment 174 until spring refueling, well beyond the date NRC originally designated for new set point implementation.
- The 4-13-15 Event Report stated that a preplanned scram for Unit 2 refueling could not be completed and a manual full scram had to be initiated.
- This event followed NRC's emergency 2-18-15 public notice of Exelon's request and NRC's intent to amend the set point implementation date in the "Classifieds" section of the Mercury.
 - The proposed extension would allow Unit 2 to appear to be in compliance, although it did not comply with the implementation date. This would avoid the appearance of being in violation of regulations that would automatically put Unit 2 in a higher risk "configuration". The higher risk would result from equipment that would have to be de-energized and taken out of service to reset the setpoints.
 - NRC'S announcement in the classifieds gave little time for public response (the usual public response time is 30 days, if NRC publishes its proposals in the Federal Register, as required unless there's an emergency))
 - NRC explained that the emergency action was needed because if NRC didn't extend the date of implementation, Unit 2 would be in violation of regulations.
 - So, NRC's proposal was to amend a previous 12-29-14 amendment requested by Exelon to revise Exelon's date for implementation of new set points.
 - ACE submitted its recommendation to close Unit 2 down for the sake of public safety,, knowing that NRC would grant Exelon's request, because, although public safety is always mouthed by NRC and Exelon, NRC finds ways to accommodate Exelon at public expense.

ALL SORTS OF DIFFICULTIES ARE ENCOUNTERED DURING SCRAMS:

2-24-15: Automatic forced scram into hot shutdown

- NRC was notified by Exelon as a result of a "Main Steam Isolation Valve" unexpectedly closing due to a leak in the nitrogen gas supply line. Limerick has a hydraulic system that uses nitrogen gas to operate the valve.
- As a result of the valve closure, reactor pressure rose higher than allowed which automatically resulted in "hot shutdown", described by NRC as " idling" : fission stops occurring, but the reactor is ready for quick startup.
- Water kept the reactor idling, supplied by the steam bypass valves and Limerick's once motor-operated feedwater system valve system (MOVs), but which broke down in 2011, resulting in a "white" violation issued by NRC. The failure may have been associated with Limerick's ongoing experiments. Records show that Exelon has a pervasive history of failing to properly analyze, determine, and correct the root cause of many of Limerick's scram events.

DIFFICULTIES HAVE OFTEN BEEN ASSOCIATED WITH SHUTDOWNS.

EXAMPLES IN 2012 INCLUDE:

Unit 1: May 1: An alarm event reported by Exelon: Spurious trip of the reactor enclosure ventilation system

- The cause could not be determined.
- Because the restoration of pressure was completed without consequence, the Licensee Event Report (LER) is closed:
- **ACE concern: NRC admits they don't know what caused this issue, but closed the issue anyway even though it could have been a serious threat. WHY?**

Unit 2: June 25: During a Test, the 'B' RHR minimum flow valve failed to open following a simulated Loss of Coolant Accident. The simulation was repeated with the same results. During a test, the 'B' RHR minimum flow valve failed to open following a simulated Loss Of Coolant Accident signal, the test was repeated, with the same results

- The problem existed from Nov. 30, 2011 until the condition was corrected on June 27, 2012.
- **ACE concern: This serious problem existed for 7 months. NRC called it a more than minor violation -but it was a test that failed twice - yet NRC treated it as a non-cited violation. This is an illustration of other issues that have remained uncorrected for long periods of time and could lead to serious consequences.**
- **ACE Question: Could condensation have harmful consequences to plant systems?**

Unit 1: July 11: Unplanned shut down resulting in violation: "Failure to follow an alarm response procedure following the receipt of a main control room alarm".

- Operators failed to reduce power within 15 minutes, and delayed reducing power for 1 hour and 49 minutes.

- Exelon failed to respond to NRC within a reasonable time after NRC required a response, as Exelon Management was reminded to do in a mtg. on August 22, 2012.
- Circumferential fatigue cracks were observed along the weld toe due to reverse bending and indicated the line was subject to vibration and were caused by the inoperability of two independent reactor channels, indicating they were subject to vibration.
- In 1984, it was reported that hundreds of Limerick's safety-related welds were not properly welded by Bechtel Power Corporation welders and that welds were not properly inspected by Bechtel and NRC inspectors. Yet NRC granted Exelon "Relief Requests" for weld inspections, irrationally counting relief as compliance for relicensing. In essence, NRC is allowing elimination of a requirement to be a substitute for compliance.
- Limerick maintains that although the event involved the inoperability of two independent channels in the Reactor Protection Service (RPS), the RPS safety function was maintained and NRC has closed the violation.
- **ACE concern: Exelon has established a pattern of delayed notification of NRC when accidents happen. This pattern of delaying notification has caused uncontrollable and unnecessary threats to public health and safety. NRC would be negligent to relicense Limerick knowing this pattern is likely to continue, possibly with dire consequences as Limerick ages.**

Unit 1: July 12: Main Turbine Problem - Failure of One Main Turbine First Stage Pressure Sensing Lines

- Power was reduced to 22% to remove main turbine from service to repair.

Unit 1: July 18: Unplanned shut down, "technically, an explosion", & Exelon's delay in responding to NRC result in serious violations:

- Inadequate preventive maintenance resulted in an unplanned shut down of Unit 1.
- An electrical transient flashover (*translation: explosion*) knocked out the transformer. Recirculation pumps stopped. Loss of water caused main turbine runback. Shutdown was achieved by an unplanned manual scram.
- Repairs to the transformer were made.
- This event could have upset plant stability and challenged critical safety functions during shutdown as well as power operations.
- Inexcusably, the performance deficiency occurred more than 3 years ago and was uncorrected until after the July 18 shutdown. Ineffective preventive maintenance implementation continues to exist within Limerick's preventive maintenance program and is indicative of present performance.
- **The review showed that the other 14 transformers had been deactivated due to the site's implementation thermography monitoring program in 1998. This monitoring program was credited at the time of implementation for existing preventive maintenance, but FAILED.**
- **As a result of the July 18th event and violation, NRC required Limerick to reinstitute the clean and inspect preventive maintenance on all load center transformers at an increased frequency of 8 years vs. 20 years.**

In NRC's January 31, 2012 "Request for Additional Information" (RAI) to Exelon, NRC noted that there were 14 Limerick scrams in 2011.

- Exelon's pervasive history of failing to properly analyze, determine, and correct the root cause.
- The number of Limerick's scram events is cause for alarm, but the scrams that occurred in 2012 included the 7-18-12 shutdown that was accompanied by an explosion.

LIMERICK'S REACTORS ARE UNDER SEVERE STRESS TO START WITH, DUE TO THEIR ORIGINAL INHERENT DEFECTIVE DESIGN. SIGNIFICANT STRESSES FROM YEARS OF SCRAMS HAVE ADVERSELY AFFECTED THE REACTORS AND REDUCED PUBLIC SAFETY. THERE HAVE BEEN ENOUGH SCRAMS TO CAUSE ALARM, DUE TO THEIR POTENTIAL FOR CATASTROPHIC FAILURE:

HOLLOW UNSUBSTANTIATED ASSURANCES FROM NRC OR EXELON ARE NEITHER ACCEPTABLE NOR SUFFICIENT GIVEN THE POTENTIAL CONSEQUENCES FOR UNIT 2 MELTDOWN.

- Millions of people in the Greater Philadelphia Region are at risk due to Exelon's risky experimentation and NRC's lax oversight of Unit 2.
- We have no confidence that Unit 2 can be shut down quickly and safely.

Manipulating public perception to make Limerick appear to be in compliance with NRC regulations by amending regulations to accommodate Limerick's inability to comply with NRC's already lax regulations is a prescription for disaster.

Exelon's serial violations and repeated inability to comply with NRC regulations jeopardized long-term plant stability and increase risks to public health and safety. It is shameful that NRC even considers and approves Exelon's repeated attempts to hide Limerick's violations and deficiencies through amendments to Limerick's operating license.

Limerick's defects are cumulative and started prior to the construction of the plant. In 1964, realtors started offering local farmers and landowners money to sell off their properties while a rumor was circulated that a car factory was being planned.

In 1968, at a cocktail party at the Collegeville Inn, Philadelphia Electric (PE/PECO/Exelon) announced that it was the secret buyer of the land and was building a nuclear power plant on it. A 1974 geologic survey revealed the site was on top of an earthquake fault.

In April 1972, a GE Mark II Boiling Water Reactor caused a nuclear accident in Germany at the AEG-Kraftwerks Union (KWU) Würgassen Nuclear Plant. The accident is relevant because it drew attention to the essential design flaw inherent to all GE Mark II Boiling Water Reactors.

The KWU accident resulted from a rupture due to enormous unanticipated BWR vibrations, equal to the seismic vibrations of a major earthquake that built up during the quenching process (cooling process) causing the safety relief valve to fail to close.

On November 15, 1972, just seven months later, the first component of Limerick's GE Mark II Boiling Water Reactors rolled onto PECO's proposed site aboard a 90-wheel truck.

This is relevant because it is indicative of PECO/Exelon's "put the cart before the horse" mentality. In this particular case, before completion of a geological survey or issuance of a construction permit, PECO had made a huge financial investment which, apparently for the NRC, outweighed concerns about the protection of health, safety, and the environment for millions of people when it licensed Limerick in 1984. We object to NRC's deference to Exelon's repeated use of the cart-before-the-horse strategy.

NRC SHOULD NOT BE ABANDONING PUBLIC SAFETY IN FAVOR OF LIMERICK LIFE- SUPPORT:

1. We have no confidence in Exelon's self-assessment of its own changes for Limerick operations because Exelon obviously has a stake in the outcome. Evidence shows Exelon's data and reports fail to provide full, accurate, and timely disclosure.
2. It is reckless for NRC to have failed to conduct its own independent rigorous testing for Exelon's risky changes at Limerick.
3. NRC assured the public in a recent Op-Ed that safety is its priority, but insists on putting on blinders and FAILING to regulate on behalf of public safety, mindlessly allowing Exelon's self-serving reports to substitute for actual safeguards.

NRC IS IGNORING INHERENT UNIT 1 AND 2 EQUIPMENT WEAKNESSES AND SHOULD NOT BE ACCEPTING EXELON'S FLAWED ASSUMPTIONS AND BAND-AIDE EXPERIMENTS.

THERE IS NO EVIDENCE TO SUPPORT EXELON'S SUPPOSITION THAT LIMERICK CAN FUNCTION TO THE END OF ITS CURRENT LICENSES THAT END IN 2024 AND 2049.

**EVIDENCE SUGGESTS THAT LIMERICK SHOULD BE SHUT DOWN
BEFORE IT MELTS DOWN.**

NRC WHITEWASHES LIMERICK **VIOLATIONS, MALFUNCTIONS, AND NON-COMPLIANCE** **JEOPARDIZING PUBLIC SAFETY**

NRC'S LAX OVERSIGHT AND ENFORCEMENT ARE A RECIPE FOR LIMERICK DISASTER!

Year After Year, NRC Overlooks Many Serious Issues At Limerick, Downplaying Their Significance By Frequently Declaring Them "Green Findings", Even Though Some Can Lead To Accidents And/OR Meltdowns.

EXAMPLES BELOW SHOW NRC'S DANGEROUSLY DELAYED CORRECTIVE ACTIONS AND NEGLIGENT OVERSIGHT AT LIMERICK NUCLEAR PLANT

1. Seismic Monitors Were Left Inoperable For At Least 1 Year And Four Months.
 - They Were Inoperable When The Virginia Earthquake Jolted Limerick.
2. Radiation Monitors Were Left Inoperable For Over 1 Year For Radioactive Discharges Into Public Drinking Water For Almost Two Million People
3. Preventive Maintenance Was Deferred For 3 Years For An Airlock Door Magnetic Switch.
 - That Can Result In Increased Radioactive Releases
4. Procedures To Protect The Reactor Were Not Followed In The Required 15 Minutes,
 - It Took 1 Hour And 49 Minutes To Respond To An Alarm To Reduce Power To Protect The Reactor. This Violation Was Not Recorded Properly Until 103 Days Later.
5. There Was No Preventive Maintenance For A Limerick Transformer For 3 Years.
 - This Led To An Explosion.
6. Defective Material Was Reinstalled Into A Safety System After It Failed.
 - Exelon Failed To Retest Recycled Parts After Repairs And Before Installation.
7. Age-Degraded Relays Were Not Replaced For 8 Years Past Their Vender Recommended Lifetime.
 - This Could Have Led To Core Damage.

RECENT LIMERICK VIOLATIONS COULD HAVE LED TO SERIOUS PROBLEMS, YET NRC DOWNPLAYED THEIR SIGNIFICANCE. NRC REPEATEDLY ALLOWED EXELON TO DELAY CORRECTIVE ACTIONS, INCREASING RISKS TO THE PUBLIC.

1. **Radiation Barrier Integrity Was Breached.**
 - Spill of 15,000 thousand gallons of radioactive water into the Schuylkill River.
 - The public was not notified for 23 days.
 - Millions of people were deprived of making the choice not to drink or use the contaminated water.
2. **Failure OF Degraded Magnetic Switch for a Secondary Containment Airlock Door**
 - Compromised barrier integrity that, in the event of an accident, would not have protected the public from radionuclide releases
3. **Failure To Follow Radiation Procedures For Evacuation Of Unit 2 Upper Drywell During Removal Of Irradiated Core Components**
 - Poor Communication to personnel
4. **Emergency Diesel Generator Unexpectedly Unavailable For About 40 Hours Due To Poor Maintenance.**

LIMERICK'S RADIATION RELEASES AND RISKS ARE INCREASING

NRC DOESN'T CARE

IF NRC REALLY CARED ABOUT PUBLIC HEALTH AND SAFETY, NRC WOULD:

- **CLOSE LIMERICK TO STOP RADIOACTIVE RELEASES INTO THE AIR AND WATER OF OUR CANCER-RIDDLED COMMUNITIES, IMPACTED BY LIMERICK'S RADIATION FOR 30 YEARS.**

SEE ALARMING CANCER INCREASES SINCE LIMERICK STARTED OPERATING:

WWW.ACEREPORT.ORG SECTION 2 "CANCER - SKYROCKETING INCREASES: LINKS TO LIMERICK"

IF NRC CARED ABOUT PUBLIC HEALTH, NRC WOULD:

- **STOP MAKING UNSUBSTANTIATED FALSE CLAIMS ABOUT OUR RADIATION RISKS FROM LIMERICK NUCLEAR PLANT'S ROUTINE AND ACCIDENTAL RADIATION RELEASES AND TAKE ACTION TO MINIMIZE LIMERICK'S RADIATION RELEASES, INCLUDING;**
 1. **STOP LIMERICK'S USE OF HIGH-BURN FUEL**
 2. **REQUIRE RADIATION FILTERS FOR POST-FUKUSHIMA VENTS**
 3. **REQUIRE FILTRATION OF LIMERICK'S RADIOACTIVE DISCHARGE POINT (001) INTO THE SCHUYLKILL RIVER, A VITAL PUBLIC DRINKING WATER SOURCE FOR ALMOST 2 MILLION PEOPLE. (BY FILTERING LIMERICK'S TDS DISCHARGES)**

IF NRC CARED ABOUT PUBLIC HEALTH, NRC WOULD:

- **STOP DECEIVING THE PUBLIC BY CLAIMING LIMERICK'S RADIOACTIVE DISCHARGES, INCLUDING SPILLS AND LEAKS, ARE NOT HARMFUL AND ONLY ABOUT ONE KIND OF RADIATION, WHEN OVER 100 RADIOANUCLIDES ARE ROUTINELY AND ACCIDENTALLY RELEASED INTO OUR AIR AND WATER FROM LIMERICK.**

NRC DOES NO RADIATION MONITORING

NRC'S UNSUBSTANTIATED FALSE CLAIM THAT LIMERICK NUCLEAR PLANT'S RADIATION RELEASES ARE TOO LOW TO CAUSE HARM IS A LIE, EVERY BIT AS DESPICABLE AS THE LIES TOLD BY THE TOBACCO INDUSTRY FOR DECADES.

- **NRC has no accurate idea how much of each of over 100 Limerick radionuclides have been released into our air and water since 1985, nor the actual levels for each radionuclide routinely or accidentally currently being released into our air and water from Limerick.**
- **No one can accurately determine the additive, cumulative, and synergistic harms from all radionuclides from all routes of exposure without continuous independent monitoring for each radionuclide released. Continuous independent radiation monitoring for each radionuclide being released has never been done.**
- **Yet, time after time, NRC gives false assurances claiming Limerick's radiation releases are small and not harmful, even after accidental radioactive releases. NRC often gives those false assurances even before fully understanding what happened.**

THERE IS NO SAFE DOSE

A BROAD BASED ACKNOWLEDGEMENT FROM GOVERNMENT AGENCIES, THE NATIONAL ACADEMY OF SCIENCES, PHYSICIANS FOR SOCIAL RESPONSIBILITY, AND INDEPENDENT RESEARCHERS CONFIRMS THERE IS NO SAFE DOSE OF EXPOSURE TO RADIATION. EVERY DOSE INCREASES THE RISK OF CANCER.

HIGH BURN FUEL USE AT LIMERICK INCREASES RADIOACTIVE RELEASES

HIGH-BURN FUEL RELEASES 2 TO 3 TIMES HIGHER RADIOACTIVE FISSION GAS

RADIATION SPIKES DETECTED BY CITIZENS ARE LIKELY FROM LIMERICK'S USE OF HIGH-BURN FUEL

- Citizen radiation monitoring detected 20% to 30% higher radiation spikes - highest readings were more than double (in 2013 compared to 2006)
- Comparison of ACE radiation monitoring in the mid 2000s and recent radiation monitoring show radiation spikes far exceeded earlier radiation detection by 20% to 30%.
- Radiation spikes from Limerick go undetected because there is no continuous independent monitoring with real time reporting on Limerick's routine and accidental radiation releases.

EXELON'S RADIATION REPORTS FOR LIMERICK ARE COMPLETELY UNRELIABLE

- **36% MARGIN OF ERROR IS ALLOWED BY NRC IN LIMERICK'S RADIOACTIVE FISSION GAS (ASSOCIATED WITH HIGH-BURN FUEL) RELEASED TO AIR.**
- **WHY WOULD NRC ALLOW SUCH SHOCKING MARGINS OF ERROR IN LIMERICK'S RADIOACTIVE GAS REPORTS (UNCERTAINTY UP TO 36.6%)?**

Exelon's 2011 Radiation Report to NRC for Limerick Nuclear Plant Table 1A Page 13

<u>Radioactive Gas Releases</u>		<u>UNCERTAINTY</u>
A.	Fission and Activation Gasses	36.6%
B.	Radioactive Iodine	20.4%
C.	Particulates	22.6%
D.	Gross Alpha	22.6%
E.	Tritium (H-3)	15.7%

Other Examples of Unreliable Radiation Data for Limerick:

- Radwaste Liquid Effluent Monitoring Instrumentation - NRC Docs Page 5, I.
EXELON'S RADIATION MONITOR WAS LEFT INOPERABLE OVER 1 YEAR FOR LIMERICK'S DISCHARGE POINT INTO A VITAL DRINKING WATER SOURCE
(6/22-08 TO 7/1/09) Release Flows Were Not Repaired in Required 30 Days - Remedy DID NOT Eliminate The Issue
- **RADIATION DOSE FACTORS WERE OMITTED** For The Last 5 Weeks Of 2010
- Exemptions From Data: Limerick's 2007 Radiation Environmental Monitoring Program
 - Air Particulate Sample (location 22G1 for week 5/29/07 to 6/4/07)
NOT AVAILABLE - INCORRECT PLACEMENT OF AIR PARTICULATE FILTER
 - Air Iodine Sample (location 10S3 for the week 9/24/07 to 10/1/07)
NOT SHIPPED - SAMPLE COLLECTION ERROR
 - Destroyed Due to Vehicle Accident - TDL holder for location 10S3 on 2/18.
EXPOSED TO ELEMENTS
 - TLD Data (Locations 18S2, 25S2 and 29S1)
NOT COMPLETE FOR THE 1ST QUARTER
Vendor inability to read all dosimeters - Vendor Suspected DAMAGE by MOISTURE
Average Ambient Radiation Level was DETERMINED BY AVERAGING 3 GOOD DOSIMETERS
It Was Determined (Presumably by Exelon)
 - Equipment Breakdowns and Power Outages Were Unavoidable.

RADIOACTIVE GROUNDWATER IS CONFIRMED AT LIMERICK

- **AND IT'S NOT JUST TRITIUM AS CLAIMED BY RICK ENNIS 5-5-15**
- **EXELON'S OWN RADIATION REPORTS TO NRC REFUTE ENNIS'S CLAIM**

5-5-15 Richard Ennis Response To ACE About Borehole Testing Followed by ACE Comments.

- Ennis Said "Borehole testing is not performed at Limerick for the purposes of monitoring groundwater"

ACE comments:

- Borehole testing should be required, especially for all long-lived radionuclides associated with Limerick's operations.
 - When long-lived radionuclides have been detected in the groundwater under Limerick, then the soil should also be expected to contain those radionuclides.
 - Over the past 20 years, there have been numerous radioactive leaks and spills into the ground water at Limerick.
 - NRC has never required clean up.
 - Long-lived radionuclides logically contaminate the soil as a result of those leaks and spills, and there could be soil contamination coming from other reactor problems.
- Ennis inaccurately said, "*With respect to concerns about radionuclides in the groundwater for Limerick, with the exception of tritium (which had no offsite or onsite dose impact), no other radionuclides have been identified in onsite groundwater".*
 - It is an outright lie to claim that tritium is the only radionuclide in Limerick's ground water.
 - Even Exelon's groundwater monitoring shows 15 of 15 radiation monitoring wells included a broad range of radionuclides.
 - Limerick Nuclear Power Plant's Radioactive Test Results - It's Not Just Tritium
RADIOACTIVE GROUNDWATER Limerick Test Results
15 of 15 Gross Beta (dissolved) **Detected**
3 of 15 Gross Beta (suspended) **Detected**
9 of 15 Gross Alpha (dissolved) **Detected**
5 of 15 Gross Alpha (suspended) **Detected**
3 of 15 Gamma Emitters **Detected**
4 of 5 Uranium 233/234 **Detected**
This type of uranium has a very long half-life and is a fissile isotope
It is clearly from Limerick operations.
 - Ennis claimed there is no offsite or onsite dose impact from all the radionuclides in Limerick's groundwater. That claim is completely unsubstantiated. There has never been independent well testing on or off-site.
 - Wells within a 1-mile radius from Limerick's reactors were NEVER tested for radionuclides detected in Limerick's groundwater.

46	Domestic Withdrawal Wells
2	Industrial Wells
2	Commercial Wells
1	Institutional Well
1	Potable Water Supply Well - 175 Feet from the Reactor Building - Who Drinks or Showers In That Water?

ACE Concerns:

- It is illogical to assume long-lived radionuclides in Limerick's groundwater are not in the soil. Why wouldn't they be? There has never been clean-up.
 - Borehole testing should have been a requirement for relicensing, given the numbers of leaks and spills that were never cleaned up, and the numbers of radionuclides detected in all 15 of Exelon's radiation monitoring wells at Limerick.
 - Radioactive releases into the groundwater should be considered for aging management. The longer and harder the plant runs, there are increased additive and cumulative risks from additional radioactive leaks and spills.
- Ennis Said, "*Limerick uses a number of wells as part of a comprehensive groundwater monitoring program*"

ACE Comments:

- 15 monitoring wells on a 600 acre site "placed and monitored by Exelon" should NOT be considered a comprehensive groundwater monitoring program by anyone.
- The entire monitoring, testing, and reporting are controlled by Exelon, the company with a vested interest in the outcome that has shown here and elsewhere that it can't be trusted for full and accurate disclosure.
- NRC does nothing more than review Exelon's self-serving radiation reports.
- NRC failed to do radiation testing of groundwater.

NO ONE EVER DID BOREHOLE TESTING TO DETERMINE THE EXTENT OF RADIOACTIVE CONTAMINATION OF SOIL NEAR LIMERICK'S REACTORS.

- ACE raised concerns that, if there were cracks in the reactors and cracks in the concrete surrounding the reactors, radiation could escape into the soil and contaminate the groundwater. ACE indicated that it believed that borehole testing in the ground close to the Limerick reactors should be performed.
- **8 RADIONUCLIDES ARE ALREADY CONFIRMED TO BE IN LIMERICK'S SEDIMENT AND BROAD LEAF VEGETATION. WHY WOULDN'T NRC REQUIRE BOREHOLE TESTING FOR AT LEAST THESE RADIONUCLIDES?**

8 Radionuclides Reported "Above Background"			$\frac{1}{2}$ Life
Beryllium	Be-7	53	Days - Unstable
Cesium	Cs-134	30	Years
Cesium	Cs-137	30	Years
Manganese	Mn-54	314	Days
Cobalt	Co-58	70	Days
Cobalt	Co-60	70	Days
Iodine	I-131	8	Days
Potassium	K-40	1	Day

5-5-15 Richard Ennis's email said:

ACE's e-mail dated April 10, 2015, referenced Exelon's 2007 and 2009 radiological reports to the NRC for Limerick and cited concerns with radionuclides in the groundwater, sediment and broad leaf vegetation.

- "Regarding concerns about radionuclides in the sediment and on broad leaf vegetation at Limerick, NRC senior health physics staff re-reviewed the Limerick 2007 and 2009 Annual Radiological Environmental Monitoring Reports, referenced in the ACE e-mail."
- "Those reports did identify Cesium 137 in sediment samples associated with the liquid effluent discharge path and no Limerick-generated radionuclides were detected in broad leaf vegetation."
- "Reports also identified very low levels of tritium in surface water samples associated with the liquid effluent discharge path and groundwater associated with the turbine building wall leakage".
- "The public dose projections associated with these two radionuclides were well within applicable regulatory limits."

ACE Comments:

- This is another example of despicable NRC deception to minimize actual risks to avoid protective action.
 - Regulatory limits for radiation are far from protective.
 - When projections of public dose are not based on additive, cumulative, and synergistic impacts from all radionuclides detected, they are inaccurate and virtually meaningless.
- Ennis said, "Based on our review, we did not identify any other radionuclides, attributable to plant operations, in the environment"
- ACE Comment:
- It is indefensible and absurd to suggest that radionuclides found in Limerick's radioactive groundwater and soil contamination are not from Limerick after 30 years of nuclear plant operations routinely and accidentally releasing radiation into the environment.

ABSURD UNSUBSTANTIATED CLAIMS ABOUT RADIATION IMPACTS FROM LIMERICK CAUSE NRC TO LOSE ALL CREDIBILITY WITH THE PUBLIC.

WATER - THERE IS NOT ENOUGH AVAILABLE TO DEAL WITH MULTIPLE FUKUSHIMA-LIKE MELTDOWNS AT LIMERICK

A CATASTROPHIC WATER DISASTER COULD RESULT FROM LIMERICK MELTDOWNS

- **MANY MILLIONS OF PEOPLE ACROSS SIX COUNTIES COULD BE LEFT WITH LITTLE OR NO WATER AFTER LIMERICK MELTDOWNS**
- **ALMOST 2 MILLION PEOPLE WHO DEPEND ON THE SCHUYLKILL RIVER FOR THEIR DRINKING WATER COULD END UP WITH NO WATER OR WATER TOO RADIOACTIVE TO USE**

IF NRC CARED ABOUT PUBLIC HEALTH AND SAFETY,

- **NRC WOULD CLOSE LIMERICK TO AVOID LIMERICK MELTDOWNS THAT COULD RESULT IN A CATASTROPHIC DRINKING WATER DISASTER FOR MILLIONS OF PEOPLE.**

NRC SHOULD REJECT EXELON'S LUDICROUS CLAIM OF ADEQUATE MAKE UP WATER FOR LIMERICK MELTDOWNS

(From NRC's 3-15 Report - Post-Fukushima 3.1 Major Reactor Systems Concerns:

- **DESPITE EVIDENCE SHOWING WHY THERE IS NOT ENOUGH WATER, NRC INEXPLICABLY ACCEPTS EXELON'S UNSUBSTANTIATED EVALUATION OF THE ABILITY TO ALIGN MAKE UP WATER RESOURCES TO DEAL WITH LIMERICK MELTDOWNS.**
- There's never been enough water in the Schuylkill River to even sustain Limerick's routine operations, a fact acknowledged before Limerick construction. That's why Exelon had to divert water from the Delaware River and why Exelon now pumps toxic mine pool water into the Schuylkill River to supplement the river flow. Even with supplementation, the Schuylkill River reached record low flows by 1999. Each year, the river becomes more depleted.
- Clearly, there would not be enough water under severe Limerick accident conditions, especially for simultaneous multiple Fukushima-like meltdowns in Limerick's reactors and fuel pools.
- NRC blindly accepts Exelon's unsubstantiated evaluation of the ability to align make up water resources, despite water worries even for Limerick's routine operations.
- So much water was required to deal with the Fukushima meltdowns, that massive amounts of water were needed and withdrawn for many months from the Sea of Japan.
- There is no Sea of Japan, or other ocean, to deal with the potential of four multiple meltdowns at Limerick Nuclear Plant (2 fuel pools and 2 reactors).
- Exelon could take everyone's groundwater from across six counties, toxic mine pit water, and massive amounts of water from the Delaware River and it would still likely NOT be enough to try to cope with Limerick meltdowns.

FUEL POOL INSTRUMENTATION TO AVOID MELTDOWNS - STILL NOT INSTALLED

NRC DOESN'T CARE ABOUT LIMERICK'S RISK OF FUEL POOL MELTDOWNS:

Despite threats of catastrophic health and financial consequences from limerick fuel pool meltdowns, NRC ISN'T EVEN REQUIRING A FINAL TIMELINE FOR INSTALLATION OF LIMERICK'S FUEL POOL INSTRUMENTATION.

IF NRC CARED ABOUT PREVENTING FUKUSHIMA-LIKE FUEL POOL MELTDOWNS AT LIMERICK:

- 1. NRC WOULD NOT ALLOW EXELON TO KEEP STALLING TO AVOID COSTS.**
- 2. NRC WOULD REQUIRE IMMEDIATE INSTALLATION OF LIMERICK'S SPENT FUEL POOL INSTRUMENTATION TO MINIMIZE RISK OF FUEL POOL MELTDOWNS AND FINE EXELON FOR EVERY DAY IT IS NOT COMPLETED.**

EXELON IS MAKING A MOCKERY OF NRC'S 2012 POST-FUKUSHIMA ORDERS TO MINIMIZE LIMERICK'S FUEL POOL MELTDOWN THREATS. LIMERICK'S FUEL POOL INSTRUMENTATION IS STILL NOT INSTALLED THREE YEARS AFTER NRC'S ORDER WAS ISSUED.

➤ EXELON FAILED TO EVEN COMPLETE AN EVALUATION FOR INSTALLATION

3-12-12 After Fukushima Meltdowns, NRC Issued Orders To Minimize Meltdown Risks:

NRC's March 2012 Orders directed Exelon to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event.

"Order ...With Regard to Reliable Spent Fuel Pool Instrumentation" TO MINIMIZE RISK OF MELTDOWNS IN LIMERICK'S SPENT FUEL POOLS

3-17-15 - RELIABLE SPENT FUEL POOL INSTRUMENTATION - NOT INSTALLED

IMPORTANCE OF FUEL POOL INSTRUMENTATION:

- Spent fuel pools rely on maintenance of an adequate inventory of water under accident conditions to provide containment to prevent meltdowns, as well as for cooling and shielding.
- Emergency responders need reliable information on water in spent fuel pools to prioritize emergency actions.
- Fukushima demonstrated confusion and misapplication of resources that can result from inadequate instrumentation. At Fukushima responders were without reliable instrumentation to determine water level in the spent fuel pool. This caused concerns that pools may have boiled dry, resulting in fuel damage.

NRC's 3-17-15 Audit Shows:

- Exelon acknowledged its "EVALUATION" OF LIMERICK'S SPENT FUEL POOL AREA for steam and condensation HAS NOT BEEN PERFORMED.
- NRC WILL NOT REQUIRE EXELON TO CONFIRM A FINAL TIMELINE UNTIL DETAILED DESIGNS ARE COMPLETED AND PROCEDURES ARE DEVELOPED. Limerick is continuing to finalize procedures and designs to validate the timeline for events for FLEX.

ACE Written Concern to NRC 3-21-13

INADEQUATE FUEL POOL INSTRUMENTATION TO DETECT LOSS OF WATER TO PREVENT LIMERICK MELTDOWNS

NRC Orders 8-3-12 were rules requiring Exelon to install new, more reliable instrumentation at Limerick, to measure Limerick's spent fuel cooling pools - no later than within 2 refueling cycles. NRC issued Orders August 30, 2012. Yet, now NRC is allowing NO FINAL TIMELINE.

NRC'S RESPONSE TO ACE'S 3-21-13 CONCERNS ABOUT DELAY OF FUEL POOL INSTRUMENTATION:

- *"The NRC has taken a methodical approach in reviewing and taking actions to address the March 2011 Fukushima Accident "*
- *"...the Commission prioritized actions to ensure timely implementation of the most important safety improvements"*

HARDENED VENTS DELAYED - NO RADIATION FILTERS REQUIRED TO PROTECT PUBLIC HEALTH

NRC IS ALLOWING EXELON TO AVOID AND DELAY COMPLIANCE WITH NRC'S POST-FUKUSHIMA RECOMMENDATIONS TO AVOID MELTDOWNS AND THEIR CATASTROPHIC RADIOACTIVE CONSEQUENCES.

After Fukushima, filtered vents were recommended by NRC staff, to minimize consequences of Limerick meltdowns, yet now NRC is not requiring Exelon to install radiation filters, and vent installation has been delayed.

IF NRC CARED ABOUT PREVENTING LIMERICK MELTDOWNS AND THE CATASTROPHIC CONSEQUENCES FROM THEM:

- 1. NRC WOULD REQUIRE IMMEDIATE INSTALLATION OF VENTS, NOT ACCEPT DELAYS UNTIL 2018, 2019, OR LATER.**
- 2. NRC WOULD REQUIRE RADIATION FILTERS FOR VENTS AS RECOMMENDED BY NRC STAFF, REGARDLESS OF COSTS TO EXELON.**

EXELON IS MAKING A MOCKERY OF NRC'S REGULATORY PROCESS

Despite An Estimated 90% Chance Of Failure Of Limerick's Mark II Reactor Containment,

- NRC Is Allowing Exelon To **DELAY** And **AVOID COMPLIANCE** With NRC's Post-Fukushima Recommendations And Orders To Protect Public Health And Safety.
- NRC'S Unprotective Decisions at Limerick Are **BASED ON EXELON'S ECONOMICS.**

1. NO RADIATION FILTERS

NRC DOESN'T CARE ABOUT CATASTROPHIC CONSEQUENCES TO PUBLIC HEALTH, SAFETY, AND FINANCIAL INTERESTS FROM MASSIVE RADIATION RELEASES DURING LIMERICK MELTDOWNS.

Despite long-term catastrophic consequences to the environment, public health, safety, and financial interests in the densely populated Greater Philadelphia Region:

- **NRC IS ALLOWING EXELON TO AVOID COSTS FOR RADIATION FILTERS**
Exelon's costs for filters would be miniscule compared to the public's costs for not installing radiation filters for vents in the case of not-so-unlikely Limerick meltdowns.

NRC IS IGNORING ITS OWN STAFF'S STRONG RECOMMENDATIONS TO INSTALL RADIATION FILTERS TO PROTECT PUBLIC HEALTH.

- NRC's own staff stated, "**VENTS WITHOUT FILTERS BECOME RADIOACTIVE HOSES INTO THE SKY.** **NRC STAFF CALLED FILTERS FOR VENTS VITAL.** Yet NRC Is Failing To Require Exelon To Install Filters For Limerick's Vents. NRC acknowledges that "questions remained about... limiting the release of radioactive materials if venting systems were used without filters during severe accident conditions".

- NRC staff stated, "**RADIATION FILTERS ARE VITAL, DESPITE COSTS**". **YET, NRC IS ALLOWING EXELON TO AVOID COSTS FOR INSTALLATION OF FILTERS,** increasing catastrophic risks from radioactive releases to public health and the environment during Limerick accidents/meltdowns. Exelon's costs for filters would pale by comparison to the potential for catastrophic health and financial consequences of no radiation filters during Limerick accident/meltdowns in the densely populated Greater Philadelphia Region.

2. DANGEROUS DELAY TACTICS FOR INSTALLATION OF VENTS

Without vent installation, Limerick reactors will remain at risk of hydrogen explosions, similar to those that destroyed Fukushima reactors, yet NRC is allowing Exelon to avoid installation - for up to another 3 years.

NRC DOESN'T CARE ABOUT PREVENTING REACTOR EXPLOSIONS AND MELTDOWNS.

➤ NRC ORDERED VENT INSTALLATION WITHOUT DELAY IN 2012, YET NRC IS ALLOWING EXELON TO STALL FOR UP TO 8 YEARS

NRC's 4-2-15 Evaluation For Installation of Limerick's Vents Shows:

- **3 and 1/2 YEARS After NRC Staff Recommended "INSTALLATION of VENTS WITHOUT DELAY", EXELON STILL HAS NO WORKABLE PLAN FOR INSTALLATION.**
- **LIMERICK'S VENT INSTALLATION WILL NOT BE COMPLETED FOR UP TO 8 YEARS AFTER FUKUSHIMA AND 3 YEARS AFTER NRC ORDERS.**

LIMERICK'S MELTDOWN THREATS HAVE INCREASED DRAMATICALLY SINCE 2012.

NRC SHOULD NOT ALLOW DANGEROUS VENT INSTALLATION DELAYS BELOW:

Phase 1 - Exelon was to design and install a venting system that provides venting capability from the **wetwell** of Limerick's Mark II reactors during severe accident conditions using a vent path from the containment wetwell to remove decay heat and control containment pressure within acceptable limits to vent the containment atmosphere. To be vented:

- Radioactive Fission Products
- Aerosols, Non-Condensable Gases and Carbon Monoxide
- Hydrogen and Steam

The HCVS is to be designed for accident conditions **before and after core damage to reduce probability of containment failure** including loss of active containment heat removal capability or extended loss of alternating current power.

NRC SHOULD REJECT NEGLIGENT TIMELINE COMPLIANCE AND DEVIATIONS

Phase 1 - Wetwell - Compliance Timeline and Deviations For Exelon's Overall Integrated Plan (OIP):

Unit 2 - By startup from 2nd refueling outage that begins after **June 30 2014 or June 30, 2018**, (whichever comes first)
Currently scheduled for 2nd quarter 2017

Unit 1 - By startup from 2nd refueling outage that begins after **June 30 2014 or June 30, 2018**, (whichever comes first)
Currently scheduled for 2nd quarter 2018

Phase 2 Exelon was to design and install a venting system that provides venting capability from the **drywell** of Limerick's Mark II reactors under severe accident conditions.

Phase 2 - Drywell - Compliance Timeline and Deviations For Exelon's Overall Integrated Plan (OIP):

Unit 1 - By startup from 1st refueling outage that begins after **June 30, 2017 or June 30, 2019**, (whichever comes first)
Currently scheduled for 2nd quarter 2018

Unit 2 - By startup from 1st refueling outage that begins after **June 30, 2017 or June 30, 2019**, (whichever comes first)
Currently scheduled for 2nd quarter of 2019

LIMERICK'S VENT INSTALLATION DELAYS ARE DANGEROUS AND UNACCEPTABLE

NRC's 4-2-15 Document States, "If Deviations Are Identified At A Later Date, Then They Will Be Communicated In A Future 6-Month Update".

➤ **IDENTIFIED DEVIATIONS COULD RESULT IN FURTHER DELAYS OF LIMERICK'S VENT INSTALLATIONS - YET ANOTHER EXELON STALL TACTIC TO DELAY COSTS**

DESPITE RISK OF FUKUSHIMA-LIKE EXPLOSIONS AT LIMERICK, NRC HAS VIRTUALLY DONE NOTHING TO MINIMIZE THAT RISK.

- Limerick's Mark II reactors are fundamentally flawed.
- For decades, NRC has known about Limerick's especially vulnerable risk of hydrogen leaks and risk of explosion under elevated pressure conditions, expected to occur in severe accidents.
- Evidence shows NRC underestimates the rate, extent, and likely impacts of hydrogen production in severe loss-of-coolant accidents.
- NRC's reluctance to address this issue is explained in history. From the 1970s NRC (then AEC) officials recommended banning the construction of GE Mark I reactors (similar to Limerick's Mark II reactors) over this problem.
- Following the Chernobyl meltdown in 1986, NRC's top safety official said Mark I reactors (similar to Limerick's Mark II reactors) have a 90% chance of containment failure in a severe accident scenario, precisely because of hydrogen build-up in the containment and following explosion.
- NRC is allowing delays that jeopardize our health and financial future because of Exelon's economics. Exelon is now facing severe competitive pressures in wholesale competitive markets leading to questionable commercial viability and the new investment required to sustain public safety.

Timeline:

- 9-9-11 - NRC's own staff recommended vent installation without delay. Memorandum, "Staff Requirements Recommended to be Taken Without Delay"
- 10-3-11 - "Staff Requirements - Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned"
- 2-17-12 - NRC staff provided "Proposed Orders and Requests for Information in Response to Lessons Learned", including the order to implement the installation of a reliable venting system for containment of Limerick's Mark II reactors, similar to those at Fukushima.
- June 6, 2013 NRC issued "Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable (HCVS) of Operation Under Severe Accident Conditions"
- 11-1-13 NRC staff issued Japan Lessons-Learned Project Directorate and endorsed NEI's revisions as an "acceptable" means of meeting requirements.
- 11-12-13 - NEI, the nuclear industry's lobbyist group, issued "Industry Guidance for Compliance".
- 5-27-14 - NRC notified Limerick that staff will be conducting audits of the implementation.
- 4-2-15 - NRC was unable to complete its review because Exelon failed to provide necessary information needed, even after having almost a year's notice.
- 9-9-11 - NRC'S own staff recommended vent installation without delay in Memorandum, "Staff Requirements Recommended To Be Taken Without Delay"
- NRC's 4-2-15 evaluation reveals that 3 and 1/2 years following NRC's order, Exelon has NO REAL PLAN for installation of Limerick's severe accident capable hardened vents. It was impossible for NRC to complete its task to comply with NRC's phase one order for "Severe Accident Capable Hardened Vents". Exelon's Overall Integrated Plan (OIP) for Limerick's Severe Accident Capable Hardened Vents Was Not Completed.

EXELON STILL HAS NO "PLANS" FOR VENT INSTALLATION (NRC 4-2-15 Report)

- **NRC Was Unable To Complete Its Review Because Exelon Failed To Provide Needed Information.**

OPEN ITEMS LISTED IN NRC'S 4-2-15 REPORT INCLUDE:

1. How Limerick's Hardened Containment Vent System (HCVS) dc power and/or motive power will be disabled during normal operation to provide assurances against inadvertent operation, but also minimize actions to enable the HCVS operation during an emergency
2. Final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation
3. Evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment
4. Analyses demonstrating that Limerick's HCVS will have the capacity to vent the steam/energy equivalent of 1% of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit
5. Seismic and tornado missile final design criteria for the HCVS stack
6. Descriptions of local conditions (temperature, radiation and humidity) anticipated during Extended Loss of Alternating Power (ELAP) and severe accident for the components - valves, instrumentation, sensors, transmitters, indicators, electronics, control

- devices, and etc. required for HCVS venting, including confirmation that components are capable of performing their functions during Extended Loss of Alternating Power (ELAP) and severe accident conditions
7. HCVS nitrogen pneumatic system design including sizing and location
 8. Documentation demonstrating adequate communication between the remote HCVS operation locations and HCVS decision makers during the extended loss of alternating power and severe accident conditions
 9. Description of final design of the HCVS to address hydrogen detonation and deflagration
 10. Description of the strategies for hydrogen control that minimizes potential for hydrogen gas migration and ingress into the reactor building or other buildings
 11. Documentation of a seismic qualification evaluation of HCVS components
 12. Descriptions of all instrumentation and controls (existing and planned) necessary to implement this order, including qualification methods
 13. Procedures for HCVS operation

NRC HAS NO WILL TO IMPLEMENT AND ENFORCE TIMELY COMPLIANCE WITH NRC'S ORDER TO INSTALL VENTS, OR NRC'S RECOMMENDED INSTALLATION OF FILTERS FOR VENTS AT LIMERICK.

- **THIS IS ONE MORE EXAMPLE OF NRC'S PATHETIC, INEFFECTIVE, AND UNPROTECTIVE REGULATORY PROCESS THAT JEOPARDIZES PUBLIC SAFETY.**

NRC'S INEXPLICABLE SUMMARY CONCLUSION (4-2-15 REPORT) IS INDEFENSIBLE

Exelon did NOT provide a workable plan for NRC to evaluate, yet NRC concluded that Exelon provided an "acceptable" means for implementing Phase 1 Requirements of NRC'S Order.

- Exelon failed to provide the information NRC needed to conclude whether it was or was not "acceptable".
- Exelon failed to provide 13 crucial items for NRC's evaluation and report. NRC cannot and should not consider that "acceptable".

TERRORIST THREATS - NO ADEQUATE PROTECTION

TERRORISTS POSE CATASTROPHIC RISKS TO LIMERICK NUCLEAR PLANT: INCLUDING FROM PLANES, MISSILES, CYBER ATTACKS, AND NOW DRONES, YET, LIMERICK NUCLEAR PLANT IS NOT ADEQUATELY PROTECTED.

VAST NUMBERS OF PEOPLE COULD BE FINANCIALLY RUINED AND PERMANENTLY DISPLACED. IT'S INSANITY TO ALLOW THAT KIND OF UNNECESSARY RISK TO CONTINUE.

IF NRC CARED ABOUT PREVENTING TERRORIST-INDUCED MELTDOWNS AT LIMERICK,

- **NRC WOULD CLOSE LIMERICK NUCLEAR PLANT.**
- **NEITHER NRC NOR EXELON CAN GUARANTEE PROTECTION FROM TERRORIST CYBER ATTACKS, OR AN ATTACK BY AIR (PLANES, MISSILES, OR DRONES)**

NRC WON'T, AND IN FACT CAN'T, ELIMINATE THESE TERRORIST RISKS.

Despite catastrophic risks for millions of people in the Greater Philadelphia Region suffering irreparable health harms and losing everything due to terrorist induced meltdowns at Limerick, NRC isn't even requiring Exelon to spend the money that would be required to provide the most protective security measures.

- **LIMERICK'S SECURITY HAS BEEN LAX**
- **NRC'S OVERSIGHT IS APPALLING**
- **THE PUBLIC IS KEPT IN THE DARK**

A 2013 Defense Department analysis said NO U.S. nuclear plant is protected against terrorist attacks, and all pose catastrophic risks. Terrorists admit they want to target a nuclear plant. Recent drone issues are of serious concern.

On September 24, 2014, a PBS documentary, "Cyber Security, Rise of the Hackers", revealed the reality of high-stakes cyber attacks. For example: the Stuxnet virus targeted an Iranian nuclear plant in 2010, destroying over 1,000 centrifuges before detection. Stuxnet, capable of spreading, could be a blueprint for cyber attacks on U.S. nuclear plants. Even a cyber attack on the grid could lead to extended loss of power and water, triggering meltdowns at Limerick.

On July 30, 2014, the Mercury printed Evan Brandt's article, "NRC Mum about Security Problem at Limerick Nuclear Plant". It's unacceptable for NRC to withhold information about risks from those who would be most impacted by the consequences.

- Limerick's "SECURITY PROBLEM" about which the public is kept in the dark, may still not be completely resolved.
- **March 4, 2015**, NRC's correspondence to Exelon suggests that the security problem referred to in the 7-30-14 Mercury is still not resolved. NRC is still "inspecting" for the security-related problem.

We are aware of other security threats at Limerick.

- Limerick security and NRC oversight are so lax that an Al-Qaida suspect worked undetected for 5 years (2002-2007) during Limerick re-fueling.
- The drunken pilot incident in Limerick's air space, from the Limerick Airport, made it clear Limerick Nuclear Plant has no way to stop a plane from crashing into Limerick's fuel pools above its reactors. Substandard cement used in the construction of Limerick's fuel pools add to the risk of fuel explosions and fires from even a small plane.
 - If a plane or missile crashed into a fuel pool, it could result in loss of water, meltdown, and fire.
 - One expert reported that a fuel pool fire could cause fatal radiation-induced cancer in thousands of people as far as 500 miles from the site.
 - "Spent fuel" rods (among the deadliest materials on earth) are jam packed in Limerick's extremely vulnerable fuel pools, constructed with substandard cement and without extra containment walls. Like Fukushima's, they're directly above Limerick's reactors.

Since 2,000 ACE has been investigating Limerick's vulnerabilities to terrorism, plus security and evacuation problems. The reality is alarming. For details: [#13 "Terrorists Threats: Precaution Is Inadequate"](http://www.acereport.org) and Video Blog Series 1-8.

EARTHQUAKE RISKS ARE UNDERESTIMATED BY NRC

Fukushima's Lessons were clearly not learned by NRC for Limerick. Despite Limerick being at high and increasing risk for Fukushima-like meltdowns and knowing earthquakes can trigger catastrophic multiple meltdowns at Limerick, NRC dismisses and denies unprecedented risks.

Earthquake-triggered meltdowns at Limerick could be devastating to the health, safety, and financial interests of millions of people in the entire Greater Philadelphia Region and beyond. Over 8 million people live within 50 miles of Limerick. The region could become a dangerous radioactive dead zone for generations.

NRC DOESN'T CARE ABOUT LIMERICK'S UNPRECEDENTED AND GROWING EARTHQUAKE RISKS:

- NRC whitewashes historic and newly identified and growing earthquake risks at Limerick.
- Four years after Fukushima meltdowns, despite increasing risks for earthquake-triggered meltdowns at Limerick, NRC is still failing to take meaningful action to avoid Fukushima-like meltdowns at Limerick.
- Instead, despite extremely high risks at Limerick, NRC is allowing Exelon to wait four more years, until 2019, to complete a self-serving seismic 'study'.
- No study can or will eliminate Limerick's earthquake-triggered meltdown risks.
A 2019 'STUDY' IS A STALL TACTIC FOR NRC / EXELON TO AVOID TAKING PRECAUTIONARY ACTION

IF SAFETY WAS NRC'S TOP PRIORITY:

1. NRC WOULD CLOSE LIMERICK NOW TO AVOID EARTHQUAKE-TRIGGERED MELTDOWNS IN OUR HEAVILY POPULATED REGION

2. UNTIL LIMERICK CLOSES NRC SHOULD:

- A. Require Exelon To Keep All Limerick's Seismic Monitors Continuously Operable
- B. Place Heavy Fines On Exelon For Every Day A Limerick Seismic Monitor Is Inoperable.
- C. Ask USGS To Provide NRC With Immediate Electronic Earthquake Alerts For All Earthquakes Within Several Hundred Miles Of Limerick

FRACKING INCREASES LIMERICK'S RISKS OF EARTHQUAKES

- Fracking is triggering shallow earthquakes that can:
 - be felt more widely
 - cause more damage than natural earthquakes
- Fracking-linked earthquakes may strike far from fracking wells (Seismological Society of America). Fracking may cause earthquakes much farther from fracking sites than previously thought.
 - The earthquake rate shot up to an average of 300 earthquakes yearly after 2010 - resulting from the growth in fracking, according to geologists.
 - Fracking - induced earthquakes are considered a significant hazard.
- Massive fracking in PA (over 4,200 wells approved since 2007) and fracking in bordering states dramatically increases earthquake risks at Limerick.

BUILT DIRECTLY ON TOP OF EARTHQUAKE FAULT FRACTURES AT LIMERICK:

- Reactors
- Fuel Pools
- Control Room
- Rad-Waste Building
- Turbine Building

THIS IS UNFIXABLE AND FAR TOO RISKY

OTHER CONCERNS DISMISSED BY NRC

- 4 other earthquake faults are within 17 miles Of Limerick Nuclear Plant
- Ramapo Fault, just 9 miles away, is considered active by USGS
- The 8-23-11 Virginia earthquake jolted Limerick Nuclear Plant, Teaching Us Earthquakes From Great Distances Can Impact Limerick's Underground Infrastructure That Can't Actually Be Inspected
- At least two earthquakes were felt in Philadelphia, about 20 miles away

- 1-25-15 an earthquake in Downingtown, a short distance from Limerick, appeared map-wise in line with the fault leading to Limerick.
- Earthquakes are growing stronger and more frequent. Even small earthquake disturbances could disrupt miles of aging vital buried pipes and cables under Limerick and not be detected with inspections.

LIMERICK'S FUEL POOLS AND REACTOR CONTAINMENT WERE CONSTRUCTED WITH SUBSTANDARD CEMENT. RISKS ARE COMPOUNDED BY 30 YEARS OF EMBRITTLEMENT.

- Limerick's fuel pools and reactor containment were constructed with substandard cement
- Embrittlement and cracking of reactors is intensifying risks.
- 30 years of embrittlement from Limerick operations has caused a weakening of Limerick's structures, creating an additional layer of concern.
- A major earthquake in any of the faults under to near Limerick could crumble fuel pools and containment, leading to catastrophic Fukushima-like multiple meltdowns

LIMERICK'S MILES OF BURIED PIPES AND CABLES ARE VULNERABLE TO DISRUPTION FROM SHALLOW FRACKING-INDUCED EARTHQUAKES

- Shallow fracking-induced earthquakes can disrupt underground pipes and cables vital to preventing meltdowns.
- Damage to buried pipes, cables, and fittings can go undetected for long periods of time.
- NRC did NO actual inspection of Limerick's pipes and cables after the 8-23-11 earthquake jolted Limerick.
- Actual inspection of miles of underground pipes and cables is clearly impossible, but ignoring the risk doesn't eliminate it.

LIMERICK'S SEISMIC MONITORS ARE UNRELIABLE TO DETERMINE RISK

- A Seismic Monitor Was Left **Inoperable At Limerick For Over A Year And Four Months Before** The Virginia Earthquake And **Inoperable Several Months After** The Earthquake Jolted Limerick.
- NRC failed to provide full disclosure about whether all Limerick's seismic monitors were continuously operable before, during and after the 1-25-15 Downingtown earthquake.

NRC'S LAX OVERSIGHT INVOLVING INOPERABILITY OF LIMERICK SEISMIC MONITORS -

- NRC failed to answer the following questions - (ACE to Fred Bower, 4-6-15 - most recent request):
 - Are All Limerick's Seismic Monitors Currently Operational? Yes Or No?
 - Do They All Continuously Have Power? Yes Or No?
 - Are Monitors And Gauges Calibrated To Detect Small Changes Due To Earthquakes That Can Disrupt Deteriorating Underground Pipes And Cables? Yes Or No?

ORIGINALLY 3-17-11 NRC REPORTED THAT LIMERICK WAS SELECTED TO GET A BETTER ESTIMATE OF CATASTROPHIC FAILURE FROM AN EARTHQUAKE. YET, THAT NEVER HAPPENED. LIMERICK ENDED UP IN NRC'S LOWEST CATEGORY OF U.S. NUCLEAR PLANT SEISMIC RISKS. NOW, NRC IS ALLOWING EXELON TO STALL UNTIL 2019 BEFORE PRODUCING A SELF-SERVING "STUDY", LEAVING THE PUBLIC AT GREAT AND GROWING RISK.

- Neil Sheehan, NRC said 3-12-11 (right after Fukushima started melting down), that NRC selected Limerick as one of the plants requiring further study to get a better estimate of the possibility of catastrophic failure from an earthquake.
- Limerick was put on a list of plants that will be getting an updated seismic analysis (Reported in Mercury, March 17 2011), yet NRC has allowed Exelon to stall for 8 years before completion in 2019.

USGS'S SEISMIC UPDATE ASSESSMENT (2008) SHOWS THAT LIMERICK'S EARTHQUAKE RISKS WERE UNDERESTIMATED AT THE TIME OF CONSTRUCTION.

- Now Limerick's risks for a major earthquake increased dramatically from fracking and stronger more frequent natural occurring earthquakes since Limerick's original seismic study.
- Limerick's original risk analysis claiming Limerick was at low risk was wrong to begin with, yet NRC keeps to referring to it in an effort to avoid action to prevent meltdowns, despite the actual high-risk potential.

NRC'S WHITEWASH AND FAILURE TO PROTECT THE PUBLIC IS UNACCEPTABLE. EACH YEAR LIMERICK'S RISKS FOR EARTHQUAKES AND MELTDOWNS INCREASE

- Whitewashing risks doesn't reduce or eliminate them. NRC denying risks doesn't remove them.

- It is not clear what NRC doesn't comprehend about the consequences of Fukushima and Chernobyl and the need to prevent meltdowns at Limerick.
- Over 8 million people live within 50 miles of Limerick Nuclear Plant. Fukushima-like meltdowns at Limerick will result in devastating impacts to their health, safety, and financial interests forever.

**LIMERICK IS HIGHLY VULNERABLE TO EARTHQUAKES AND MUST BE SHUT DOWN
IMMEDIATELY TO PROTECT PUBLIC HEALTH, SAFETY, AND FINANCIAL INTERESTS**

- It is urgent for NRC to acknowledge Limerick's unfixable and unprecedented earthquake risks and close Limerick to avoid multiple meltdowns.
- NRC should honestly evaluate the potentially astronomical health, environmental, and public financial costs for earthquakes triggering meltdowns at Limerick. The value of Exelon's profits for keeping Limerick operable would pale by comparison.
- Limerick's seismic safety has been a serious public concern since before Limerick construction. Yet, NRC failed to conduct a rigorous safety analysis and to address newly identified seismic risks, despite Limerick's extraordinary earthquake vulnerabilities.

**CLOSING LIMERICK IS THE ONLY WAY TO ELIMINATE
LIMERICK'S EXTRAORDINARY GROWING EARTHQUAKE RISKS.**

TORNADO HAZARD - LIMERICK IS NOT ADEQUATELY PROTECTED

LIMERICK'S EMERGENCY EQUIPMENT MAY NOT BE AVAILABLE TO AVOID MELTDOWNS

NRC IS ALLOWING EXELON TO USE STALL TACTICS TO AVOID FINALIZING PROCEDURES AND DESIGNS FOR EMERGENCY EQUIPMENT TO DEAL WITH TORNADOS.

IF NRC CARED ABOUT SAFETY,

NRC WOULD REQUIRED EXELON TO TAKE IMMEDIATE ACTION TO ASSURE ALL LIMERICK'S EMERGENCY EQUIPMENT REMAIN CONTINUOUSLY DEPLOYABLE FOR IMMEDIATE USE!

NRC'S 3-17-15 Audit Report Revealed:

- **Limerick's Equipment To Prevent Meltdowns May Not Remain Deployable During A Tornado.**
- **NRC Said Limerick's Equipment Storage Configuration Is Not Reasonably Protected Against Tornado Wind/Missile Hazards.**
- **Limerick Could Be Unable To Access Or Use Necessary Emergency Equipment In A Tornado Wind/Missile Hazard Event.**
- **There Are No Strategies For Deployment Path Debris Removal At Limerick.**
- **Limerick Is Not In Compliance With FLEX Equipment Storage Configuration Guidance.** Limerick's FLEX storage configuration would NOT support the maintenance and testing provisions, stating **Portable Equipment May Be Unavailable For 90 Days**, provided that Limerick's flex capability (N) is available.
- **Exelon Has 'NO PLAN' Completed For Compliance.**
Exelon has NOT provided acceptable assurance that all flex equipment will remain deployable to prevent meltdowns at Limerick. NRC's 3-17-15 Report States:
 - Limerick's FLEX Equipment Is NOT considered to be reasonably protected against the tornado hazard. therefore, it is NOT reasonably assured to be available or remain deployable to assure mitigation for meltdowns.
 - Limerick's FLEX equipment storage configuration would not meet even NEI's condition, stipulated for the allowance of the 90-day portable equipment unavailability.
 - Limerick's +1 FLEX equipment will be stored in a commercial NON-Tornado Protected Building, OUTSIDE The Protected Area.
 - Limerick's FLEX Equipment Storage Configuration Does NOT Meet NRC Guidance. Limerick's +1 building does NOT store N sets of FLEX equipment and is NOT credited to be sufficiently separated from the other buildings to afford reasonable tornado protection.
 - Limerick's FLEX storage configuration would NOT support the maintenance and testing provisions, stating: Portable Equipment May Be Unavailable For 90 Days, provided that Limerick's flex capability (N) is available. Should an item of FLEX equipment be made unavailable in the N-building, Limerick's FLEX capability (N) would no longer be available to mitigate a tornado.

Tornadoes Can Happen Here - Just Two Examples:

- **7-27-94 - A DEADLY TORNADO STRUCK PARTS OF LIMERICK TOWNSHIP (Near Limerick Nuclear Plant),** killing an infant and her parents and destroying property. It was reported that the tornado blew off the roof of the NRC building in King of Prussia.
- **4-20-15 - TORNADO WATCH IN EFFECT -** For Counties That Impact Limerick Nuclear Plant - Montgomery and Chester Counties

CRUDE-OIL BOMB TRAINS SHOULD NOT TRAVEL THROUGH LIMERICK NUCLEAR PLANT PROPERTY.

THIS IS A RECIPE FOR APOCALYPTIC DISASTER THAT CAN AND MUST BE AVOIDED.

IF NRC CARED ABOUT SAFETY,

- **NRC WOULD SPEAK OUT TO BAN CRUDE-OIL TRAINS FROM TRAVELING THROUGH LIMERICK NUCLEAR PLANT'S PROPERTY. INSTEAD, NRC'S SILENCE IS DEAFENING!**

Everyone, including Exelon and NRC, should acknowledge that explosive, highly combustible, 100 car long crude oil trains traveling right through the Limerick Nuclear Plant property is a recipe for disaster that can and must be avoided, regardless of costs to industry. To deny or dismiss such astronomical risk to so many people is negligent at best.

Hope that it doesn't happen is NOT the answer. Richard Lengel, Pottstown's Fire Chief, admitted, "If something catastrophic happens, there's no municipality along the railroad that can handle it [a crude oil explosion and fire], the volume [crude oil] is too great."

Over 100 railcars, estimated to hold three million gallons of explosive, flammable, hazardous crude oil regularly travel through the Limerick Nuclear Plant site.

- Heat from the rupture and ignition of one 30,000-gallon car can set off a chain reaction, causing other cars to explode, releasing a days-long fireball.
- Basically, responders must let it burn out.

No one, including Exelon nor NRC, should assume or suggest there will not be a crude-oil train derailment, explosion, and fire on or near the Limerick property.

Train derailment disasters should be anticipated.

- Serious crude-oil train derailments and fires are occurring with more frequency. Many have occurred just since the beginning of 2015.
- Sixty-five tank cars bound for Philadelphia had loose, leaking, or missing safety components to prevent flammable, hazardous contents from escaping (Hazmat report - last two years).
- A fuel-oil train already derailed a few miles from Philadelphia.

Crude-oil train derailment, explosion, and extended fire could have devastating consequences on or near this nuclear plant site. Whole towns have already had to evacuate from crude-oil trains and fires.

The worst of eight major crude oil train accidents include:

- A train derailment and explosion killed 47 and destroyed 30 buildings in Quebec.
- 2,300 residents were evacuated in North Dakota. The fireball was observed several states away.
- A derailment in West Virginia in February 2015. The train was a new safer-design that was adhering to the speed limit.
 - Hundreds of families had to flee their homes in frigid weather
 - Burning continued for days
 - Drinking water and electricity were lost
 - Leaking crude oil poisoned the water supply
 - Fireballs erupted from crumbled tank cars, underscoring volatility of crude oil's propane and butane

QUESTIONS AND CONCERNS

1. NRC's 3-17-15 Audit Report said Limerick's equipment may not be available and deployable to avoid Limerick meltdowns related to tornado wind/missile hazards.
 - Couldn't that also be true related to major extended heat and smoke from a crude-oil explosion and fire?
 - NRC said Limerick equipment storage configuration is not reasonably protected.

- Limerick could be unable to access or use necessary emergency equipment.
- There are no strategies for deployment path debris removal at Limerick.
- Limerick is not in compliance with FLEX equipment storage configuration guidance.
- Exelon has no plan for compliance.

How could Exelon possibly provide assurances that all its FLEX equipment will remain deployable to prevent meltdowns related to the heat and dense black smoke from a crude-oil fire?

2. Crude oil explosions and fires have lasted for days.
 - Would Limerick workers all be able to do their jobs effectively in all areas of the nuclear plant when crude-oil explosions and fires cause so much thick black smoke for days? Please explain in detail how workers can continue working in days of thick black smoke.
3. If evacuations are ordered due to a crude-oil explosion and fire, will all Limerick workers be expected to stay on the job, exposed to the thick black toxic smoke?
 - If workers are expected to stay at Limerick even in an evacuation order, how will Exelon insure their safety?
4. How will the extreme heat and soot from an extended crude oil fire impact Limerick's:
 - Schuylkill River water intake? Massive cooling water is required to keep Limerick operating and even from melting down.
 - Casks holding Limerick's deadly high-level radioactive wastes? This radioactive waste remains thermally heated. Natural air flow from slats on the side of the casks is needed. Extended thick black smoke could prevent blocked vents from being detected.
 - Limerick's cooling towers? Massive amounts of corrosive chemicals are needed daily to keep Limerick's Cooling towers operating. What happens if workers are unable to add all those chemicals each day?
5. When Occidental Chemical, just .7 of a mile from Limerick, had white powder vinyl chloride accidents, Limerick had to "button up" its control room. When accidental, short-term releases of white powdered vinyl chloride were detrimental to Limerick's control room operations:
 - What would be the impacts to Limerick's control room from on-going, extended thick black smoke?
 - How long can the control room remain buttoned up?
 - How many hours can workers in the control room work on one shift without sleep?
6. Serious security concerns related to terrorists could result after a fuel oil explosion and extended fire as massive numbers of firemen and emergency workers descend onto the site. Confusion could entice terrorists and provide cover for an attack. Security checks for terrorists would be difficult, if not impossible, during a crude-oil fire emergency.
 - Dense smoke following crude oil explosions and fireballs triggering evacuations and lasting for days could be difficult, if not impossible, for guards to identify terrorists among the vast numbers of firemen and emergency personnel coming onto the site to attempt to deal with a crude oil explosion and fire.
 - Limerick security guards would have difficulty remaining on the job during an evacuation or remain effective during days of thick black smoke.
 - If people are ordered to evacuate from the thick black smoke, would the next shift of Limerick guards be expected to show up to relieve those on duty?
7. Will Exelon agree to pay for its part in the irreversible devastation that can be caused by train derailments, explosions, and fires that could possibly lead to meltdowns? Included:
 - Long-term ecological damage that would leave ghost towns that can't be cleaned up safely.
 - Risking the vital drinking water resource for almost two million people (Pottstown to Philadelphia).
 - Millions of people losing their homes, businesses and health.

If not, Exelon should demand that crude-oil trains be re-routed off its property.

SAFE EVACUATION IS IMPOSSIBLE

Exelon's Self-Serving ETE Is Unworkable, Unprotective, and Irresponsible. Exelon's ETE confirms there is no viable plan to safely evacuate the millions of people surrounding Limerick Nuclear Plant.

IF NRC CARED ABOUT SAFETY, NRC WOULD REJECT EXELON'S ETE WITH ITS UNREALISTIC, UNWORKABLE SUPPOSITIONS, ASSUMPTIONS, INCONSISTENCIES, AND INACCURACIES AND CLOSE LIMERICK TO AVOID MELTDOWNS FROM WHICH WE CAN'T SAFELY EVACUATE.

Major Problems With Exelon's Evacuation Plan For Limerick:

1. A broad range of extremely dangerous radionuclides would be released in the radiation plume from a Limerick accident/meltdown, yet there is no requirement to immediately inform the public. Radiation releases can start within the first half hour of a Limerick accident / meltdown, yet Exelon doesn't have to inform us for hours or days after Limerick's accidental radiation releases start.
2. People would remain in Limerick's radioactive plume (including a broad range of dangerous radionuclides) far too long without taking protective action. We can't see, feel, smell, or taste radiation.
3. Evidence proves Limerick Nuclear Plant's radiation plume would travel far beyond our current 10-mile evacuation zone, yet the evacuation zone has not been expanded. Most people who evacuate outside 10 miles would still be dangerously exposed to radiation.
4. It is impossible for everyone to safely escape the densely populated Greater Philadelphia Region. Even before Limerick was constructed, in 1980 population density was double what was considered safe for evacuation. Population has increased dramatically since then.
5. A massive population would be trying to move on over-crowded roads where bottlenecks and accidents would extend the time people are forced to be exposed to Limerick's radioactive plume,

INSTEAD OF REJECTING EXELON'S ETE, NRC RECENTLY APPROVED EXELON'S SELF-SERVING FICTION.

NRC ordered Exelon's Evacuation Time Estimate (ETE) for Limerick Nuclear Plant, but takes no responsibility for its accuracy or feasibility.

- Even before Limerick was constructed, NRC knew safe evacuation was impossible in this densely populated Greater Philadelphia Region.
- At a 1980 public hearing on Limerick evacuation, an NRC official said Limerick's population density was double what was considered safe to evacuate within 30 miles. Since that time, the population density around Limerick increased four-fold.

NRC doesn't want to face the facts about the unrealistic, unworkable, suppositions in Exelon's ETE. NRC never allowed ACE to make a presentation of our summary analysis of Exelon's ETE.

- **4-17-13 ACE contacted John Anderson, NRC, the fourth NRC official with which we requested a meeting to discuss our findings on Exelon's ETE.**
 - Subject Of Our Correspondence: Failure Of NRC To Take Responsibility For Minimizing Radiation Exposure To The Public During Evacuation In The Case Of A Limerick Nuclear Plant Radiation Accident / Meltdown.
- **6-4-13 Mark Thaggard, NRC Director, Preparedness and Response, responded for John Anderson.**
 - He said NRC does not approve ETE updates but will review them (ONLY) for completeness. In other words, NRC has no intention of evaluating Exelon's emergency plan for Limerick for its effectiveness in protecting people from a Limerick radiation accident/meltdown.
 - Thaggard said "We look forward to discussing with you, in a mutually agreeable venue, your concerns and insights regarding the December 2012 ETE update for the LGS site.
- **7-20-13 - ACE responded to Mark Thaggard, asking that the meeting on a mutually acceptable date and time, take place in our office due to the extensive information from our investigation needed for discussion.**
 - We asked him to review documents on our website regarding details of Exelon's deficient, unprotective ETE, in preparation for our presentation.
 - **TO THIS DAY, MARK THAGGARD NEVER ANSWERED ACE'S 7-20-13 RESPONSE ASKING FOR THE MEETING DATE AND TIME TO DISCUSS LIMERICK'S EVACUATION PLAN.**

OF GREATEST CONCERN: CHILDREN

Exelon's ETE for Limerick, unnecessarily exposes vast numbers of children to Limerick's Radioactive Plume for far too long.

Over 65,000 children live in Limerick's 10-Mile Evacuation Zone (attending over 230 Schools and Day-Cares).

- Most would be transported to reception centers still in Limerick's Radioactive Plume, just outside Limerick's 10-Mile Evacuation Zone.
- Radiation threats to children could be minimized if the evacuation zone was expanded to 50 miles. Children would be transported to reception centers further from Limerick's radiation plume.
- Many pre-schools and day-care centers have no emergency plans.

Exelon's ETE Grossly Overestimates School Buses And Certified Drivers Available For Evacuation.

All children are assumed to be evacuated from all schools simultaneously (over 65,000).

- Based on the numbers of available buses and drivers, we can only conclude thousands of children would be left behind.
- Availability of certified licensed school bus drivers assumed in Exelon's ETE is questionable at best.
- Traffic gridlock would likely make return trips impossible. Most drivers admit they won't go back for a second run.

SCHOOL BUS DISCREPANCY IN EXELON'S ETE

164 Bus Discrepancy - This should have been challenged by NRC.

- 1,224 Estimated Buses Needed (Page 1-9)
- 1,388 Totals Charted By Specific Schools (Pages 6-18 to 6-22)

AMBULANCE AND VAN DISCREPANCY IN EXELON'S ETE

- 1,706 AMBULANCES and VANS ARE NEEDED

EXAMPLES FROM THE ITEMIZED LIST OF 1,706

- ✓ Pottstown Hospital - ETE Lists 332 Ambulances / Vans Needed - within 1 mile of Limerick Nuclear Plant
- ✓ Phoenixville Hospital - 82 Ambulances and Vans - Within the 10 miles zone to be evacuated

Examples From The Itemized List Of 1,706 Also Include:

- ✓ Montgomery County Rehabilitation Center - 330 Ambulances and Vans
- ✓ Veterans Center - 146 Ambulances and Vans

- **YET (PAGE 1-9) OF EXELON'S ETE CLAIMS ONLY 442 AMBULANCES AND VANS ARE NEEDED**

WORKERS AT MANY INSTITUTIONS WILL BE EXPECTED TO REMAIN BEHIND TO CARE FOR CHILDREN, THE ELDERLY, PRISONERS, OR PATIENTS

Many people do not realize what would be expected of them. For example, ACE found most workers expect to evacuate with their families.

PRISONS

Graterford Prison Would NOT Be Evacuated.

Instead, Graterford Prisoners And Guards Are Expected To Shelter In Place

Montgomery County Prison (1,200 Inmates) Would Be Evacuated -

100 Vans and Buses would be needed - Where would all these prisoners go?

EXELON'S ETE UNDERESTIMATES TRANSIT-DEPENDENT POPULATION:

Exelon's ETE drastically underestimated people without cars in places like Pottstown, Royersford, and Collegeville.

- Exelon's ETE Listed Only 4,500 People (.015% of 292,061 Population) As Transit Dependent Population
 - Exelon's ETE suggests that 99.985% of people in Limerick's 10-mile evacuation zone would have access to vehicles to evacuate - That's a gross understatement of what could be a significant need.
 - Exelon's ETE unrealistically requires 150 bus trips to evacuate people with no transportation (Page 1-9).
- A telephone survey was the basis for determining residential vehicle availability. It was not representative.
 - The telephone survey sample was too small to make valid conclusions.
 - ✓ Only 317 responses were analyzed out of 292,000 total households.
 - ✓ Approximately 64% of the 317 were 55 years old or older. Yet, survey questions were centered on who in the family is working, how many vehicles they have, how long it would take to get to work and home, and what shift people worked.

EXELON'S ETE MUNICIPAL PICK-UP POINTS ARE UNREALISTIC

- Most people who work for boroughs and townships are likely to want to evacuate immediately with their families,
 - yet Exelon's ETE tells residents to call township, borough, or local officials about scheduling pick up.

BLINKING LIGHTS AT INTERSECTIONS COULD CONTRIBUTE TO INCREASED CONFUSION, CONGESTION, AND ACCIDENTS.

- Exelon's ETE Requires Manual Override of Traffic Lights by Undesignated Officials, supposedly to alleviate bottleneck points. In reality, under emergency conditions, a blinking signal would not alleviate congestion, but instead contribute to confusion, increased congestion, and accidents.
- Traffic Congestion - (Page E-3)
The ETE assumes that the worst case scenario would add only 160 minutes due to adverse winter weather.
- Traffic Estimates for Employees of Many Businesses Were Excluded From Total Vehicle Estimates

EXELON'S ETE IS A SHAMELESS SHAM THAT SATISFIES A REGULATORY REQUIREMENT WITH LITTLE REGARD FOR REALITY. ASSUMPTIONS IN EXELON'S ETE JUST WON'T WORK IN REALITY:

- By the time people are notified, they will already have been exposed to radiation releases.
- Hospitals would be unprepared and unable to treat so many victims of radiation sickness. Some victims could become so radioactive they would be turned away from hospitals and emergency care facilities outside the evacuation zone, as happened in Japan.
- Evacuation plans for schools assume parents will not rush to pick up their children.
- Some school plans are contradictory.
- Most school bus drivers say that even if they could transport their first load of children to reception centers, they wouldn't and couldn't come back for the second.
- Emergency responders may be out in radioactive plumes for hours.
- There are not enough qualified drivers for school buses, ambulances, and other emergency vehicles, even if there were enough vehicles (which there are not).
- There are conflicts of roles for police officers, bus drivers, and first responders.

PROBLEMS CREATED BY FAULTY ASSUMPTIONS IN EXELON'S ETE:

- The worst problem of all is that this report places little priority on limiting radiation exposure to evacuees.
- Exelon's ETE covers a 16-hour evacuation period (Appendix D - Maps of Average Speed by Hour for Road Network Pages 1-16).
- Each hour of exposure to Limerick's radiation during an accident / meltdown critically impacts the health of residents, especially fetuses and children.
- Exelon's ETE allows too much time to elapse between public notification and actual evacuation.
- Exelon assumes school, hospital, and other employees are going to abandon their loved ones to get on buses and ambulances and follow this plan to the letter. Exelon requires people to abandon their natural instincts to care for their families.

Information In This Report Is Summarized by the Alliance For A Clean Environment (ACE) May 2015

See www.acereport.org - ACE Video / Blog - Part 7 April, 2013

For Questions - aceactivists@comcast.net

NRC PARED DOWN EMERGENCY and EVACUATION PLANS

After documented evidence of widespread radiation harms from Fukushima meltdowns in 2011, in 2012, NRC inexplicably pared down emergency and evacuation plans for Limerick and other nuclear plants.

IF NRC CARED ABOUT PUBLIC HEALTH AND SAFETY:

- **NRC WOULD NOT HAVE PARED DOWN ITS EMERGENCY AND EVACUATION PLANS IN 2012, AFTER FUKUSHIMA**
- **INSTEAD, NRC WOULD HAVE STRENGTHENED PLANS AND EXPANDED EVACUATION ZONES TO 50 MILES FOR EVACUATION AND 100 MILES FOR THE INGESTION ZONE PATHWAY**

Inexplicably, after Fukushima, NRC went to extraordinary lengths to deceive the public about radiation exposure revealing just how little NRC cares about the health, safety, and financial interests of people like us who live in the region of a nuclear power plant.

News Articles Also Reveal That NRC:

- 1) Failed to Pursue Emergency Planning Related to Decision-Making, Radiation Monitoring, and Public Education
- 2) Failed to Address Prolonged Station Blackout Conditions
- 3) Failed to Address A Multi-Unit Event, Such As Simultaneous Meltdowns In Limerick's Two Reactors and Two Fuel Pools
- 4) Failed to Shift Preparedness Focus To Deal With Meltdowns Along With Natural and Severe Weather Events, Such As Earthquakes

NRC Attempted To Hide New Pared Down Emergency Plans and Drills From The Public:

- 1) NRC Announced Revisions December 23, 2011, at the Peak of the Holiday Season
- 2) NRC and FEMA 12/11 and 1/12 Web Archives show NO news releases on evacuation plan changes, so most people were unaware safeguards have been minimized and eliminated
- 3) May 2012, the public had the first full disclosure on NRC's Pared Down Emergency Rules, through an Associated Press Investigative Report by Jeff Donn, titled, **"Evacuation Plans, Emergency Drills Pared Down Near Nuke Plants"** (In Mercury 5/20/12 - <http://www.pottsmmerc.com>)

Instead Of Attempting To Minimize Chaos And Reduce Radiation Exposure Through Better Emergency Planning and Drills For A Radioactive Accident / Meltdown:

- 1) NRC Deceived The Public
- 2) NRC Denied Radiation Risks and Harms
- 3) NRC Weakened Emergency Rules
- 4) NRC Failed To Expand Emergency Zones

Despite Devastating Lessons After Chernobyl and Fukushima:

- 1) NRC Requires FEWER Exercises for Major Radiation Accidents
- 2) NRC Recommends FEWER People Evacuate Right Away
- 3) NRC Allows Emergency Drills To Be Run Without Practicing for Radiation Releases

Many Responders Viewed NRC's New Rules as Downright Bizarre, Making No Sense:

- NRC called for a 50-mile evacuation zone in Japan after Fukushima, but refused to expand U.S. evacuation zones beyond 10 miles, despite Fukushima's radiation contamination documented to have spread to Tokyo and other locations, far beyond 50 miles.
- It was baffling to many emergency responders and citizens across the nation that when NRC finally overhauled community emergency planning for the 1st time in over 30 years, that NRC actually pared down emergency rules and evacuation plans, further jeopardizing the public.

NRC has long been aware that original evacuation plans for Limerick Nuclear Plant were deficient.

- August 3, 1983, GAO said, **"Nuclear Evacuation Plans Are Deficient"**

In 1980, PECO, Limerick's Original Owner, Attempted To Avoid Costs Associated With Evacuation Plans For Limerick Nuclear Plant.

- At 1980 Limerick Hearings a PE Official said: "Evacuation Plan Is Unnecessary" (1980 Mercury News Article Reported - May 28, 1980)

An independent report on Fukushima July, 2012, said failure to implement adequate measures to protect against nuclear accidents and poor planning by governments led to confusion over evacuation.

- Collusion in Japan reveals that values which place money before life and health can lead to unnecessary and devastating consequences.
- The report said the Fukushima disaster was man-made and caused largely as a result of collusive efforts by the government, regulators and TEPCO to avoid developing and implementing basic safety requirements.

IF NRC CARED ABOUT PUBLIC SAFETY:

- **NRC WOULD MINIMIZE CHAOS AND REDUCE RADATION EXPOSURE BY IMPROVING AND STRENGTHENING LIMERICK NUCLEAR PLANT'S FATALLY FLAWED AND INADEQUATE EMERGENCY AND EVACUATION PLANS**
- **NRC WOULD REQUIRE IMMEDIATE NOTIFICATION OF RADIATION RELEASES, NOT ALLOW EXELON TO WAIT HOURS OR DAYS TO INFORM THE PUBLIC**
- **NRC WOULD IMMEDIATELY EXPAND LIMERICK'S EVACUATION ZONE TO 50 MILES AND LIMERICK'S INGESTION PATHWAY ZONE TO 100 MILES**

NRC'S FLAWED PETITION PROCESS: **A DEAD-END FOR THE PUBLIC**

EVIDENCE SUGGESTS NRC'S PUBLIC PETITION PROCESS IS A ONE-WAY STREET TO A DEAD END FOR PUBLIC CONCERNS.

NRC'S ASSURANCES THAT SAFETY IS ITS PRIORITY HAVE PROVEN TO BE HOLLOW:

- NRC does not seem willing to judge public petition requests on their merit, diverting attention to regulation interplay, and away from public safety and health.

NRC'S REGULATIONS ARE NO SUBSTITUTE FOR SOUND JUDGMENT AND COMMON SENSE.

- NRC's interpretation of regulations, when dealing with the public requests, pushes the public and enormous issues of public safety and health, out of Exelon's way.
- NRC's interpretation of regulations, when dealing with Exelon's requests, relaxes and eliminates regulations while counting the changes as compliance. NRC keeps Limerick operating at growing public risk.

NRC HAS NOT YET BEEN ABLE TO ACKNOWLEDGE LIMERICK'S POTENTIAL FOR CATASTROPHE NRC HAS CREATED BY RELICENSING LIMERICK:

- By relinquishing Limerick's nuclear safety issues to Exelon, NRC has created unprecedented and unpredictable risks.

AS OF 2014, NRC HAS BLINDLY SOLDIERED ON, LOSING TWO OF ITS OWN CHAIRMEN WHO WERE COURAGEOUS IN DISSENTING WITH THE COMMISSION'S IRRESPONSIBLE AND IRRATIONAL LOCKSTEP AGAINST REVIEWING ISSUES THAT PUT THE PUBLIC AT RISK.

WORST OF ALL, IN 2014, NRC IRRESPONSIBLY RUBBER-STAMPED EXELON'S REQUEST FOR LIMERICK LICENSE RENEWAL AFTER DENYING SEVERAL VERY IMPORTANT ISSUES RAISED BY THE PUBLIC THROUGH NRC'S FLAWED PETITION PROCESS.

- Those denials mean that Limerick's potential for catastrophe will grow as Limerick's equipment and systems continue to fall apart hidden by properly filed paperwork and data files that show no problems.

IN 2014, NRC ANNOUNCED THAT IT GAVE LIMERICK A "GREEN" RATING FOR PERFORMANCE IN 2014 INFERRING THAT ALL SYSTEMS WERE GOOD TO GO, CONDITIONS WERE SAFE, AND THE PUBLIC WAS PROTECTED, WHICH IS SHEER NONSENSE WHEN COMPARED TO THE REGULATION SHREDDING THAT OCCURS "BY AMENDMENT".

- NRC'S VOLUMES OF REGULATIONS DO NOT ENSURE SAFETY
- REGULATIONS DO NOT GUARANTEE FOLLOW-THROUGH AT LIMERICK
- EXELON'S DATA FILES OF REPORTS ARE SELF-SERVING AND ARE NOT A PROPER SUBSTITUTE FOR INDEPENDENT PHYSICAL EXAMINATION OF LIMERICK'S FAILING SYSTEMS AND EQUIPMENT.

ALTHOUGH NRC STATES THAT ITS PETITION PROCESS GIVES NRC THE AUTHORITY TO TAKE ACTION ON BEHALF OF PUBLIC SAFETY NRC HAS, SO FAR, REFUSED TO ACCEPT PUBLIC PETITIONS THAT WOULD RESULT IN NRC DOING THE THINGS IT SAYS IT HAS THE AUTHORITY TO DO:

- NRC could modify Limerick's license
- NRC could suspend Limerick's license
- NRC could revoke Limerick's license
- NRC could take any other appropriate enforcement action against Limerick on behalf of public safety and health.

WHEN ACE ASKED NRC ABOUT NRC'S DENIAL OF NRDC'S DECISION, ONE OF LIMERICK'S NRC OFFICIALS EXPLAINED THAT LIMERICK DID NOT NEED A SAMA FOR RELICENSING BECAUSE NRC HAD REQUIRED A SAMA BEFORE LIMERICK WAS LICENSED.

- However, evidence shows flaws in that explanation and shows that it is not true.

THE TRUTH ABOUT HOW AND WHY A SAMA WAS PRODUCED FOR LIMERICK IS THAT **AFTER NRC LICENSED LIMERICK, A FEDERAL JUDGE ORDERED NRC TO PRODUCE A SAMA FOR LIMERICK.**

NRC'S PETITION PROCESS LEAVES NO ROOM FOR THE ENTIRETY OF LIMERICK'S BACKGROUND TO BE CONSIDERED IN RELATION TO PUBLIC PETITION REQUESTS.

NRC'S DECISIONS HAVE FORCED THE PUBLIC TO COMPETE WITH LIMERICK FOR THE FUNDAMENTAL NATURAL RESOURCES THAT SUSTAIN LIFE.

THAT IS WHY WE ARE FIGHTING SO HARD FOR PROTECTIONS IN THE AREAS OF SAFETY AND HEALTH.

EVEN THIS ABBREVIATED SUMMARY OF LIMERICK NUCLEAR PLANT'S HISTORY, SHOWS THAT THE PETITIONS NRC HAS DENIED UNDOUBTEDLY INCREASE THE CHANCES OF CATASTROPHIC FAILURE AT LIMERICK:

SECRETS FROM THE START, COUPLED WITH POOR DECISION-MAKING LED TO THE UNSAFE CONDITIONS AT LIMERICK NOW:

- In 1964, realtors began offering large sums of money to local farmers and landowners while a rumor was circulated that a car factory was in the works.
- In 1968, at a cocktail party at Collegeville Inn, Philadelphia Electric (PE, then PECO, now Exelon) announced that it was the secret buyer of the land and it would build a nuclear plant on it.
 - The reality is that Limerick's 600-acre site was chosen a decade before a geologic study formally dismissed the significance of the large earthquake fault discovered under the site.
 - The Atomic Energy Commission dismissed the idea to choose an alternative site to save PE the money already invested in acquiring the site.
 - The AEC decision not to choose an alternative presents new potential for catastrophe in the changing world we are experiencing now.
- In 1972 a GE Mark II Boiling Water Reactor (BWR) caused a nuclear accident and exposed a defect that all GE Mark II BWRs carry to this day.
- Seven months later, the first component of Limerick's defective BWRs arrived on site, further compounding present-day public risks.
- In 1974, Limerick's geologic survey was completed, simultaneously defining and dismissing the significance of Limerick's earthquake fault according to the controversial standard of the Atomic Energy Commission (AEC).
- In 1974, the AEC issued Limerick's construction permit.
- In 1974 the AEC was dissolved due to public outcries over its heavy-handed and controversial promotion of nuclear power plants at the expense of public safety.
- The NRC was created to replace the AEC and was given the responsibility to regulate nuclear power plants on behalf of public safety and the environment, not to promote them.
- However, in 1975, when the NRC began operations, it picked up the AEC's banner and has been promoting Limerick ever since, despite Limerick's growing risk due to the fact that:
 - Limerick was built on a site on top of a large earthquake fault zone with a fracture-riddled surface - hardly a suitable location for a nuclear power plant.
 - Limerick's defective reactors, substandard fuel pools, control room, turbine building, and radwaste storage building are all built over fractures that were partially filled in with cement in the early 70's, but were not filled in completely.
 - Bechtel, the company filled the fractures in to a point, diagrammed the fractures, showing that they extended into the earth to unknown depths.
 - Enough cement was poured to smooth the earth at the surface so Limerick's nuclear plant structures could be built on a level surface.

NRC SHOULD HAVE HALTED CONSTRUCTION IN 1975 AND CONSIDERED ALTERNATIVES TO LIMERICK DUE TO THE ENORMOUS POTENTIAL FOR CATASTROPHE THAT EXISTED EARLY IN LIMERICK'S HISTORY.

BUT NRC SOLDIERED ON MUCH TO THE DISMAY OF THE PUBLIC.

- 1980, NRC noted that there was already double the populations that NRC considered safe for evacuation, but NRC continued promoting Limerick instead of regulating on behalf of public safety and the environment.

PUBLIC OPPOSITION TO LIMERICK GREW, BUT NRC TURNED A BLIND EYE AND A DEAF EAR TO REQUESTS TO ACT ON BEHALF OF PUBLIC HEALTH AND SAFETY.

- Groups of residents had banded together to demand the protections that the NRC had promised, but NRC shut the public out.
- One of the groups that formed was Limerick Ecology Action (LEA, the predecessor of ACE).

IN 1981, BEFORE UNIT 1 WAS COMPLETED, LEA FILED A LAWSUIT AGAINST THE NRC IN FEDERAL COURT FOR NOT ADEQUATELY CONSIDERING APPROPRIATE ALTERNATIVES FOR LIMERICK. LEA HAD SPENT A YEAR AND INVESTED A LARGE AMOUNT OF MONEY PREPARING A CASE IT KNEW IT WOULD WIN.

- NRC should have halted construction until the suit was decided
- But NRC continued construction, while dragging out the suit until NRC had not only constructed and licensed Unit 1 in 1984, but finished and licensed Unit 2 in 1989.
 - Despite the stall tactic, the judge, agreed with LEA and ruled in favor of the public.
 - NRC officials were required to appear in federal court to hear the ruling against NRC.
 - The judge ordered NRC to prepare a SAMA for Limerick, which NRC completed in 1989.
- By 1996, NRC licensing regulations began to include a SAMA requirement for all new nuclear plants.
 - However, NRC specifically exempted Limerick from requiring an updated SAMA for relicensing.
- In 2011, only three months after the Fukushima disaster, Exelon submitted its irrational request for Limerick license renewal to NRC.
- **The Natural Resources Defense Council (NRDC) requested that Limerick's outdated SAMA be updated to incorporate new understandings of Limerick's deficiencies and the fact that its public risks have increased.**
- In 2012, NRC joined Exelon in opposing the Atomic Safety and Licensing Board's waiver request presented to the Commission on behalf of the NRDC.
- IN 2013, NRC denied the Natural Resource Defense Council's petition for an updated SAMA as part of Limerick relicensing, and in so doing, turned its back on public safety and health.
 - The NRC's fixation on regulation interplay resulted in NRC's arrogant denial of NRDC's request, calling it "impermissible attack on our regulations".

UNFORTUNATELY, WHEN NRC APPLIES ITS REGULATIONS TO EXELON, NRC BENDS, WEAKENS, OR ELIMINATES THEM, WHICH INCREASES PUBLIC RISKS.

HOWEVER, FOR THE PUBLIC, NRC TIGHTENS ITS REGULATIONS, STRICTLY INTERPRETING REGULATIONS IN LIEU OF ACTUALLY EVALUATING THE DECADES OF DISASTROUS NRC DECISIONS THAT INCREASE PUBLIC HEALTH AND SAFETY RISKS.

SOME PETITIONS NRC HAS DENIED DISPLAY SHORT-SIGHTEDNESS AND UNBRIDLED POWER, NOT A QUEST TO PROTECT PUBLIC SAFETY AND HEALTH :

- 2012: The National Resource Defense Council (NRDC) request that NRC update Limerick's Severe Accident Mitigation Alternatives:
- 2011-Thomas Saporito's petition against Limerick due to Limerick reactor embrittlement
 - The petition highlighted recent Limerick reactor scrams (shutdowns) which can cause stress in reactors creating embrittlement-induced cracking, which could lead to meltdowns, which are included in the section entitled, "EMBRITTLEMENT".
- Paul Gunter, on behalf of Beyond Nuclear common sense request for closure of all aging, inherently defective GE Mark II BWR reactors, including Limerick Nuclear Plant.
- 2014- Michael Mariotte on behalf of the Nuclear Information and Resource Service (NIRS)