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Speaker Bio -

Mr. Allard is the Pennsylvania DEP's Acting Deputy Secretary for the Office of Waste, Air, Radiation & Remediation. Previously, he was the Director of Bureau of Radiation Protection (BRP), and responsible for the: accelerator, X-ray, environmental surveillance, nuclear safety, radiological emergency response, radioactive materials, decommissioning / site clean-up, low-level radioactive waste and radon programs within the Commonwealth. He is also the technical lead on oil & gas TENORM issues for DEP. BRP has over 100 technical and administrative staff and a $14M annual budget. Mr. Allard is the Governor's official liaison to the U.S. Nuclear Regulatory Commission, and the DEP's alternate Commissioner for the Appalachian States Low-level Radioactive Waste Compact Commission.

Mr. Allard received a bachelor of science degree in Environmental Sciences from SUNY Albany and a master of science degree in Radiological Sciences & Protection from U Mass - Lowell. He is certified by the American Board of Health Physics, a Fellow of the Health Physics Society (HPS), and has acted as the Conference of Radiation Control Program Directors' (CRCPD) official liaison to the National Council on Radiation Protection and Measurement (NCRP) for about 15 years. He is also a member of the AAPM, ANS, NRRPT and SNMMI.

Prior to joining DEP in February 1999, he was a consultant to the U.S. Department of Energy on environmental and occupational radiation protection issues for eight years. Mr. Allard has been involved in the various aspects of governmental, industrial, reactor, medical and academic radiation protection for over 40 years. He has been in various leadership roles with the HPS and CRCPD, and is the immediate Past Chairperson of the CRCPD. Mr. Allard also serves as a member or advisor on several national radiation protection committees; he has authored numerous professional papers and reports; and, frequently lectures on a wide variety of radiation protection topics and concerns.

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Nuclear Waste and TMI

PA House Environmental Resources & Energy Committee Hearing
April 29, 2019

Tom Wolf, Governor

Patrick McDonnell, Secretary

Presentation Objectives

- Overview of DEP / BRP's authority
- Review the TMI U2 accident in 1979
- Overview of Emergency Response and Environmental Surveillance Programs
- Types of 'nuclear' radioactive waste
- Decommissioning scenario with a possible shut-down of TMI U1

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Radiation Control in PA

- **DEP:**
  - X rays
  - Accelerators
  - Radon
  - Radioactive Materials & Emergency Preparedness

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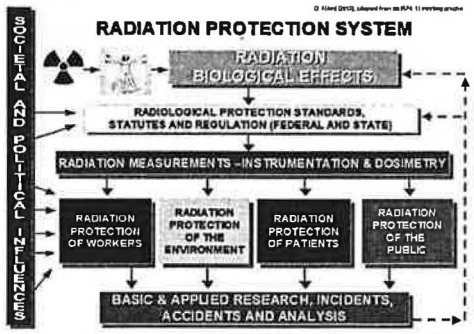
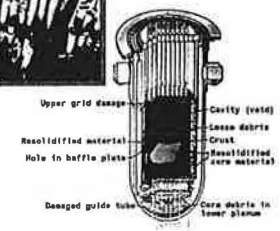
Nuclear Waste and TMI



Nuclear Waste and TMI

1979 TMI Unit-2 Accident Emergency Response / Damaged Fuel Shipped to Idaho



Radiation Protection - Act 147

Powers and Duties: Emergency Response and Environmental Surveillance

RADIATION PROTECTION ACT
Act of Jul. 10, 1984, P.L. 688, No. 147 Cl. 27

AN ACT

Combining the radiation safety provisions of the Atomic Energy Development and Radiation Control Act and the Environmental Radiation Protection Act; empowering the Department of Environmental Resources to implement a comprehensive Statewide radiation protection program; further providing for the power of the Environmental Quality Board and for the duties of the Environmental Hearing Board; expanding the authority of the department to regulate other radiation sources; providing for radiation emergency response; establishing requirements for transport of spent reactor fuel; establishing fees; providing penalties; making

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PA Legislative Authority

- Radiation Protection Act (Act 1984-147)
- Appalachian States LLRW Compact Act (Act 1985-120)
- LLRW Disposal Act (Act 1988-12)
- LLRW Disposal Regional Facility Act (Act 1990-107)

Note: the Commonwealth's Nuclear Power Plants are regulated by the U.S. Nuclear Regulatory Commission (NRC) under the Atomic Energy Act (AEA) and Code of Federal Regulations (CFR).

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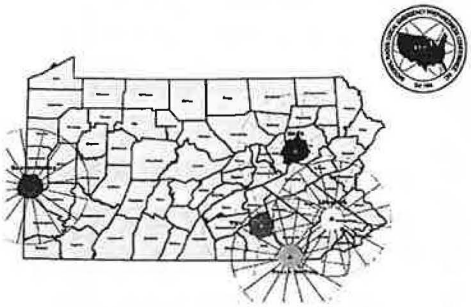
PA Nuclear Power Plants (NPP)

- Limerick
- TMI
- Peach Bottom
- Beaver Valley
- Susquehanna

PA Radiological Emergency Preparedness



NPP Emergency Response

- NPP: Emergency Plans required by NRC in Title 10 CFR 50.47
- 10 mile Plume Emergency Planning Zone (EPZ)
- 50 mile Ingestion Pathway EPZ

Note: there is also a Hostile Action Based exercise / incident Security Zone.

Routine Environmental Surveillance

Routine Sampling:

- Air
- Soil / Sediment
- Water / Rain
- Food Stuffs
- Direct Radiation

NPP Decommissioning Sites

PA Sites:

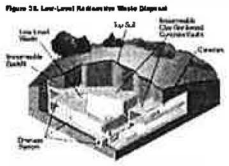
- TMI U2
- PB U1

Saxton and Shippingport NPPs – decon complete, no SNF onsite.

Figure 38. Power Reactor Decommissioning Status

Types of Radioactive Waste

- Spent Nuclear Fuel (SNF)
- High-level Radioactive Waste (HLRW)
- Low-level Radioactive Waste (LLRW)
  1. Class A, B and C LLRW
  2. Greater than Class C (GTCC)
  3. Transuranic Radioactive (TRU) Waste



SNF & HLRW Storage Sites

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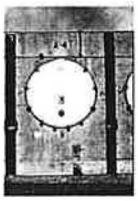
SNF & HLRW Storage Sites

SNF Dry Casks:



SNF Pool:

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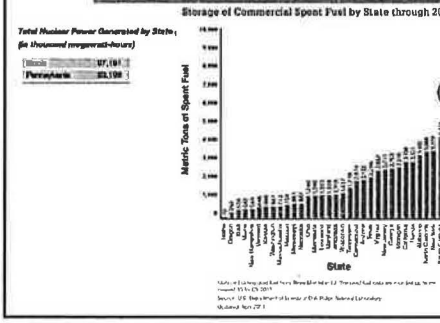
Nuclear Waste and TMI

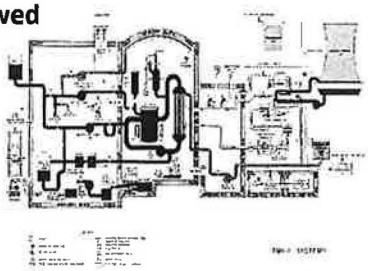


PA has over 6,400 metric tons of SNF in the state.

TMI Unit-1 Shut-down?

Options Allowed By NRC:

- ENTOMB
- DECON
- SAFSTOR



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Nuclear Waste and TMI

Questions?

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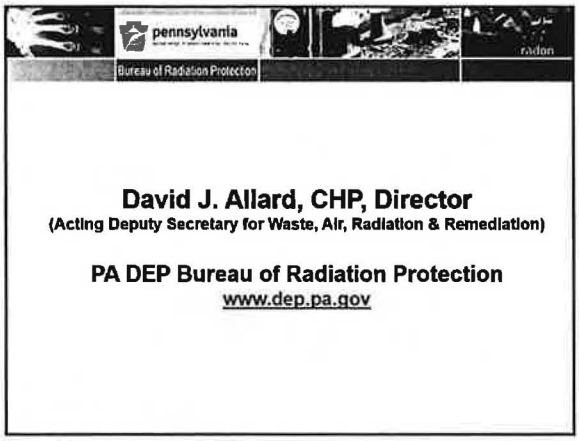
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radon
David J. Allard, CHP, Director
(Acting Deputy Secretary for Waste, Air, Radiation & Remediation)
PA DEP Bureau of Radiation Protection
www.dep.pa.gov

DECOMMISSIONING OF TMI

Background Information for the PA House Hearing on April 29, 2019

Prepared by the PA DEP Bureau of Radiation Protection

Introduction

On May 30, 2017, Exelon Corporation issued a press release announcing it will prematurely retire its Three Mile Island (TMI) Generating Station Unit 1 on or about September 30, 2019, absent changes in state policy. Exelon submitted a formal Cessation of Operation Letter to the U.S. Nuclear Regulatory Commission (NRC) on June 20, 2017, certifying the company's intent. However, the final shutdown decision will be based, in part, on possible Pennsylvania legislative actions regarding inclusion of nuclear power generation in the State's Alternative Energy Portfolio Standard, a zero-emissions credit program, and/or other opportunities that will help mitigate the station's apparent economic challenges.

Background

Decommissioning is the process by which nuclear power plants (NPP) are retired from service and terminate the operating licenses granted by the NRC. To ensure that NPP facilities and site decommissioning and clean-up are safe and environmentally sound, the NRC established regulations and associated guidance outlining the requirements and process companies must follow. A major aspect is the NRC's requirement that financial assurance be established for funding the decommissioning.

The decommissioning and site restoration process involves decontaminating the facility to reduce residual radioactivity, dismantling the structures, removing contaminated materials to appropriate disposal facilities, storing spent nuclear fuel (SNF) until it can be removed from the site for disposal or consolidated storage, and releasing the property for other uses. The owner remains accountable to the NRC until decommissioning has been completed and the agency has terminated the applicable license.

Currently, there are 27 NRC licensed power reactors in various stages of decommissioning in the United States. Eleven reactors have completed decommissioning safely to either the point of license termination or the remaining activities are limited to management of an Independent Spent Fuel Storage Installation (ISFSI) for storage of SNF onsite. Sixteen commercial power reactors are in decommissioning, and several more will transition to this process over the next few years.

Under the federal Atomic Energy Act, the NRC maintains regulatory authority throughout the process and allows for: "DECON' or early site decommissioning, "SAFSTOR," or an "ENTOMB" or an entombment scenario. The SAFSTOR approach appears to be the only viable option for the TMI site. The Peach Bottom Unit 1 nuclear power plant in Delta, PA has been de-fueled and is currently in SAFSTOR. Per the Commonwealth's Radiation Protection

Act, DEP will continue to maintain independent oversight through the decommissioning process to ensure the health and safety of the public, decommissioning workers, and protection of the environment.

Nuclear Site Decommissioning

There are three main stages for decommissioning the facility. In a phased approach, they are Decommissioning Transition, SAFSTOR, and Site Restoration. The key objectives of each category include, but are not limited to:

Decommissioning Transition –

- Develop and implement staffing and communications plans;
- Implement a strategic decision making process;
- Safely shutdown the nuclear power plant;
- Completely offload the fuel in the reactor core; and,
- Implement permanently de-fueled site emergency plan.

As part of the initial decommissioning transition process, a Decommissioning Transition Organization (DTO) will be formed by Exelon to develop and implement key objectives. The DTO consists of a staff of eighteen individuals who will execute the actions required for decommissioning such as security; fire protection; site characterization; transportation; water management; environmental monitoring and reporting; license amendments and submittals; contract management; and SAFESTOR preparations.

SAFESTOR - (method in which a nuclear facility is placed and maintained in a condition that allows it to be safely stored and subsequently decontaminated.)

- Complete movement of fuel to an ISFSI* in accordance with the strategic plan;
- Reduce staffing upon completion of fuel movement to ISFSI;
- Transition to ISFSI-only emergency plan;
- Implement ISFSI-only security plan; and,
- Begin decontamination activities as applicable.

* Independent Spent Fuel Storage Installation (ISFSI)

The ISFSI is a facility designed and constructed for the interim storage of SNF and is licensed separately from the nuclear power plant. Dry cask storage allows the SNF that has already been cooled in the spent fuel pool in the plant for several years, to be stored inside a container called a cask. The casks are typically well-shielded steel cylinders that are either welded or bolted closed. The steel cylinder provides a leak-tight confinement of the SNF. Currently, four out of five nuclear power plant sites in Pennsylvania have installed ISFSI's for storage of SNF due to the lack of a permanent repository in the United States.

TMI is the only site that does not have an ISFSI. In regards to the construction of the ISFSI at TMI, Exelon is still investigating its placement. It will most likely be on the island. However, there is a very low probability it will be installed at an offsite location.

The U.S. Department of Energy was to have the Yucca Mt. repository in NV constructed and accepting SNF by 1998. A license application was submitted to the NRC, but continued legal challenges by NV and failure to fund DOE and NRC has slowed the progress of bring Yucca Mt. online.

Site Restoration –

- Restore the site based on strategic decision making.

It is important to note that TMI Unit 2, which is owned by First Energy Nuclear Operating Company (FENOC), is currently in Post Defueling Monitored Storage (PDMS). It would be desirable to decommission both units simultaneously to lower cost, reduce radiation exposure to workers, and minimize any potential environmental effect. This will be a joint decision between Exelon Corporation and FENOC, and will be determined at some point after the completion of moving the Unit 1 SNF to a new onsite ISFSI.

Decommissioning Licensing Activities

Within approximately 12-18 months of plant shutdown, key License Amendment Requests (LAR), Exemptions, Certifications, and Reports must be developed and submitted to the NRC.

Once the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel is officially recorded, the licensee can no longer operate the reactor or retain nuclear fuel within the reactor vessel under its NRC license. The decommissioning must be completed within 60 years of permanent cessation of operations, and will not go beyond the 60 years unless approved by the NRC for public health and safety reasons.

A Post-Shutdown Decommissioning Activities Report (PSDAR) will be submitted to the NRC prior to or within two years after permanent cessation of operations. A copy of the PSDAR will also be sent to the State. The PSDAR will include a description and schedule of the planned decommissioning activities, a summary of the reasons why there will be no other environmental impacts due to site-specific decommissioning activities other than those previously issued in environmental impact statements, and a site-specific Decommissioning Cost Estimate, including the projected cost of managing spent fuel. Regarding the fiscal aspects of decommissioning, per NRC regulations, Exelon is required to routinely estimate the cost of SNF storage and decommissioning, and maintain 'financial assurance' that it can do so if required. NRC is party to that financial assurance instrument and can access it should Exelon abandon the site. That has never occurred in the U.S. nuclear power industry.

The NRC will make the PSDAR available for public comment and conduct public meetings within 90 days of the PSDAR submittal. The licensee will not perform any major decommissioning activities, as defined by federal regulation, until 90 days after the NRC has received the licensee's PSDAR.

PA DEP Bureau of Radiation Protection (BRP) Decommissioning Oversight

The BRP will continue to maintain its independent oversight of the TMI site during the decommissioning transition. This effort will include, but not be limited to, site assessments, evaluations, and frequent interactions with the TMI decommissioning transition team and environmental monitoring group. The bureau will continue its environmental monitoring program at TMI during the site decommissioning process, and until the site is fully restored and released for unrestricted use.

Conclusion

The nuclear energy industry has proven that it has the technology, resources and expertise to successfully decommission commercial nuclear reactors in a safe, secure and environmentally friendly manner. Examples include the Shippingport and Saxton nuclear power plants in the Commonwealth, as well as the Maine and Connecticut Yankee plants in New England.