

LWRS Physical Security Initiative



F. Mitch McCrory

**LWRS Physical Security Initiative Lead
Sandia National Labs**

**NEI Physical Security Working Group Meeting
Nuclear Energy Institute
June 12-13, 2019**

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.





LWRS Physical Security Initiative

*We are new to LWRS
Physical Security Initiative*



- The DOE-NE Light Water Sustainability (LWRS) Program effort seeks to create tools that will risk-inform physical security decisions and activities; assess benefits from proposed enhancements, novel mitigation strategies, and potential changes to regulations; and **enhance the technical basis** necessary for operating utilities to reevaluate their physical security posture while meeting regulatory requirements.

Risk-inform physical security decisions and activities;

Enhance the technical basis necessary for operating utilities to reevaluate their physical security posture while meeting regulatory requirements.

Assess benefits from proposed enhancements, novel mitigation strategies, and potential changes to regulations; and



Collaboration



- Industry Collaborations
 - Utilities
 - Monticello site visit April
 - Palo Verde site visit planned for August 12-13, 2019
 - Other engagements in progress
 - NEI
 - Ongoing communication
 - NRC
 - Coordinating with NRC NSIR and RES on LWRS R&D plans
 - EPRI
 - Ongoing communication with EPRI
 - Owners Groups
 - Some limited engagement with future engagement planned at the Owners Group request
 - Vendors
- LWRS Industry Working Group
- Leverage NNSA and DOD R&D in this effort
 - Advanced M&S
 - Remote Weapons
 - Architectures



Focus Areas

Still a Work-in-Progress



Focus Areas

- Near-term Efforts
- M&S input data – identify areas where an advanced technical basis can remove unnecessary conservatisms, i.e., adversary time lines – this FY
- Industry training on physical security systems – completed first of a kind training in March 2019 (13 utilities, NEI, others)
- Physical Security Economic Model and Validation – to identify security cost drivers for evaluation in prioritizing research efforts – this FY
- Visit nuclear power sites – review current security practices – first site visit 4/16/19-4/18/19; second site visit planned for August, 12-13, 2019; potential for 3rd site visit
- Initiate our LWRS Physical Security Working Group – Charter in draft form; 1st meeting tentative scheduled for September 10-11 with the 12th being a classified set of briefs (see slide)
- Engaged with JCNRM and other standard's bodies to ensure R&D reflected where possible
- Identify potential inefficiencies in security sensor maintenance and identify potential technical basis gaps that prevents increasing maintenance periodicity
- Complete Program Plan – draft in final stages of review (note this plan is living and will change as we learn more from our pilots and collaboration)
- Explore the technical basis necessary for implementation advanced security technology
 - Remote weapon systems



Focus Areas

Still a Work-in-Progress

Focus Areas (Cont.)



- Next Couple of Years (note that as research matures and is validated, it will be made available)
 - Risk Informing Physical Security – identifying conservatisms in physical security scenarios and perform the research necessary to create/document the technical basis to remove unnecessary conservatisms (Started in FY19)
 - Analyzing security narratives from start of security event through significant core damage – not all vital areas created equal
 - Explore barriers to utilization of FLEX equipment
 - Develop risk-informed methods that adequately address the human side of security
 - Explore barriers to credit operator action
 - Consequence mitigation
 - Explore required emergency procedure
 - Human reliability analysis in a security event
 - Other
 - Explore opportunities to replace security positions with technology and the technical basis gaps preventing the adoption of the technology (may be getting fast-tracked)
 - Example – utilization of remote operated weapons
 - Regulatory Drivers – which regulatory drivers need technical basis R&D to remove unnecessary conservatisms



Focus Areas

Still a Work-in-Progress



Focus Areas (Cont.)

- Long Term Research
 - Research into potential physical security architectures game changers
 - What does a PIDAS-less security architecture look like – is there a technical basis that could support this?
 - Advanced Tiered Physical Security Architectures
 - Other



LWRS PSI Working Group

- The formation of a DOE-sponsored Domestic NPP Security Working Group
 - Provide a venue for LWRS to obtain feedback from industry, regulatory, vendor, supplier, and other stakeholders
 - Support development of the R&D program
 - Provide periodic input on plans and activities of the initiative
 - Support pilot projects through industry participation
 - Validate and provide feedback on specific methods, techniques, and technologies
 - Facilitate development and demonstration with vendors and suppliers as technologies are readied for commercial deployment and demonstration



LWRS Physical Security POCs

F. Mitch McCrory

LWRS Physical Security Initiative Lead

P: 505-845-3031

C: 505-553-5718

E: fmmccro@sandia.gov

Dr. Douglas M. Osborn

SNL Project Lead

P: 505-844-1127

E: dosborn@sandia.gov



Dr. Vaibhav Yadav

INL Project Lead

P: 208-526-3910

E: Vaibhav.Yadav@inl.gov



In the News – Nuclear Energy Insider

Diablo Canyon decommissioning cost estimate (2018)

(Thousands of dollars)

Scope Description	Total
Program Management, Oversight, & Fees	\$1,462,045
Security Operations	560,686
Waste/Transportation/Material Management (Excluding: Breakwater, Reactor Vessel/Internal Segmentation, & Large Component Removal)	855,211
Power Block Modifications	80,707
Site Infrastructure	140,972
Large Component Removal	166,370
Reactor/Internals Segmentation	332,341
Spent Fuel Transfer to ISFSI	235,541
Turbine Building	68,667
Aux Building	92,122
Containment	121,012
Fuel Handling Building	48,627
Balance of Site	80,702
Intake	41,654
Discharge	15,122
Breakwater	286,326
Non-ISFSI Site Restoration	135,075
Spent Fuel Transfer to United States (U.S.) Department of Energy (DOE)	24,258
ISFSI Demolition and Site Restoration	54,956
Grand Total	\$4,802,395

PG&E estimates security during decommissioning at about \$560 million dollars – 11.7% of total decommissioning costs.



*<https://analysis.nuclearenergyinsider.com/pg-e-seeks-decommissioning-head-start-cost-estimates-rise>

Source: *Pacific Gas & Electric (PG&E), December 2018*