Decommissioning
San Onofre
Nuclear Generating Station

Dry Cask Storage Monitoring

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Why Survey Outlet Vents?

- During the August 20 CEP meeting, Donna Gilmore asked about a survey of the outlet air vents of the NUHOMS dry spent fuel storage modules.

- From her website, the contention is: “The NRC and Southern California Edison continue to refuse to provide the radiation levels from the outlet (rooftop) air vents of the aging Areva NUHOMS thin-wall canister systems at San Onofre. The San Onofre canisters are only 5/8″ thick and some are already 17 years old. What are they hiding?”

- Measuring the outlet air vents not necessary because surveying areas accessible from ground level will identify radioactive contamination in the unlikely event of canister leakage, with lower industrial safety risk to workers.

- We decided to survey the outlet vents to put to rest this contention about the NUHOMS dry fuel storage system.

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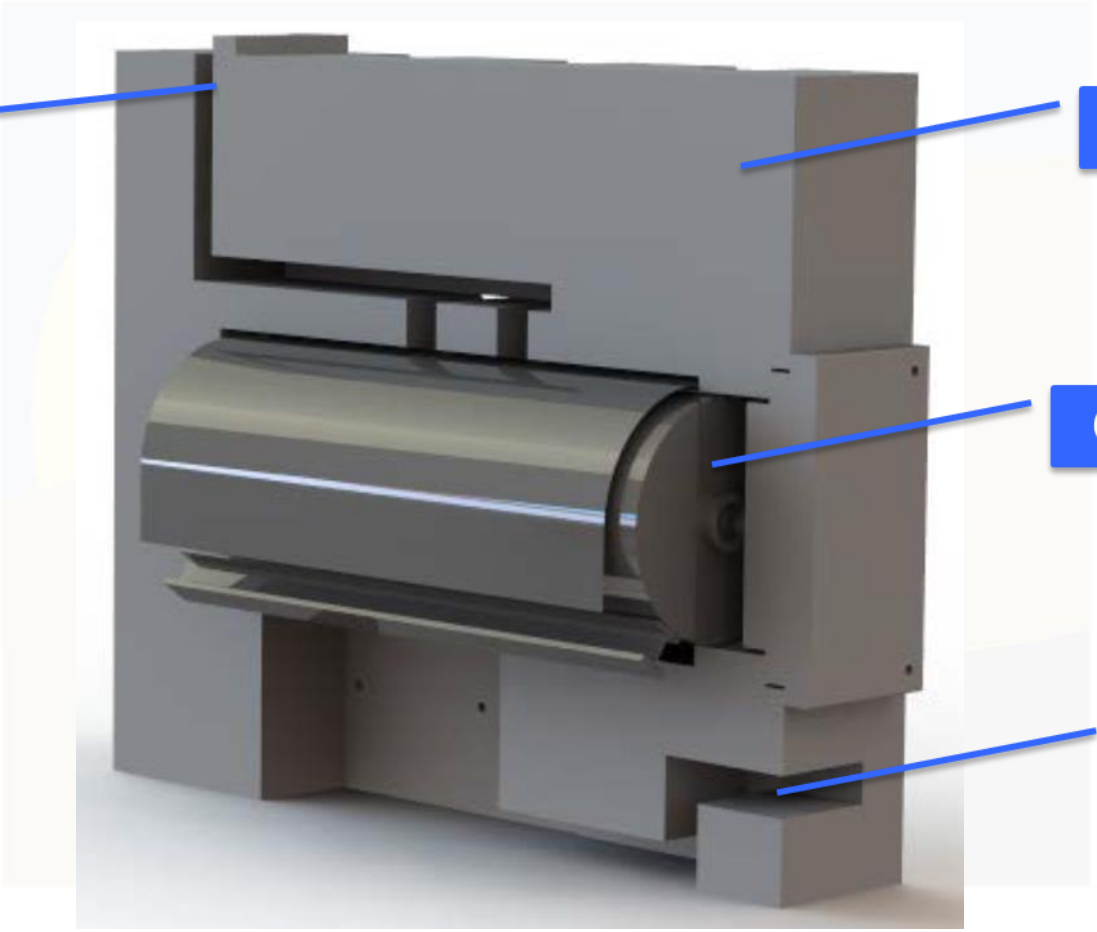
Decommissioning San Onofre Nuclear Generating Station

Orano (AREVA) NUHOMS Storage Module and Canister



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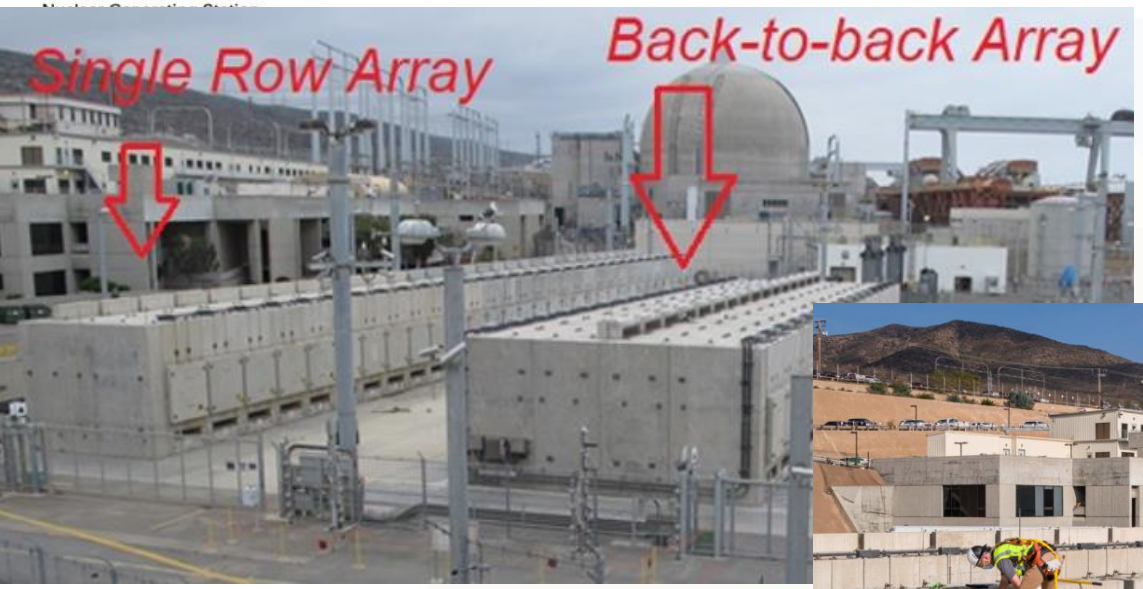
Decommissioning San Onofre

Special Survey of NUHOMS Storage Module Outlet Vents



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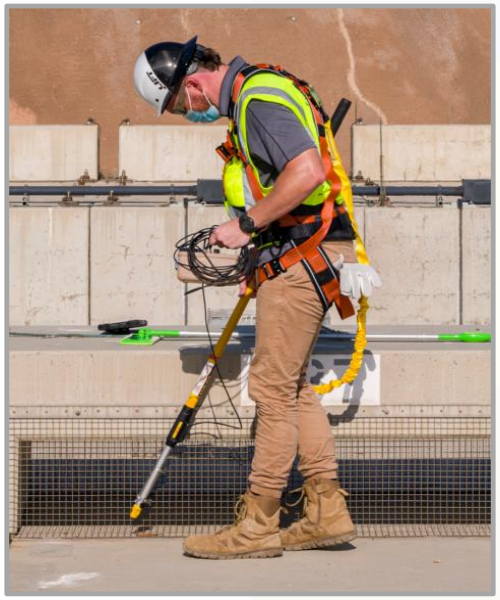
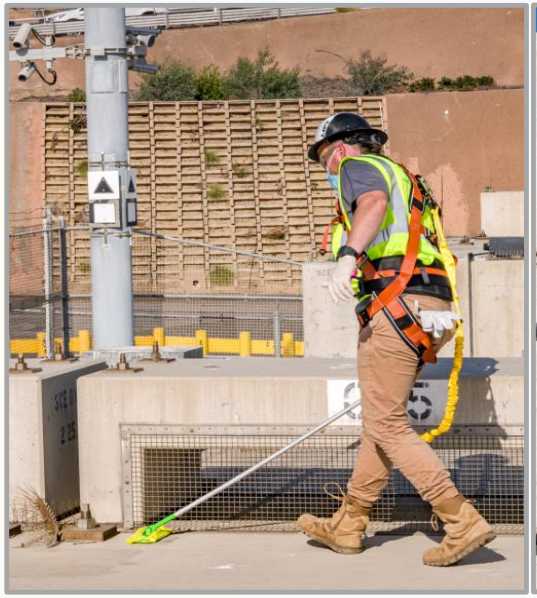
Independent Radiation Surveys Performed by Philotechnics Ltd.





All Modules Surveyed for Radiation and Contamination

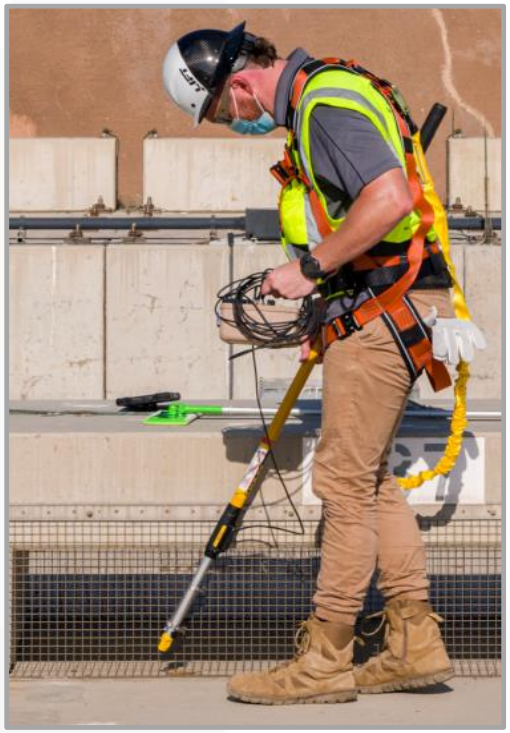
- Radiation readings were taken at each outlet vent on all 51 NUHOMS modules
  - Survey meter measures down to background levels
  - Assayed for any airborne radioactivity
- Contamination assessment done at each outlet vent using large area smear surveys

AHSM #	Lowest Dose Rate in µR/hr (closed)	Highest Dose Rate in µR/hr (closed)
1	40	50
2	20	40
3	25	55
4	20	50
5	40	45
6	40	45
7	40	50
8	40	50
9	45	40
10	45	50
11	40	55
12	40	60
13	45	45
14	30	40
15	20	
16	30	

Full data in appendix and online click here

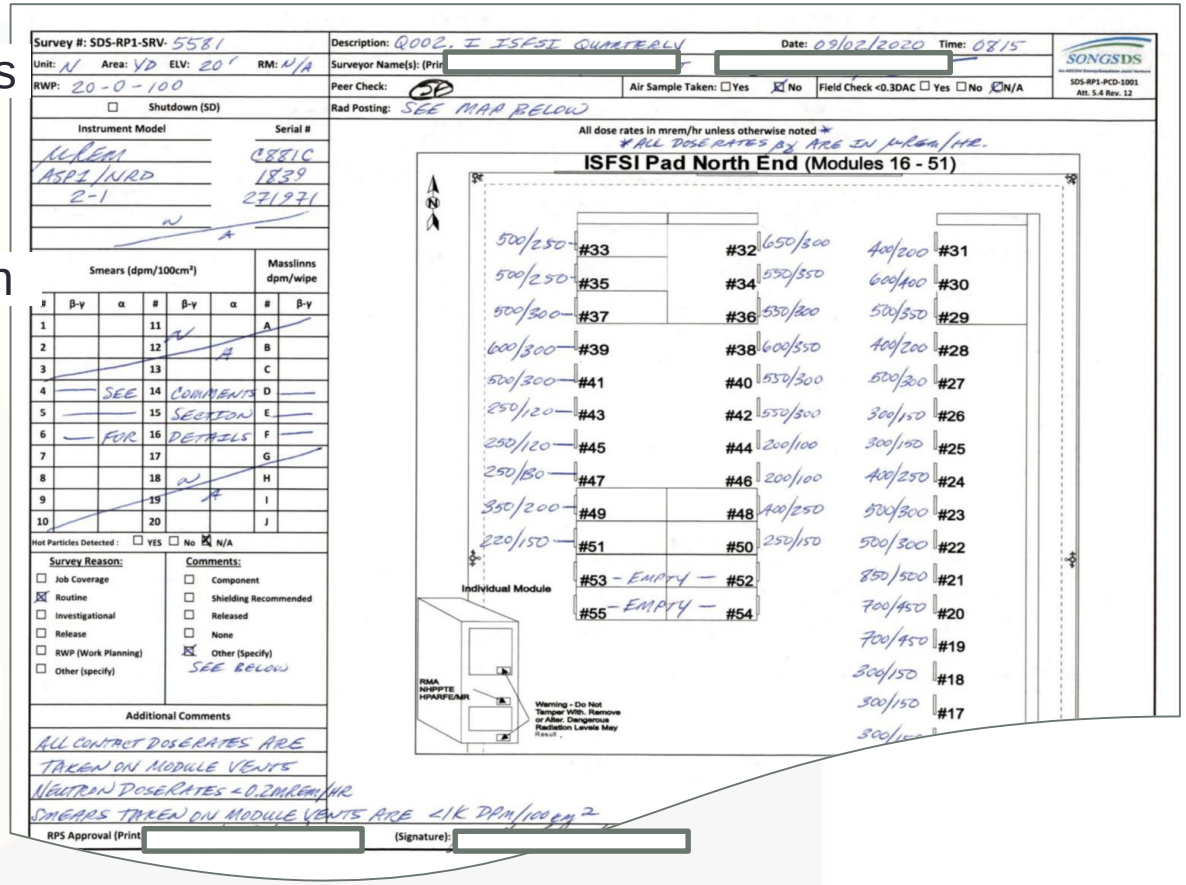
Results Show Outlet Vent Readings Lower than Inlets

- Single Row Modules ~0.040 to .060 mrem/hr (millirem per hour) at outlet vents
- Double Row Modules ~0.050 to 0.300 mrem/hr at outlet vents (double row modules combine radiation from shared outlet vent and have slightly less shielding due to adjacent outlet air vents)
- Inlet vent readings, while quite low, are higher than outlet vent readings as expected based on storage module design (greater shielding at outlet vent)
- No contamination found on any of the outlet vents
- No indication of airborne radioactivity at any module



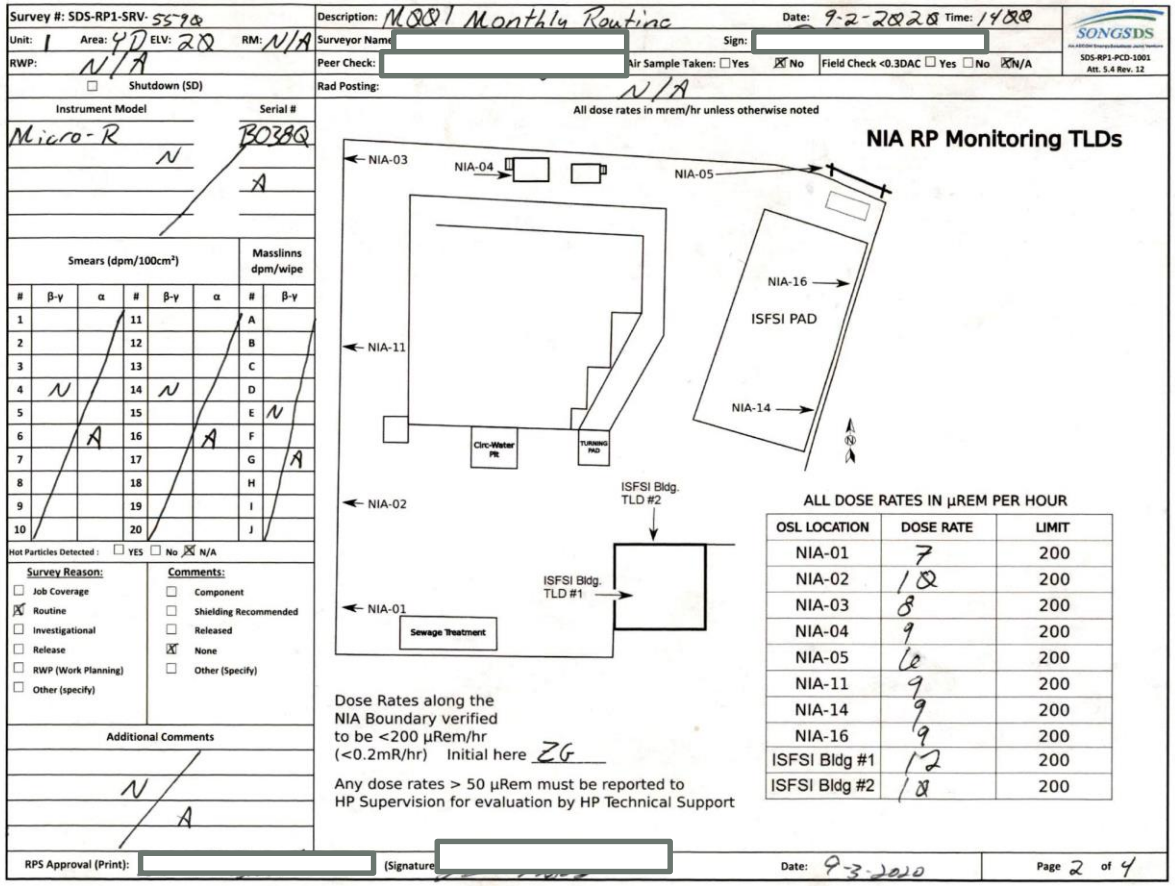
SCE Quarterly Survey of NUHOMS Inlet Vents

- Radiation levels at inlet vents from ~0.2 to 0.85 mrem/hr
- No radioactive contamination detectable on modules
- Low levels do not require Radiation Area posting
- Note this quarterly survey is in units of microrem/hr (= 0.001 mrem/hr)



SCE Monthly Surveys Show the Spent Fuel is Safely Stored

- ~0.010 mrem/hr at publicly accessible boundaries
- Background in the SONGS vicinity is ~0.010 mrem/hr
- Federal limit is 25 millirem per year (mrem/yr) above background; annual reports show <1 mrem/yr



Survey #: SDS-RP1-SRV-5590 Description: M001 Monthly Routine Date: 9-2-2020 Time: 1400
Unit: 1 Area: YD ELV: 20 RM: N/A Surveyor Name: Sign:
RWP: N/A Peer Check: Air Sample Taken: ☐ Yes ☒ No Field Check <0.3DAC ☐ Yes ☐ No ☒ N/A
☐ Shutdown (SD) Rad Posting: N/A
SONGSDS SDS-RP1-PCD-1001 Att. 5.4 Rev. 12

Instrument Model: Micro-R N Serial #: B038Q A

Smears (dpm/100cm²) / Masslinns dpm/wipe

#	β-γ	α	#	β-γ	α	#	β-γ
1			11			A	
2			12			B	
3			13			C	
4	N		14	N		D	
5			15			E	N
6		A	16		A	F	
7			17			G	A
8			18			H	
9			19			I	
10			20			J	

Hot Particles Detected: ☐ YES ☐ No ☒ N/A

Survey Reason: ☐ Job Coverage ☒ Routine ☐ Investigational ☐ Release ☐ RWP (Work Planning) ☐ Other (specify)

Comments: ☐ Component ☐ Shielding Recommended ☐ Released ☒ None ☐ Other (Specify)

Additional Comments: N A

All dose rates in mrem/hr unless otherwise noted

NIA RP Monitoring TLDs

ALL DOSE RATES IN µREM PER HOUR

OSL LOCATION	DOSE RATE	LIMIT
NIA-01	7	200
NIA-02	10	200
NIA-03	8	200
NIA-04	9	200
NIA-05	6	200
NIA-11	9	200
NIA-14	9	200
NIA-16	9	200
ISFSI Bldg #1	12	200
ISFSI Bldg #2	10	200

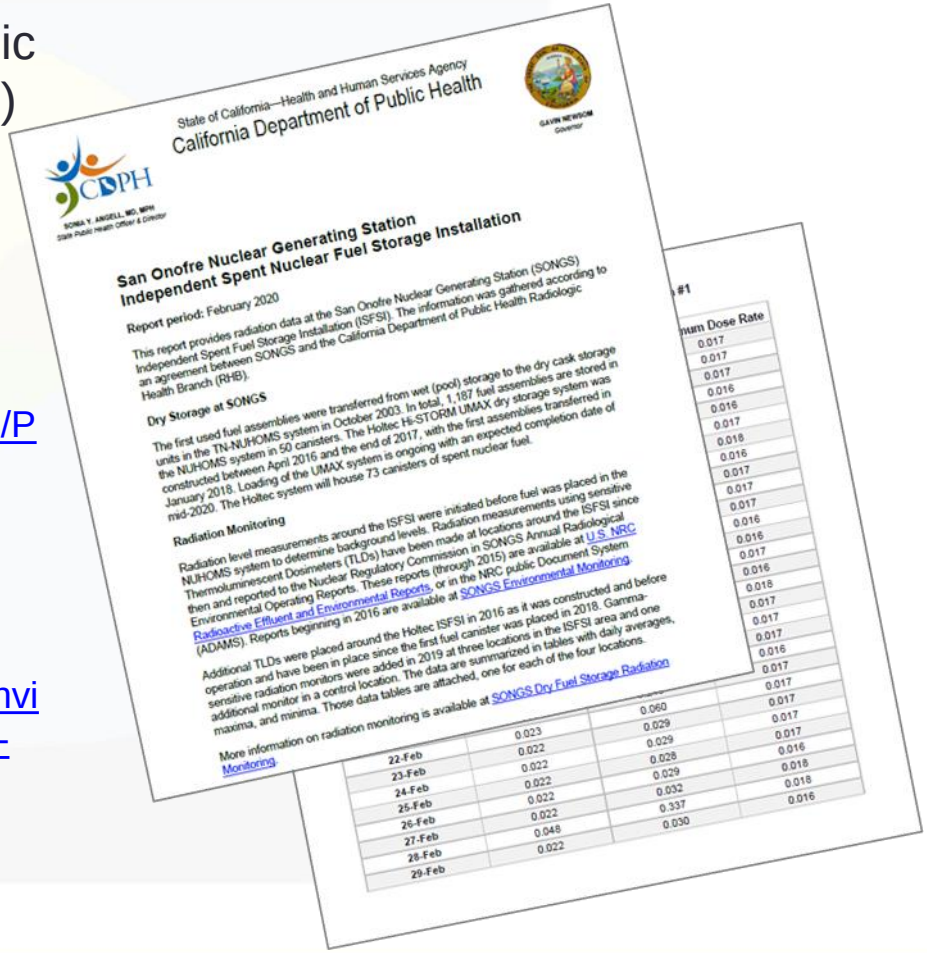
Dose Rates along the NIA Boundary verified to be <200 µRem/hr (<0.2mR/hr) Initial here ZG

Any dose rates > 50 µRem must be reported to HP Supervision for evaluation by HP Technical Support

RPS Approval (Print): (Signature) Date: 9-3-2020 Page 2 of 4

ISFSI Radiation Monitoring Monthly Reports Available Online

- Data streamed to CA Department of Public Health, Radiologic Health Branch (CDPH)
  - Publishes monthly reports
  - Provides high, low, and average radiation levels at each monitor
- CDPH publicly available online
  - https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB-Environment/SONGS-ISFSI-reports.aspx
- SONGS website provides contextual information and a link to CDPH reports
  - https://www.songscommunity.com/stewardship/environmental-monitoring-around-san-onofre/dry-fuel-storage-radiation-monitoring



State of California—Health and Human Services Agency
California Department of Public Health

San Onofre Nuclear Generating Station
Independent Spent Nuclear Fuel Storage Installation

Report period: February 2020

This report provides radiation data at the San Onofre Nuclear Generating Station (SONGS) Independent Spent Fuel Storage Installation (ISFSI). The information was gathered according to an agreement between SONGS and the California Department of Public Health Radiologic Health Branch (RHB).

Dry Storage at SONGS

The first used fuel assemblies were transferred from wet (pool) storage to the dry cask storage units in the TN-NUHOMS system in October 2003. In total, 1,187 fuel assemblies are stored in the NUHOMS system in 50 canisters. The Holtec Hi-STORM UMAX dry storage system was constructed between April 2016 and the end of 2017, with the first assemblies transferred in January 2018. Loading of the UMAX system is ongoing with an expected completion date of mid-2020. The Holtec system will house 73 canisters of spent nuclear fuel.

Radiation Monitoring

Radiation level measurements around the ISFSI were initiated before fuel was placed in the NUHOMS system to determine background levels. Radiation measurements using sensitive Thermoluminescent Dosimeters (TLDs) have been made at locations around the ISFSI since then and reported to the Nuclear Regulatory Commission in SONGS Annual Radiological Environmental Operating Reports. These reports (through 2015) are available at U.S. NRC Radioactive Effluent and Environmental Reports, or in the NRC public Document System (ADAMS). Reports beginning in 2016 are available at SONGS Environmental Monitoring.

Additional TLDs were placed around the Holtec ISFSI in 2016 as it was constructed and before operation and have been in place since the first fuel canister was placed in 2018. Gamma-sensitive radiation monitors were added in 2019 at three locations in the ISFSI area and one additional monitor in a control location. The data are summarized in tables with daily averages, maxima, and minima. Those data tables are attached, one for each of the four locations.

More information on radiation monitoring is available at SONGS Dry Fuel Storage Radiation Monitoring.

22-Feb	0.023	0.060	0.017
23-Feb	0.022	0.029	0.017
24-Feb	0.022	0.029	0.017
25-Feb	0.022	0.028	0.016
26-Feb	0.022	0.029	0.016
27-Feb	0.022	0.032	0.018
28-Feb	0.048	0.337	0.018
29-Feb	0.022	0.030	0.016