

Explanation of NUHOMS Radiation Survey Results

Nov. 10, 2020

1. What is the purpose of the independent survey of the Orano (AREVA) NUHOMS dry cask storage system?

During the Aug. 20, 2020, CEP meeting, a member of the public, Donna Gilmore of San Onofre Safety, asked about a survey of the outlet air vents of the Nuclear Horizontal Modular Storage (NUHOMS) dry spent fuel storage modules at SONGS and Southern California Edison committed to perform such a radiation survey and report the results. Gilmore has essentially postulated the NUHOMS canisters are “leaking” and that is why Southern California Edison has not surveyed the outlet vents on the top of the storage modules, only the inlet vents at the bottom of the modules. A common refrain on her website is “what are they hiding?”

SCE conducts quarterly radiological surveys of the inlet vents on the NUHOMS modules. There is no technical specification (regulatory requirement) for measuring the outlet air vents because the canisters in the storage modules are welded closed and airtight. SCE elected to survey the outlet air vents in response to public interest in the NUHOMS dry fuel storage system. SCE contracted Philotechnics, Ltd., an independent company to perform the survey using their own qualified health physicist and calibrated instruments. The company was recommended by the California Department of Public Health Radiologic Health Branch (CDPH/RHB).

2. What is the purpose of this document?

This document serves as a brief summary to explain the results of the radiation survey performed by Philotechnics, Ltd. (reference survey results in table format on page 4). SCE will provide an overview of the results of the independent survey during the 4th Quarter Community Engagement Panel (CEP) meeting scheduled for Nov. 19, 2020. The link to the CEP webpage for the November 19 meeting and the radiation survey portion of the presentation is provided [here](#).

3. What were the results of the independent survey?

The Philotechnics health physicist performed a radiation survey at each outlet vent screen on all 51 NUHOMS modules of the dry cask storage system. The technician used a highly sensitive survey meter which measures down to environmental background levels and employed both open and closed window readings¹ to assess the level of radiation in the immediate vicinity of the outlet air vents. In

¹ Open and closed window readings refer to the “beta shield” that is used to assay for beta-emitting radioactivity, an indicator of airborne radioactivity. Consistent readings between both open and closed window readings means that there are no airborne emissions.

addition, SCE also asked Philotechnics to perform large area “smear surveys” to determine whether radiological contamination (particles) was present at each outlet vent, which would be unexpected because the canisters within the storage modules are seal welded. The results of both surveys are provided below.

Radiological Survey

The dose rates at the single row of modules is ~0.04 mrem/hr to .060 mrem/hr (millirem per hour) at the outlet vent screens. The dose rates at the double row of modules is ~ 0.050 mrem/hr to 0.300 mrem/hr at the outlet vent screens. (Note: The single row modules have slightly more shielding than a double row. The double row modules have combined radiation from shared outlet vents.) Readings also showed zero emissions of airborne radioactivity.

In contrast, the inlet vent screens of each module had dose rates that were nearly a factor of 10 greater than their associated outlet vent screens for the 51 storage modules (*due to the greater shielding at outlet vents*). These higher dose rates are normal and expected.

SCE performs routine monthly surveys around the Independent Spent Fuel Storage Installation (ISFSI) boundary. The radiation dose rates are ~0.010 mrem/hr at publicly accessible boundaries. This compares favorably to the background radiation dose rate the SONGS facility that is also ~0.010 mrem/hr.

Radiological Contamination Survey

No detectable radioactive contamination was found on any of the 51 module outlet vents. The most recent quarterly smear survey of the inlet vents also found no detectable radioactive contamination.

4. What are the regulatory limits for members of the public?

The federal limit is 25 mrem per year above background (10CFR72.104). SCE annual reports show < 1 millirem per year at the site boundary. A direct link to our recent annual reports is provided [here](#).

5. How do the regulatory limits and surveys translate into public safety?

At just a fraction of regulatory limits, dose rates are so safe and low at the Independent Spent Fuel Storage Installation (ISFSI) where the dry cask storage systems are located that it does not require Radiation Area postings per federal regulations. Radiation area posting is required at 5 mrem/hr or greater.

6. Summary:

- SCE annual reports show <1 millirem per year at the site boundary
- Monthly surveys of the [site/ISFSI] boundary show ~0.010 mrem/hr.
- Background radiation dose rate at the SONGS facility is also ~0.010 mrem/hr. This means that the ISFSI does not contribute to any measurable radiation at the ISFSI boundary.

- Independent surveys of the NUHOMS outlet vents found ~0.020 to 0.300 mrem/hr.
- Readings showed zero emissions of airborne radioactivity
- No detectable radioactive contamination was found on any of the 51 module outlet vents.
- Exposure rates of AHSM outlet screens were significantly lower than the respective inlet screens.

7. Where can I find up-to-date radiological survey information on the dry cask storage system?

In early 2020, SCE added the ISFSI radiation monitoring system in response to public interest which exceeds NRC requirements. The ISFSI radiation monitoring system streams data to offsite agencies and monthly reports are published by the California Department of Public Health Radiologic Health Branch. The report provides high, low, and average radiation levels at each monitor. The SONGS website includes contextual information including natural sources. Links are provided below:

CDPH Radiologic Health Branch - <https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB-Environment/SONGS-ISFSI-reports.aspx>

SONGS Website - <https://www.songscommunity.com/stewardship/environmental-monitoring-around-san-onofre/dry-fuel-storage-radiation-monitoring>

Philotechnics Survey Results of SONGS 51 NUHOMS Modules

Ludlum Model 19 [SN133149] Calibration Due Date: 10/12/21
 Ludlum Model 14C [SN283368] Calibration Due Date: 10/7/21
 Ludlum 44-38 [PR306897] Calibration Due Date: 10/7/21
 Ludlum 26-1 [PF00639] Calibration Due Date: 4/15/21

AHSM #	Lowest Dose Rate in $\mu\text{R/hr}$ (closed)	Highest Dose Rate in $\mu\text{R/hr}$ (closed)	Lowest Dose Rate in $\mu\text{R/hr}$ (open)	Highest Dose Rate in $\mu\text{R/hr}$ (open)	Large Area Wipe
1	40	50	40	50	≤ BKGD
2	20	40	20	40	≤ BKGD
3	25	55	25	55	≤ BKGD
4	20	50	20	50	≤ BKGD
5	40	45	40	45	≤ BKGD
6	40	45	40	45	≤ BKGD
7	40	50	40	50	≤ BKGD
8	40	50	40	50	≤ BKGD
9	45	40	45	40	≤ BKGD
10	45	50	45	50	≤ BKGD
11	40	55	40	55	≤ BKGD
12	40	60	40	60	≤ BKGD
13	45	45	45	45	≤ BKGD
14	30	40	30	40	≤ BKGD
15	20	25	20	25	≤ BKGD
16	30	50	30	50	≤ BKGD
17	40	50	40	50	≤ BKGD
18	40	45	40	45	≤ BKGD
19	45	55	45	55	≤ BKGD
20	50	55	50	55	≤ BKGD
21	45	50	45	50	≤ BKGD
22	45	45	45	45	≤ BKGD
23	50	55	50	55	≤ BKGD
24	40	45	40	45	≤ BKGD
25	45	50	45	50	≤ BKGD
26	35	40	35	40	≤ BKGD
27	40	45	40	45	≤ BKGD
28	45	45	45	45	≤ BKGD
29	45	45	45	45	≤ BKGD
30	40	40	40	40	≤ BKGD
31	40	45	40	45	≤ BKGD
32	110	200	110	200	≤ BKGD
34	120	200	120	200	≤ BKGD
36	120	250	120	250	≤ BKGD
38	50	260	50	260	≤ BKGD
40	140	300	140	300	≤ BKGD
42	100	240	100	240	≤ BKGD
44	80	150	80	150	≤ BKGD
46	80	160	80	160	≤ BKGD
48	100	155	100	155	≤ BKGD
50	180	220	180	220	≤ BKGD
51	180	250	180	250	≤ BKGD
49	120	160	120	160	≤ BKGD
47	100	120	100	120	≤ BKGD
45	100	140	100	140	≤ BKGD
43	100	140	100	140	≤ BKGD
41	200	250	200	250	≤ BKGD
39	180	200	180	200	≤ BKGD
37	180	200	180	200	≤ BKGD
35	150	170	150	170	≤ BKGD
33	120	190	120	190	≤ BKGD