How the twin domes at San Onofre nuclear plant will come down

From: Lorraine Quinn Sandstrom
Sent: Tuesday, October 27, 2020 3:42 PM
To: David G. Victor; Daniel T. Stetson; Martha McNicholas; Lisa Bartlett; Donna Boston; Jim Desmond; Rich Haydon; Rob Howard; Jammal CIV Osamah A; Jim Leach; Val Macedo; Ted Quinn; Marni Magda; Garry Brown; John Taylor; Mel Vern; Kathy Ward; Paul Wyatt; Kristal Jabara; Gene James; Ken Schultz; Mike Sappingfield; Douglas Woodyard
Cc: Manuel Camargo; John Dobken; Liese Mosher; Jackie Littler; Veronica Ferencz; Marisol Edrozo; Tanya Flink; Victor Cao; Nicole Perez
Subject: For Awareness: SD Union-Tribune and LA Times Post Article on SONGS Dismantlement Project

Dear CEP Members and Alternates,

The San Diego Union-Tribune and the Los Angeles Times posted the following article on the dismantlement of SONGS this week. The piece features an interview with Vince Bilovsky (SCE Executive Director of SONGS Decommissioning) and focuses mostly on the work that will take place in and around the domes. The full article is below.

How and when the twin domes at San Onofre nuclear plant will come down

Key pieces of the reactor vessels will be removed via underwater operations

By ROB NIKOLEWSKI
OCT. 23, 2020
6 AM

They are perhaps the most distinctive features of the San Onofre Nuclear Generating Station — the pair of containment domes from Units 2 and 3, rising nearly 200 feet above the ground on the northern edge of San Diego County that every motorist sees on the drive along Interstate 5.

But in about six years, the twin domes will be gone — obliterated — provided the schedule holds true for dismantling the now-shuttered plant, known as SONGS.

Taking down the domes is part of a much larger project that will remove all but just a few structures at the plant, which produced electricity from 1968 to late 2012 and is being decommissioned by the federal government's Nuclear Regulatory Commission.

Southern California Edison operates the facility but the massive job of taking the plant apart — and removing the heavy equipment inside it — is being done by a general contractor named SONGS Decommissioning Solutions. The group is a joint venture of the Los Angeles-based infrastructure and engineering company AECOM and Energy Solutions, a Salt Lake City firm that specializes in disposing of nuclear material.

Edison received the needed permit in October 2019 from the California Coastal Commission that cleared the way for dismantlement to begin. Workers have already taken on some jobs, including removing asbestos and establishing staging areas for industrial equipment that can load up and remove debris, such as concrete and rebar. Early work has also begun on the containment domes.

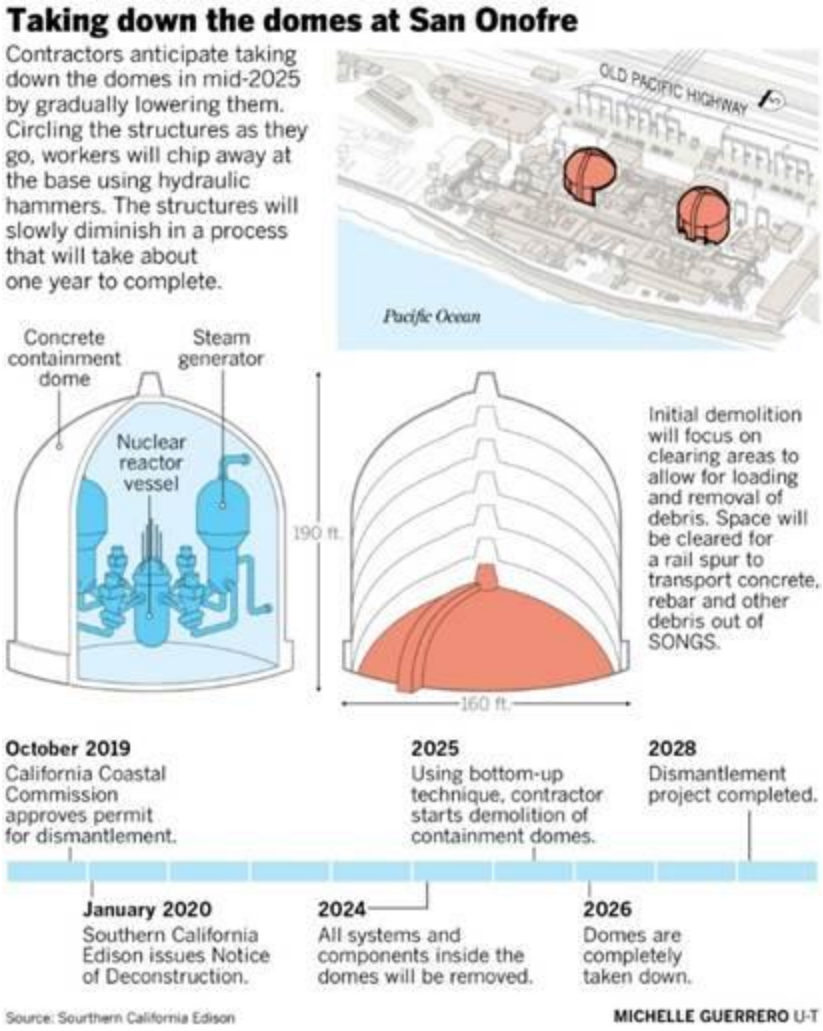
The scale of the overall project is mammoth and complicated. By the time it's all done, about 2 billion pounds of equipment, components, concrete and steel will be removed from the plant that sits on an 84-acre chunk of land at Marine Corps Base Camp Pendleton.

What gets taken out of the domes

"The first thing we've got to do is get everything out of what's inside the domes," said Vince Bilovsky, Edison's executive director for SONGS decommissioning. "And there's a lot of stuff in there, a lot of equipment and it's big and heavy."

Among the components inside Units 2 and 3 are piping, tanks, operation systems and steam generators that have absorbed small amounts of contamination over the years. They must be surgically removed in pieces and shipped out as radioactive waste.

"But the most significant component is the reactor," Bilovsky said. "That takes the most effort to remove and dispose of those parts."



To get the heavy equipment into the domes, workers have to enlarge the opening. To do that, they have to take out the "tendons" that had been built within each unit's 4 feet of reinforced concrete. The tendons act like cables that horizontally and vertically hug the containment domes.

Work has already started to remove the tendons in Unit 2. By the first quarter of next year, they will be removed from both units.

Once a larger opening into each dome is made, the dismantling equipment can be installed.

Things get interesting when workers tackle the reactor vessel. The reactor is located in a cavity and will be cut up into pieces. But because the internal parts of the vessel

were close to nuclear fuel, they are classified as low-level radioactive waste and have to be treated as such during dismantlement.

That means the process of cutting and retrieving of the pieces is done underwater.

To do that, each cavity is filled with about 500,000 gallons of treated, demineralized water.

Operated remotely by a crew using underwater cameras, the internal components of the reactor vessel will be pulled out one by one, and then cut into pieces with a rotating saw. Using robotics, the pieces are then retrieved and placed into containers. The operation requires a crew of 12 to 20.

It sounds unconventional, to say the least, but Bilovsky said the underwater operation has been used at decommissioned plants such as Zion in Illinois, Connecticut Yankee in the Northeast and the Trojan Nuclear Power Plant in Oregon.

The two reactor vessels are each about 25 feet tall, 16 feet in diameter and weigh more than 1 million pounds.

How the domes will come down

Taking out everything inside the containment domes will take about five or six years. Once the domes are empty, they can then be dismantled.

But don't get your hopes up for the type of dramatic implosions seen when some high-rise buildings come down.

Instead, the plan at SONGS is to gradually reduce the size of the domes — from the bottom up, until their nearly 200-foot height is reduced to zero. The domes are 160 feet wide.

"There's no explosives, no wrecking ball, just a slow process," Bilovsky said.

After an inner liner is removed, hydraulic hammers on the exterior of the dome chip away at the bottom of the structure. It very slowly collapses as workers move around the dome's circumference.

"It's a very methodical, slow, controlled process," Bilovsky said.

The schedule calls for the domes to start shrinking about mid-2025 and roughly one year later, they will be completely gone.

"They're iconic structures that everybody who has driven between San Diego and Los Angeles knows about," Bilovsky said.

What will get carted off

While the domes may be the most notable structures to get dismantled, there are plenty of other pieces of the plant that will be shipped away, to be classified as low-level nuclear waste:

- About 285,000 tons (570 million pounds) of material at SONGS will be labeled Class A, the lowest level. It makes up the vast majority of the plant's remains and will be sent to the Energy Solutions disposal facility in the town of Clive, Utah. Most of the waste will be sent to Utah by rail.
- Some 35 tons of Class B and C low-level waste will get shipped by truck to the Waste Control Specialists facility in the West Texas town of Andrews. Bilovsky estimates the shipments will amount to about six to eight truckloads.

An additional 125 tons of material classified as higher than Class C low-level waste will remain at SONGS. The waste will be put into 12 horizontal canisters — the same types of canisters Edison used to store spent fuel assemblies at the original storage site at the north end of SONGS.

From a policy perspective, the 12 new canisters will be treated the same as SONGS spent fuel and will be eligible to be moved to a permanent or interim repository, when and if the federal government ever opens one.

The costs for dismantling SONGS will come from about $4.5 billion in existing decommissioning trust funds. The money has been collected from ratepayers and

invested in dedicated trusts. According to Edison, customers have contributed about one-third of the trust funds while the remaining two-thirds have come from returns on investments made by the company.

Barring any unforeseen events, Bilovsky said he expects $4.5 billion will be sufficient to cover the project and said "we're fairly confident with the schedule" that all the work will be completed in eight years.

Critics of Edison's longtime management of the plant are skeptical whether the complex dismantlement plan can be completed on time or without major issues.

"Edison has only committed to doing what is 'commercially reasonable' to handle nuclear waste that has been stranded at San Onofre," said Gary Headrick, co-founder of the environmental group San Clemente Green. "Their current wishful plan might just work, but what if it doesn't, like so many other past examples you could point to?"

SONGS has not produced electricity since 2012 after a leak in a steam generator tube led to the closing of the plant.

In August 2018, transfers of canisters filled with nuclear waste from "wet storage" pools at the plant to a newly constructed "dry storage" facility were suspended for nearly a year after a 50-ton canister filled with fuel assemblies came to rest on a metal flange, 18 feet from the floor of a storage cavity for about 45 minutes to an hour.

The canister, left unsupported by the rigging and lifting equipment intended to shoulder its weight, was eventually lowered without falling. The incident led to a special inspection by the Nuclear Regulatory Commission, which fined Edison $116,000.

Transfers of the spent fuel resumed after Edison instituted a series of improved safety measures and in August of this year, the 73rd and final canister was lowered into its storage cavity at the north end of SONGS.

What will be left at SONGS?

When the eight-year dismantlement project is completed, all that will remain will be the two dry storage sites; a security building with personnel to look over the waste; a seawall 28 feet high, as measured at average low tide at San Onofre Beach; a walkway connecting two beaches north and south of the plant, and a switchyard with power lines.

The switchyard's substation without transformers stays put because it houses electricity infrastructure that provides a key interconnection for the power grid in the region.

The canisters of nuclear waste remain between I-5 and the Pacific because the federal government has not found a place to put all the used-up commercial fuel that has stacked up at some 121 sites in 35 states.

There are some 80,000 metric tons of waste from commercial nuclear plants across the country. SONGS accounts for 1,609 metric tons, or about 3.55 million pounds.

Thank you,
Lorraine Sandstrom
Community Affairs and Relations, Senior Specialist
Community Engagement Panel (CEP) Management and Stakeholder Engagement (AWS Bldg. D-D23)
Southern California Edison, San Onofre Nuclear Generating Station (SONGS)

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Question by Garry Brown re ground water elevation monitoring and SCE response following 2020 4Q CEP

From: Manuel Camargo
Sent: Monday, November 23, 2020 3:29 PM
To: Garry Brown
Cc: Ronald Pontes; Doug Bauder; Daniel T. Stetson; David G. Victor
Subject: RE: (External): Re: Groundwater Elevation Monitoring--Slide 43

Good afternoon Garry,

Thanks again for your note regarding the ISFSI, sea level rise and the risk of sinkage (settlement) and/or liquefaction.
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The California Coastal Commission (CCC) evaluated liquification during its review of the ISFSI Coastal Development Permit application. The evaluation is documented in the staff report for CDP 9-15-0228 (link: https://documents.coastal.ca.gov/reports/2015/10/Tu14a-10-2015.pdf). See Section D, Geologic Hazards, page 27 for specific discussion on liquefaction. The "dense, well consolidated sands of the San Mateo Formation … are considered to be at low risk of seismically-induced liquefaction." Page 19 of the staff report further states, "Of particular importance for the Commission's analysis is the fact that the NIA [north industrial area] has superior foundation conditions; each of the other four selected sites is partially or entirely underlain by poorly consolidated marine terrace deposits, which are considered to be more susceptible to erosion, slope failure, and seismic shaking than the San Mateo Formation." The CCC found that the proposed project, as conditioned, assures stability and structural integrity with respect to liquefaction, consistent with Section 30253 of the Coastal Act.

Recall too, that Units 1, 2 and 3 were constructed on the same geological formation with most of their structures built below the water table. SCE monitors the ISFSI elevation for signs of settlement, and while settlement is not expected, the monitoring would identify any settlement long before it becomes an issue, giving us time to respond.

Please let me know if you have any follow-up questions.

Have a happy Thanksgiving.

Manuel

Manuel C. Camargo Jr.
Principal Manager, Strategic Planning
SONGS Decommissioning
Southern California Edison
www.SONGScommunity.com

From: David G. Victor
Sent: Sunday, November 22, 2020 5:08 AM
To: Garry Brown; Manuel Camargo; Daniel T. Stetson
Subject: (External): Re: Groundwater Elevation Monitoring--Slide 43

***** EXTERNAL EMAIL - Use caution when opening links or attachments *****

Thanks Garry for your attention to detail—very much appreciated. By copy I ask Manuel to help organize an explanation—which I assume will involve a summary of the vertical and horizontal pile anchors that assure the ISFSI is anchored to bedrock, not sand—and I very much look forward to learning about this. With your permission, I would like to include your note and the reply in the next CEP circular of emails. All best wishes for the holidays, David

From: Garry Brown
Date: Saturday, November 21, 2020 at 3:37 PM
To: Manuel Camargo, David G. Victor, Dan Stetson
Subject: Groundwater Elevation Monitoring--Slide 43

Gentleman,
After studying the slides from the presentation last Thursday night, I thought it prudent to bring to your attention the graphics of Slide 43. After learning how much concrete and rebar is encapsulated in the ISFIS structure and the canisters and SNF. The overall weight of the structure and contents is enormous. Yet, the graphic demonstrates the groundwater table rising to one half of one foot in the extreme high-risk scenario. In the graphic, it appears the entire ISFIS will float on water or at least very wet sand. With water at the base of the structure is there any chance of sinkage? I live 60 yards from the beach in Sunset Beach, the Trust Deed to my home has in 14 pt. font 'LIQUEFACTION'. I am President of an HOA here and we have a street starting to sink with only the weight of vehicles on it. We are now having geotechnical studies underway to discover why now. With this background, The graphics of the slide does not instill confidence, and what could happen if the water table is at the base of the ISFIS? That was not addressed. The message conveyed was water will not reach the canisters, but what happens if the entire structure is supported by very wet sand?
I didn't bring this up at the meeting due to the time crunch and there is plenty of time for this discussion.
Thanks and have a great holiday!
Garry

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Department of Energy Proposed Research at SONGS

From: Manuel Camargo
Sent: Thursday, December 17, 2020 5:08 PM
To: David G. Victor; Daniel T. Stetson; Rob Howard; Lisa Bartlett; Donna Boston; Garry Brown; John Taylor; Rich Haydon; Jim Desmond; Val Macedo; Marni Magda; Martha McNicholas; Ted Quinn; Mel Vern; Paul Wyatt; Kathy Ward; Jammal CIV Osamah A; Michelle Anderson; Mark Riddlebarger; Gene James; Doug Woodyard
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Cc: Lorraine Quinn Sandstrom; Doug Bauder; Vincent J Bilovsky; Liese Mosher
Subject: FYI - DOE Proposed Research at SONGS

Hello CEP members,

I write to make you aware that the U.S. Department of Energy has proposed a research project through which the Sandia National Laboratories will conduct a field demonstration project at SONGS. The project would focus on temperature and environmental factors on the surface of Areva TN NUHOMS canisters and is consistent with SCE's commitment to the safe storage of spent nuclear fuel on site at SONGS. We've had preliminary discussions with Sandia about its proposed research, which still requires federal funding.

Sandia recently issued a news release on the proposed research, which is available HERE.

While we at SCE are safely storing spent fuel on site, as you know, we also are exploring off-site solutions for spent nuclear fuel and we encourage the federal government to fulfill its obligation to remove the fuel from SONGS.

I wish you all a safe and fun holiday season.

Sincerely,

Manuel

Manuel C. Camargo Jr.
Principal Manager, Strategic Planning
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Southern California Edison
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No attachment. Direct links within text.
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