SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

Community Engagement Panel
Regular Meeting

SONGS Environmental Stewardship

Thursday, March 7, 2024

2:00 – 5:00 p.m. PST via Microsoft Teams

Link available on the CEP meeting webpage at songscommunity.com

THIS MEETING IS BEING RECORDED

Agenda Topics	Presenter(s)	Time
CEP and SCE opening comments • Welcome, CEP meeting timing and Microsoft Teams format • Topics being presented and resources available at songscommunity.com	Dan Stetson Fred Bailly	2:00 – 2:10
CEP general community updates • Welcome new CEP member Michael Parham • CEP member consultation meeting report out	Dan Stetson	2:10 – 2:20
SONGS Decommissioning Project • The big picture	Fred Bailly	2:20 – 2:30
SONGS environmental update • Environmental stewardship • Annual Sea-level Rise Impact Assessment Report • Ocean Protection Council Draft 2024 California Sea Level Rise Guidance • Update on liquid batch releases • SONGS Radiological Environmental Monitoring Program	Ron Pontes Gary Huff (Energy*Solutions*)	2:30 – 3:20
Environmental update public comment period and facilitated dialogue	Victor Cabral Martha McNicholas	3:20 – 3:55
SONGS Dismantlement Update • Dismantlement update	Vince Bilovsky	3:55 – 4:10
Break		4:10 – 4:15
General public comment period and facilitated dialogue	Victor Cabral Martha McNicholas	4:15 – 4:55
SCE and CEP summary comments	Dan Stetson Fred Bailly	4:55 – 5:00

Opening Comments

Dan Stetson and Fred Bailly

SAN ONOFRE COMMUNITY ENGAGEMENT PANEL

- CEP meeting timing and format
  - Meeting time adjusted to early afternoon to accommodate participant schedules and may be adjusted as required
  - Use of Microsoft Teams format will allow guest speakers, CEP members, and public to participate without a commute
  - SONGS tour and in-person meeting planned for later in 2024
- Spent Fuel Coalition quarterly webinar featured local officials from international host communities. A video is posted at ww.spentfuelsolutionsnow.com/events
  - Vesa Lakaniemi, Mayor of Eurajoki Municipality, Finland
  - Jacob Spangenberg, former Mayor of Östhammar Municipality, Sweden

Public Comment

Dan Stetson

SAN ONOFRE COMMUNITY ENGAGEMENT PANEL

Directions for the public comment period:

To submit comments and questions in writing:

- Use the CEP Comment Form

To sign up to speak:

- Use the CEP Comment Form

Comments and questions will be addressed in the order received

Victor Cabral and Martha McNicholas will facilitate

SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

General Community Updates

Dan Stetson

CEP Community Updates

Dan Stetson

SAN ONOFRE COMMUNITY ENGAGEMENT PANEL

- Welcome new CEP member



Michael Parham, Vice President, Capistrano Unified School District Board of Trustees

CEP Community Updates

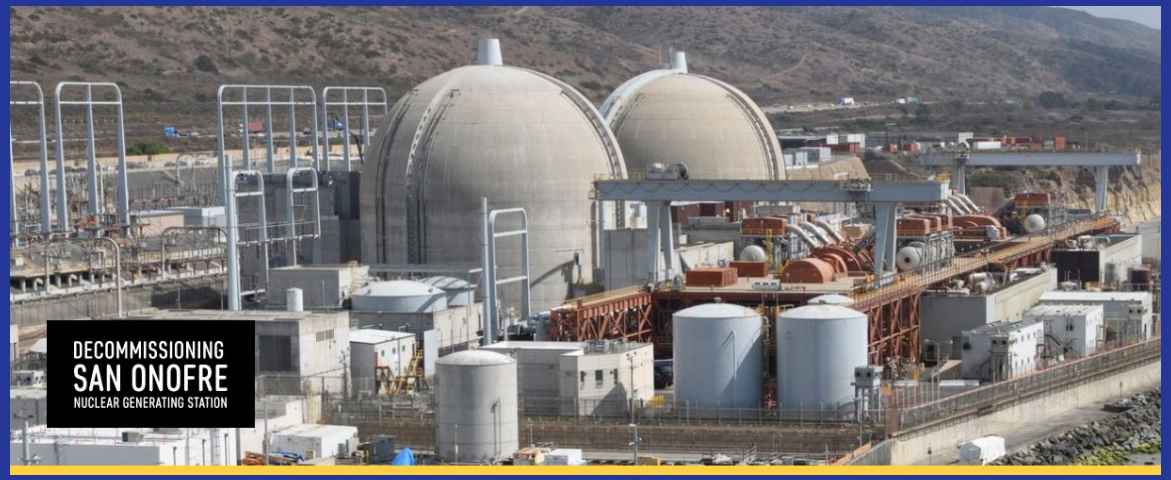
Dan Stetson and Victor Cabral

SAN ONOFRE COMMUNITY ENGAGEMENT PANEL

- CEP Member Consultation Meeting - December 7, 2023
  - What members are hearing about SONGS
    - Concerns regarding the rail line and ability to move the spent fuel offsite
  - Suggestions for future meeting topics
    - Department of Energy's consent-based siting for federal consolidated interim storage facilities
    - Railroad corridor
    - Treated wastewater batch releases
    - Floods and tsunamis
    - Radiological Environmental Monitoring Program and environmental mitigation efforts
    - Wheeler North Kelp Reef and San Dieguito Wetlands projects
    - Economic impact of decommissioning on local communities
  - Enhancements to key takeaways from CEP meetings

SONGS: The Big Picture

Fred Bailly
Vice President & Chief Nuclear Officer



Safety | Stewardship | Engagement

Decommissioning
San Onofre
Nuclear Generating Station
Safety | Stewardship | Engagement

Decommissioning Principles

SAFETY



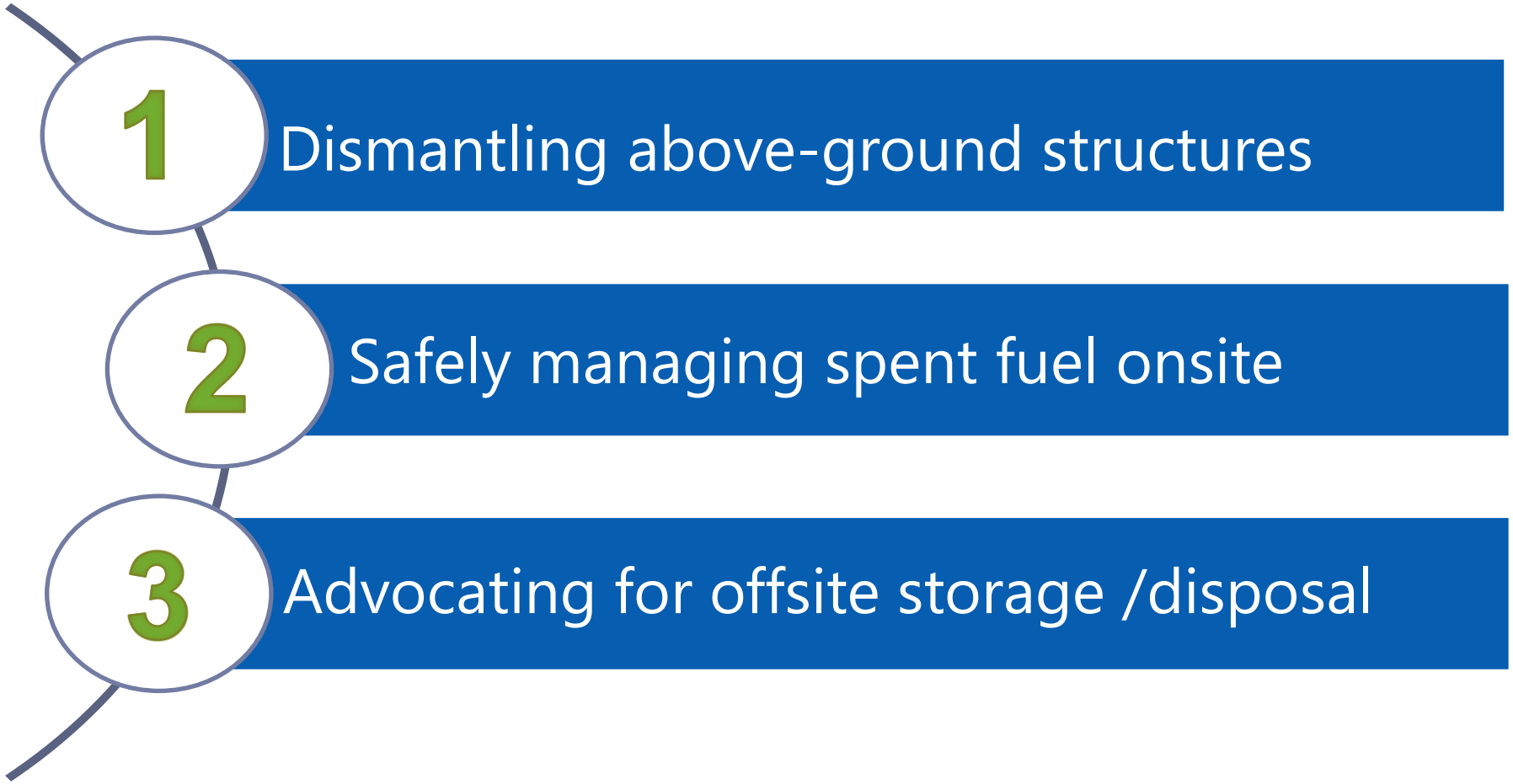
STEWARDSHIP



ENGAGEMENT

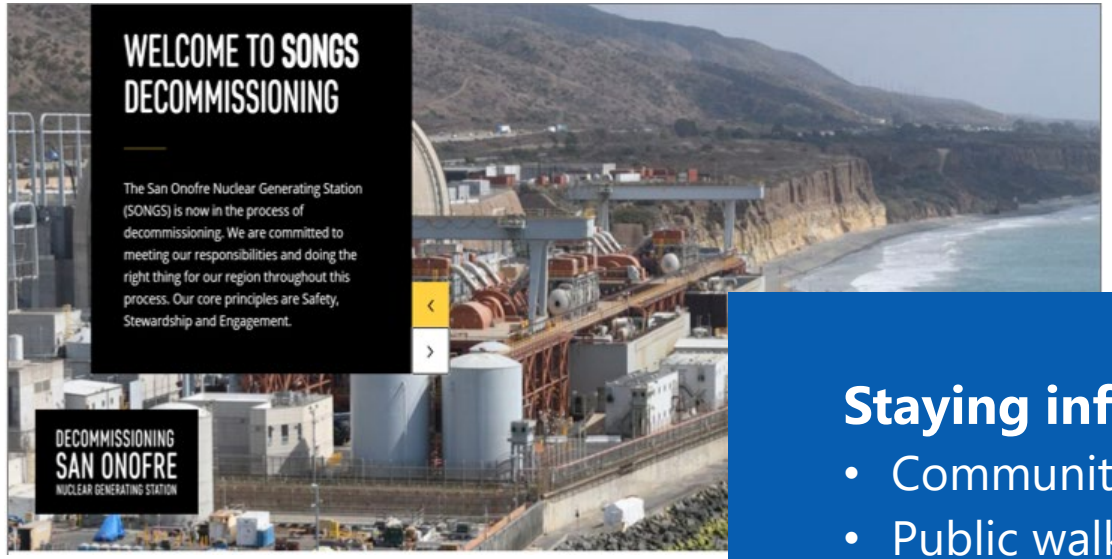


Major Workstreams



Resources

Learn about decommissioning
www.songscommunity.com



Staying informed

- Community Engagement Panel meeting dates
- Public walking tour dates and sign ups
- Decommissioning blog and news updates
- SONGS monthly community update email
- Facebook, Twitter, YouTube, Instagram

SONGS Environmental Update

Ron Pontes
General Manager
Environmental, Waste and Radiation Protection

Gary Huff
Radiation Safety Manager, Energy*Solutions*

Environmental Stewardship at SONGS

Environmental stewardship to protect the public, workers, and natural environment

- Water, air, soil sampling and monitoring
- Worker Environmental Awareness Program
- Protect endangered species
- Several groups monitor work (federal/state/county agencies, biological, cultural, tribal, SDS, and others)
- Minimize dust emissions
- Minimize truck traffic, each railcar eliminates 6 truck trips



January 2024
King Tide Photos
Courtesy of
Gary Headrick
San Clemente Green

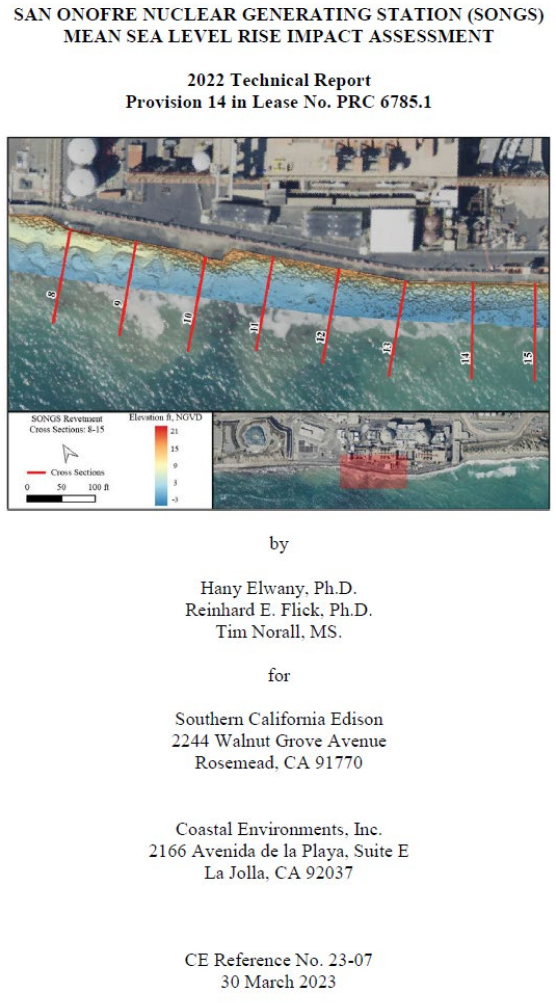








2022 Sea Level Rise (SLR) Impact Assessment Report



SAN ONOFRE NUCLEAR GENERATING STATION (SONGS)
MEAN SEA LEVEL RISE IMPACT ASSESSMENT

2022 Technical Report
Provision 14 in Lease No. PRC 6785.1

by

Hany Elwany, Ph.D.
Reinhard E. Flick, Ph.D.
Tim Norall, MS.

for

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

Coastal Environments, Inc.
2166 Avenida de la Playa, Suite E
La Jolla, CA 92037

CE Reference No. 23-07
30 March 2023

- CA State Lands Commission (CSLC) Lease Provision 14 requires preparation of an annual report to assess SLR vulnerability, structural integrity, and adaptation capacity for the SONGS site
- Assesses impact of SLR through year 2050 on SONGS
  - Revetment stability
  - Seasonal beach profile changes
  - Ground water elevation
- Provided annually to CSLC and posted on SONGS website

The information presented here is sourced from the 2022 SLR report, published on 3/30/2023. Data collected during 2023 is in the process of being compiled into an updated report, which is expected to be available on the SONGS website in April 2024.

2022 Sea Level Rise Impact Assessment Report

Sea Level Rise Monitoring

- SCE assesses and reports the potential impact of SLR using California Ocean Protection Council (OPC) SLR guidance
  - Ocean Protection Council (OPC) Medium-high and H++ extreme SLR projections combined with annual, 20-year and 100-year-storm events, as well as King Tides and,
  - Quarterly ground water elevation data collected from onsite monitoring wells

- 2022 assessments and reporting conclude that
  - The Revetment (aka "rip-rap") is in good condition and able to withstand extreme SLR through at least 2050
  - The beaches fronting SONGS have narrowed to pre-construction widths
  - The Holtec ISFSI support foundation remains above the groundwater table through 2050

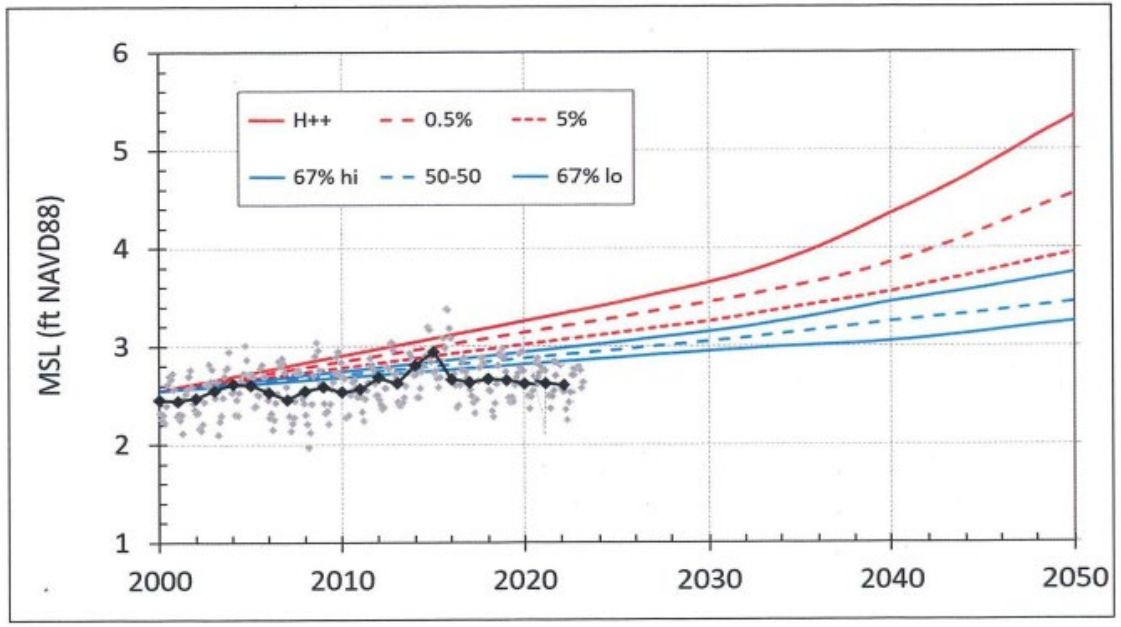


Figure 2-2: La Jolla average MSL data, 2000-2022, annual (black), monthly (grey) overlayed on OPC 2018 MSL SLR projections

Revetment (Rip-Rap) Stability Analysis

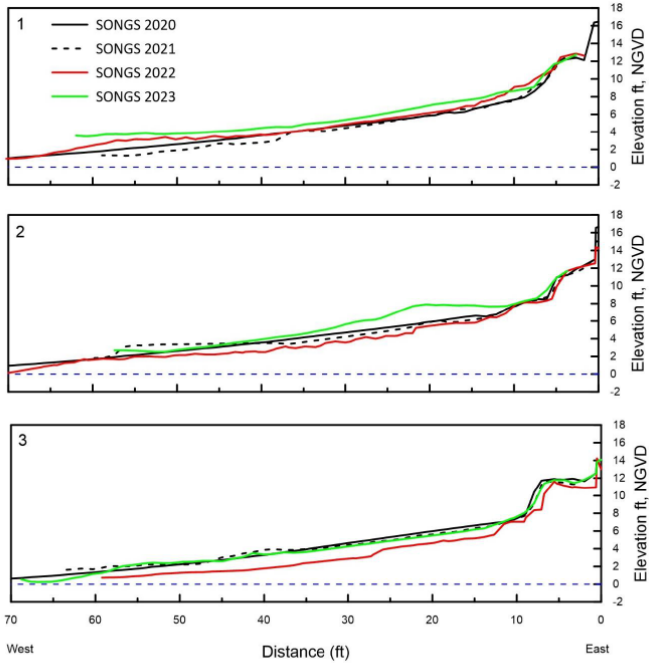


Figure B-1. Cross sections of SONGS revetment along ranges 1-3, surveyed on 19 January 2023, 01 February 2022, 25 February 2021, and 05 March 2020.

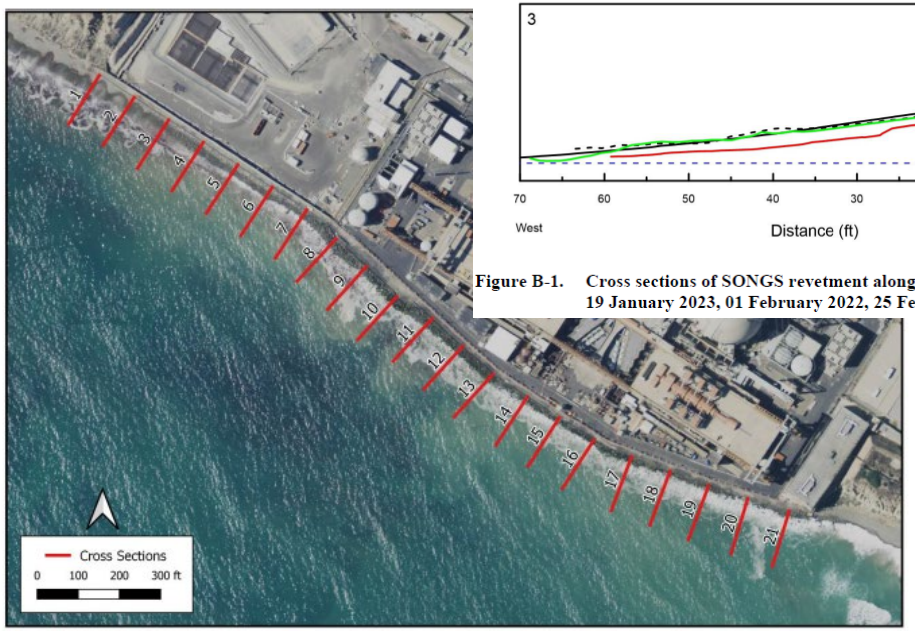


Figure 3-9. Location of 21 transects along the revetment, spaced 100 ft apart.

- Performed laser scan survey to produce digital elevation model (DEM) of revetment
- Compared 21 modeled transects to historical data
- Measured rocks to produce detailed estimation of rock weights
- Revetment stability calculated based on measured data and design wave estimates for SLR medium-high and H++ projections for years 2020 and 2050
- Revetment stability analysis indicates that the revetment rocks are of sufficient size and weight to withstand at least the median expected combined design wave height and maximum sea level expected between now and 2050

Seasonal Beach Profile Assessment

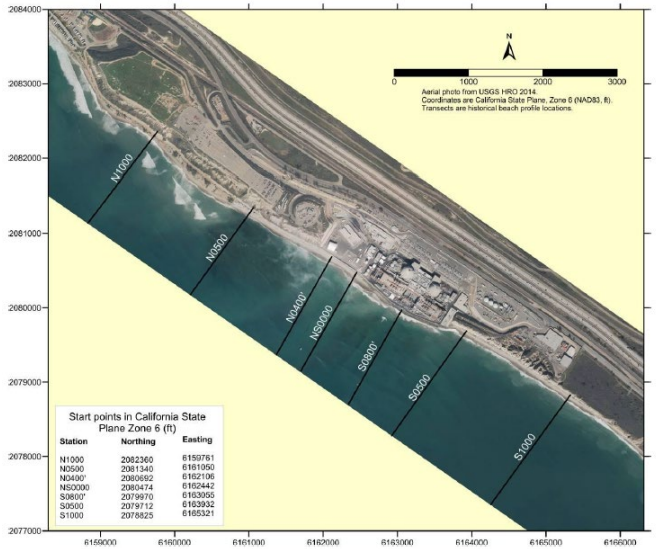


Figure 1-1. Locations of beach profiles surveyed at SONGS.

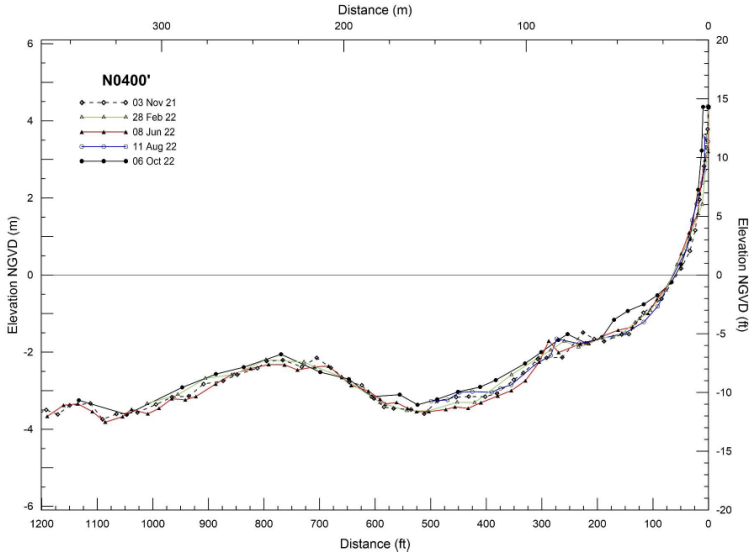


Figure 3-3. 2022 nearshore beach profile surveys of N0400'.

- Quarterly beach profile surveys started in March 2017
- The 2022 surveys were performed on Feb 28, June 8, Aug 11, and Oct 6
- Each survey covers seven transects
- Standard survey methods used onshore and digital acoustic echo sounder used for offshore
- Onshore & offshore data integrated on a laptop computer to create a profile for each transect
- Profiles compared to historical data to estimate seasonal cycles and long-term trends in beach width

Seasonal Beach Profile Assessment

Conclusions:

- Construction activities at SONGS over the 20-years from 1965 to 1984 resulted in substantial increases in beach width adjacent to and north of the plant
- Since the removal of the Units 2/3 laydown pad in 1985, the beaches have narrowed and returned to their pre-construction configuration
- From 1993 to 2022 beaches have narrowed due to limited sand supply from the surrounding creeks and rivers
- The average seasonal beach width fluctuates between 28 to 35 feet

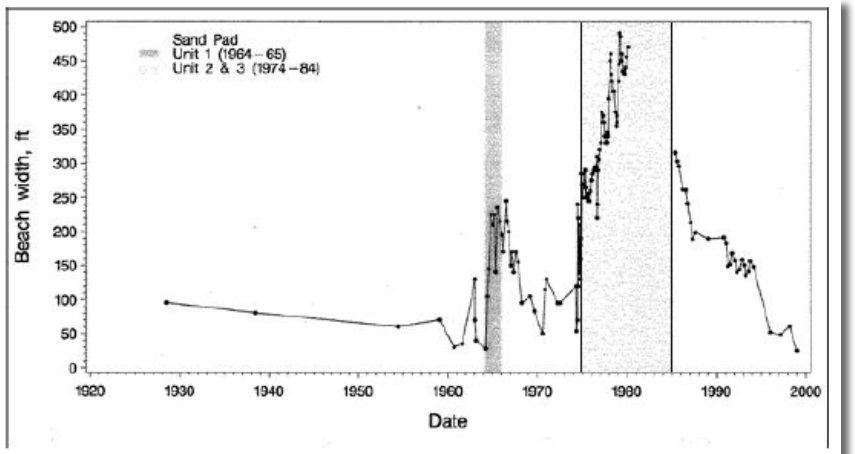


Figure 7-5. **Historical beach width adjacent to Unit 1, 1928-2000. Vertical columns show periods when laydown pads were present.**



Ground Water Elevation Monitoring

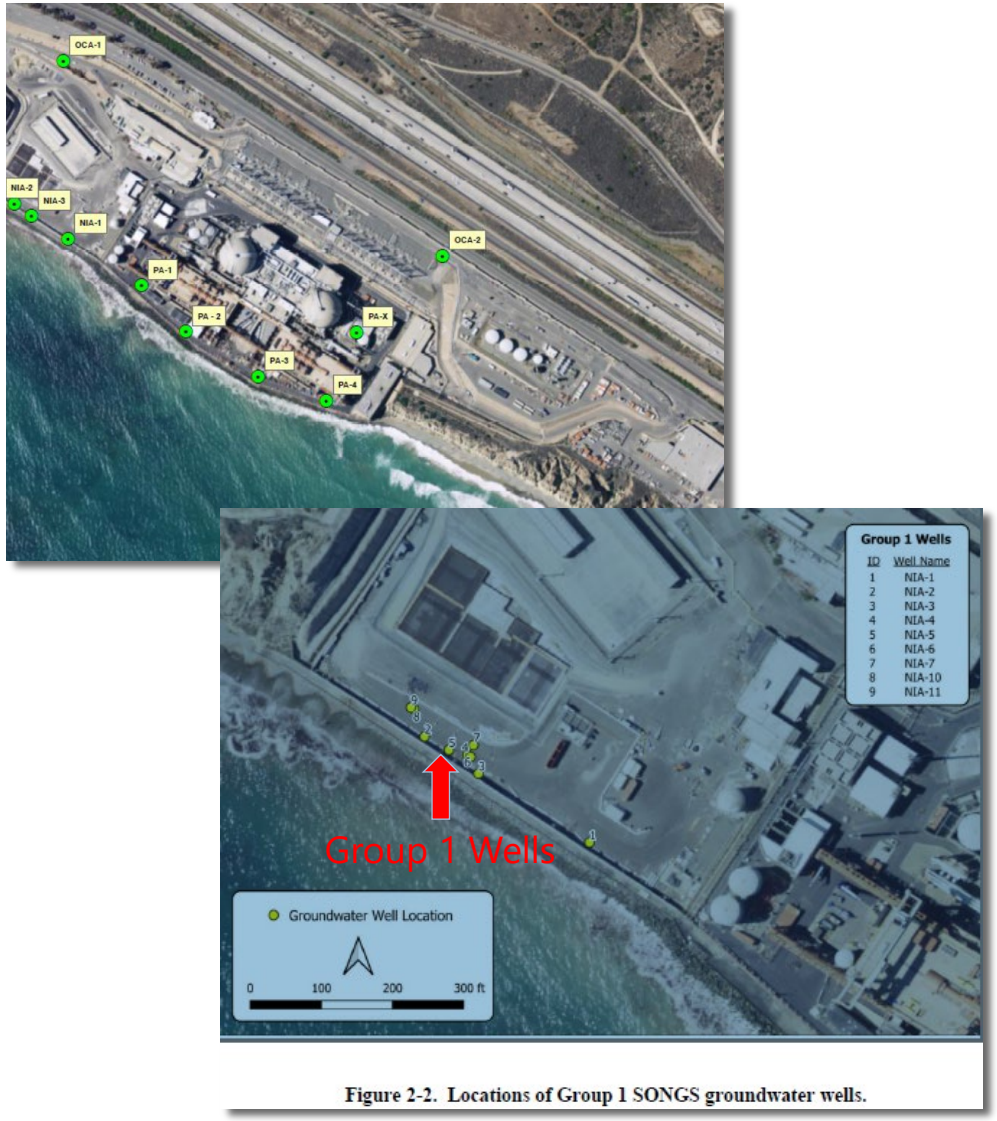
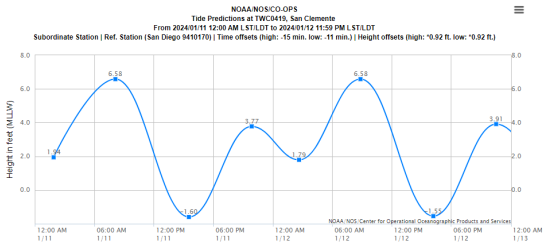


Figure 2-2. Locations of Group 1 SONGS groundwater wells.

- Quarterly water level data from SONGS site ground water monitoring wells collected and trended against tidal data
- Each of the wells was assigned to one of three groups based on their elevation and location within SONGS
- Group 1 wells occupy the lowest ground surface elevation and are located between the shoreline and Holtec ISFSI
- Groups 2 and 3 wells occupy the middling and higher ground elevations on the site
- Group 1 data used to determine the distance between groundwater level and the Holtec ISFSI support foundation

Ground Water Elevation Monitoring



Link to NOAA Tide Predictions for San Clemente, CA: https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=TWC0419&legacy=1
To know more about tidal datums go here: NOAA Tides & Currents

SLR Assessment Impact Report – Key Takeaways

- Revetment is in good condition and able to withstand H++ SLR through at least 2050
- The beaches fronting SONGS have narrowed to pre-construction widths and are mainly influenced by dry weather conditions since the early 2000s
- Even considering H++ SLR scenario, the Holtec ISFSI support foundation remains above the water table through 2050



Figure 3-8. Trimble SX10 scanning total station.

California Ocean Protection Council Draft 2024 Sea Level Rise Guidance

Ron Pontes
General Manager
Environmental, Waste and Radiation Protection

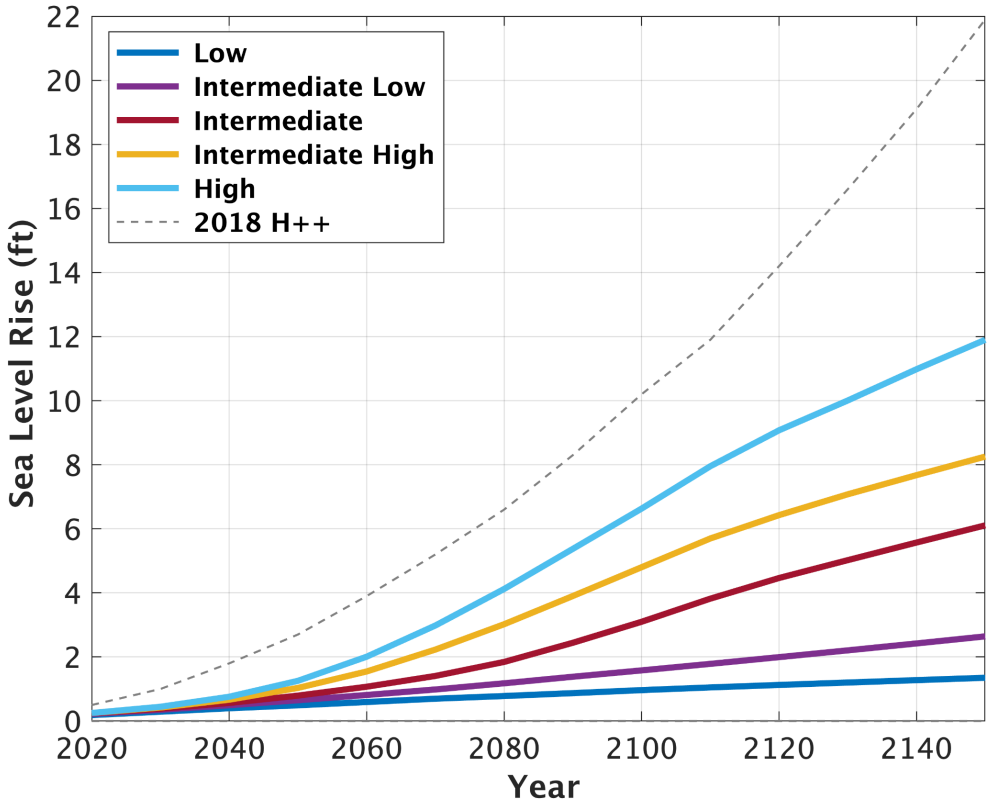
Ocean Protection Council (OPC) - Draft 2024 California Sea Level Rise Guidance

- OPC is a Cabinet-level state body that works jointly with state and federal agencies, NGOs, tribes and the public to ensure that California maintains healthy, resilient, and productive ocean and coastal ecosystems
- Mission is to protect California's coast and ocean by advancing innovative, science-based policy and management, making strategic investments, and catalyzing action via partnerships and collaboration
- OPC, in coordination with coastal and ocean state agencies and the Governor's Office of Planning Research, led the development of the 2017/2018 update to the **State's Sea Level Rise Guidance Policy**
- **Update January 2024:** OPC collaborated with the Ocean Science Trust and a scientific task force to update the California Sea Level Rise Guidance. The updated guidance expands upon the 2018 update. OPC has delivered an updated (draft) statewide guidance that includes: (1) an updated scientific understanding of statewide sea level rise and related coastal impacts (e.g. flooding); and (2) practical and pragmatic approaches for state agencies, local governments, and communities to use this new science across their respective planning efforts. This update aims to incorporate the most current scientific knowledge and improved planning and decision-making guidance to support preparedness for rising sea levels. The **2024 update has been released for public comment**
- View the public webinar held on February 5, 2024, to know more about the 2024 draft update: Public Webinar - Draft State of California Sea Level Rise Guidance: 2024 Science and Policy Update. – YouTube

Draft 2024 OPC SLR Guidance – Updated Sea Level Scenarios

SLR guidance for 2100

- Low-to-Intermediate span of possibilities without contribution from rapid ice sheet loss (medium confidence) 1.0-3.1 ft
- Intermediate-to-High span range of possibilities with contributions from uncertain rapid ice sheet loss (low confidence) 3.1 to 6.6 ft
- 2018 H++ is above the end of High Scenarios at all times and now **considered "physically unrealistic"**



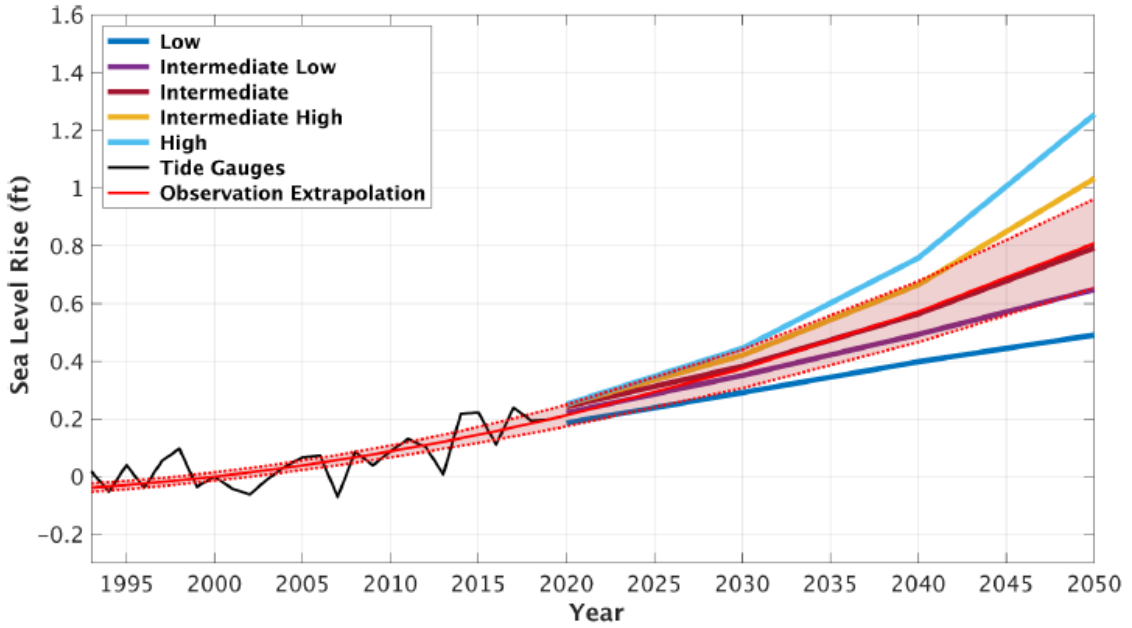
Medium confidence: Used to denote moderate agreement among experts on the model treatment of key processes (e.g., those used in the IPCC AR6 SSPs)

Low confidence: Used to denote a low level of agreement on how models represent key processes (e.g., partial, rapid ice sheet disintegration) and limited evidence supporting model outputs

Note: Information given on this slide is sourced from 2/5/2024 OPC webinar: Public Webinar - Draft State of California Sea Level Rise Guidance: 2024 Science and Policy Update. – YouTube

Draft 2024 OPC SLR Guidance - Near-Term SLR (2020-2050)

- Range in 2050 across scenarios is less than 8 inches and much narrower than past reports
- Observations are consistent with intermediate scenario
- Scenarios show **"greater certainty"** in the next 30 years than previous reports
- Sea levels **"most likely to rise 0.8 ft"** by 2050 (Intermediate Scenario)



Key Takeaways

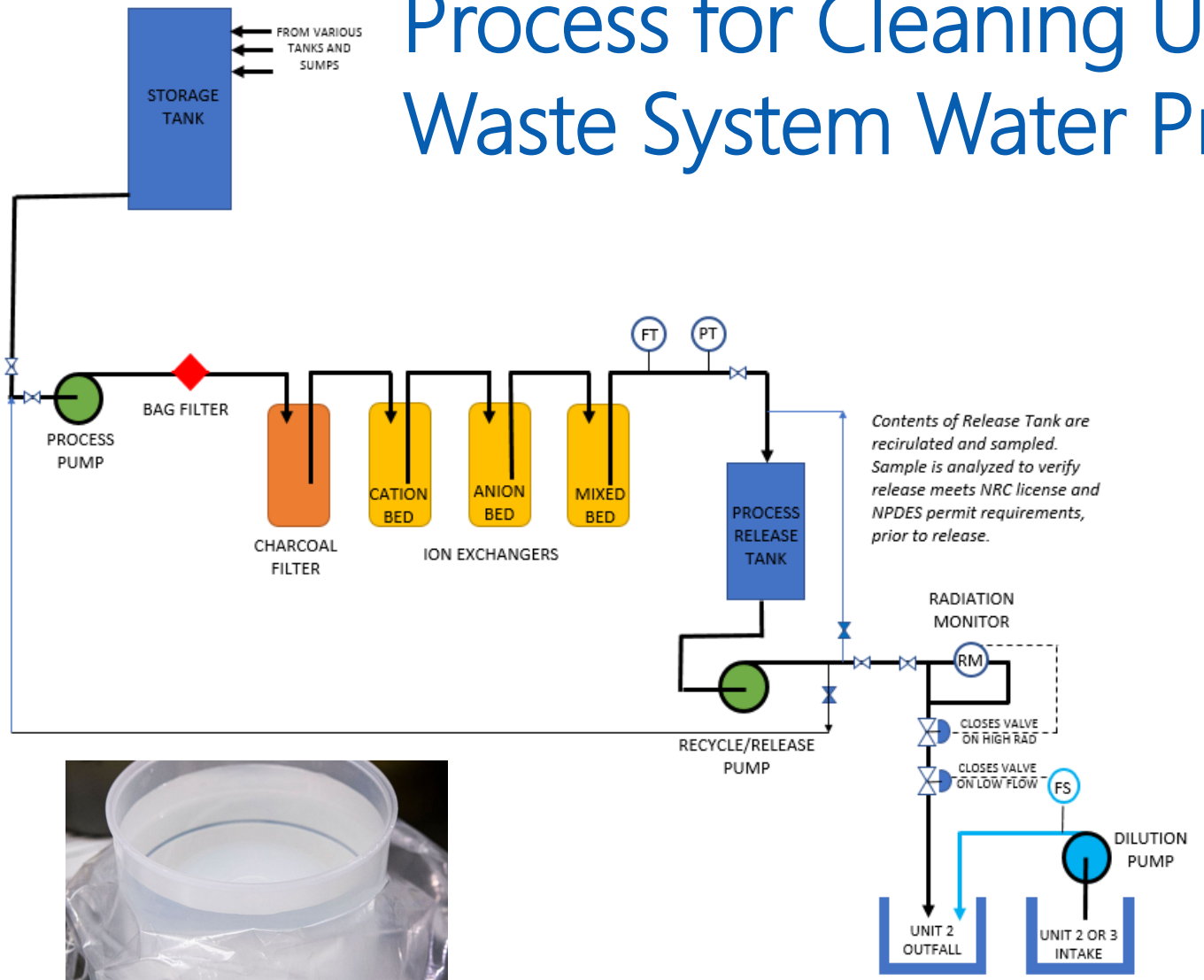
- There is greater certainty and a narrowing range of the amount of sea level rise in the next 30 years. Statewide, sea levels are most likely to rise 0.8 ft (Intermediate Scenario) by 2050
- By 2100, statewide sea levels are most likely to rise between 1.6 ft and 3.1 ft 9Int-Low to Intermediate Scenarios), although higher amounts cannot be ruled out
- The extreme sea level rise scenario (i.e., H++) from Rising Seas 2017 is much higher than best available science suggests

Note: Information given on this slide is sourced from 2/5/2024 OPC webinar: Public Webinar - Draft State of California Sea Level Rise Guidance: 2024 Science and Policy Update. – YouTube

Liquid Batch Releases Update

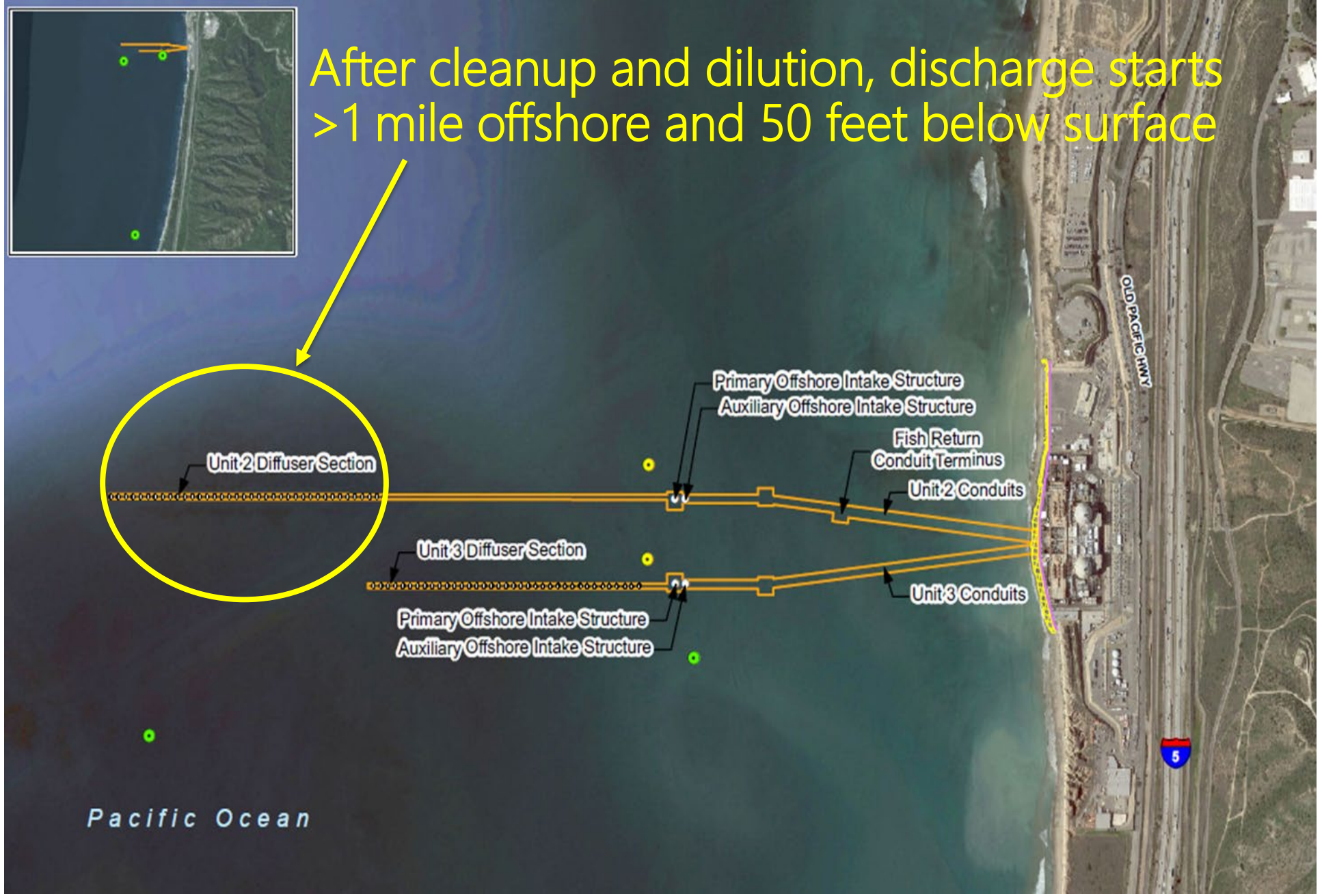
Ron Pontes
General Manager
Environmental, Waste and Radiation Protection

Process for Cleaning Up Radioactive Waste System Water Prior to Release



Sample of water after cleanup

- Ocean discharges permitted by SONGS National Pollution Discharge Elimination System (NPDES) Permit
  - Federal program administered by the CA State Water Boards
  - Establishes limits on what can be discharged
  - Provides monitoring and discharge limits
- Discharge of radioactive materials is exclusively regulated by US NRC and subject to 10CFR20 and 10CFR50
  - SONGS NRC license establishes limits for releases of radioactivity


After cleanup and dilution, discharge starts >1 mile offshore and 50 feet below surface
Primary Offshore Intake Structure
Auxiliary Offshore Intake Structure
Fish Return Conduit Terminus
Unit 2 Diffuser Section
Unit 2 Conduits
Unit 3 Diffuser Section
Unit 3 Conduits
Primary Offshore Intake Structure
Auxiliary Offshore Intake Structure
OLD PACIFIC HWY
5
Pacific Ocean

Liquid Batch Releases Pose No Harm

2023 Actuals

Month	Volume (Gallons)
February	25,546
February	85,542
March	120,734
May	45,050
June	119,515
June	73,670
July	119,250
October	119,250
November	97,815
November	90,100
December	105,364
Total	**1,001,836**

Total Dose:	***0.024 mrem***

2024-2025 Planned Releases

- In 2024, an estimated 1,450,000 gallons of cleaned up water from the spent fuel pools, reactor cavities, hydrolyzing, and rainwater is planned for release
  - Batch volumes vary from 75,000 to110,000 gallons
  - Planned tempo – one to two per month from mid-February through October
- In 2025, anticipated volume of releases is presently estimated to be less than 100,000 gallons

- Releases pose no harm to people, or the environment as supported by decades of independent monitoring
- Water is cleaned up well below SONGS NRC license requirements (<1.5 mrem/qtr. and <6 mrem/yr.)
- SONGS provides 48-hour advance notice of batch releases to the public via songscommunity.com

Reef and Wetlands Technical Review Workshops

- Projects required by CA Coastal Commission to compensate for impacts of SONGS operations on coastal marine resources
  - More information at https://marinemitigation.msi.ucsb.edu/

- Wheeler North Kelp Reef
  - Monday, April 8, 2024, 1:30 – 4:30 pm
  - Dana Point Women's Club Community House, 24642 San Juan Ave.

- San Dieguito Wetlands
  - Thursday, May 9, 2024, 1:30 – 4:30 pm
  - Del Mar City Hall, 1050 Camino Del Mar

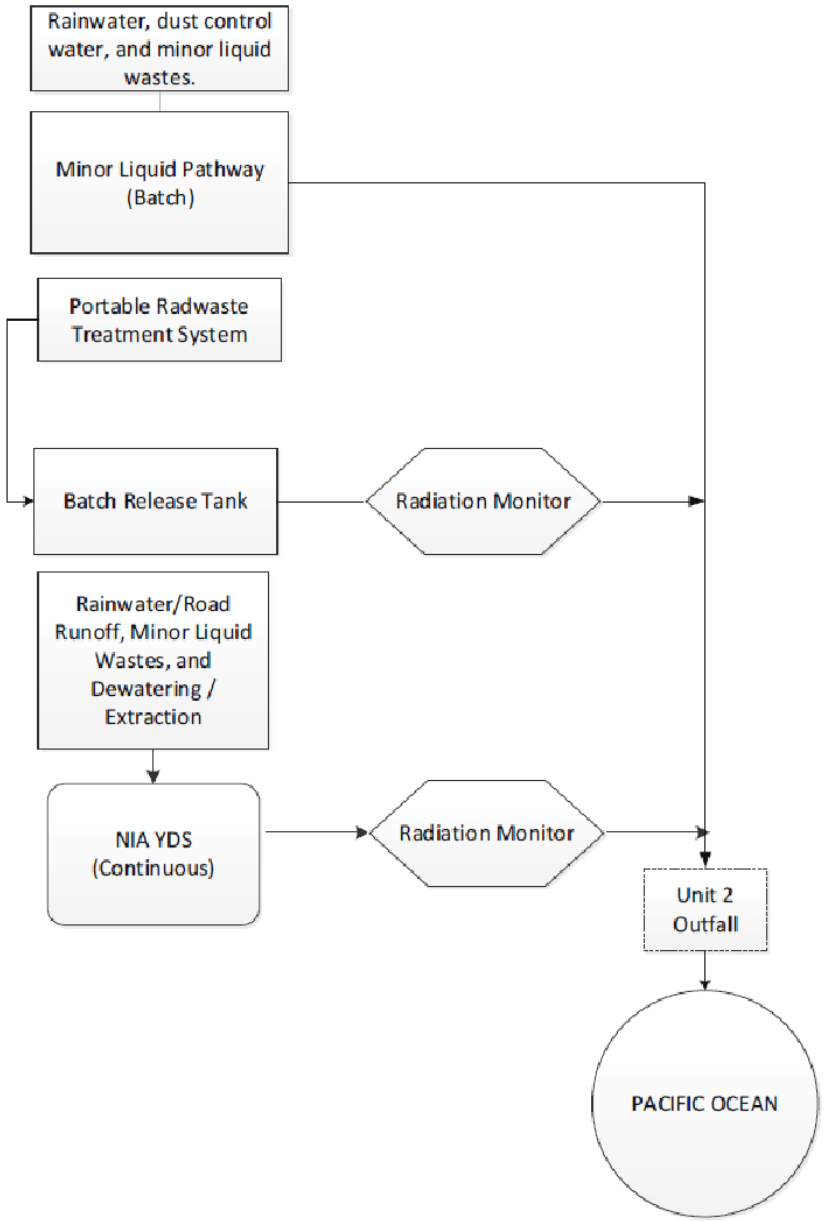


Radiological Environmental Monitoring Program

Gary Huff
Radiation Safety Manager, Energy*Solutions*

Radioactive Effluent Control Program (RECP)

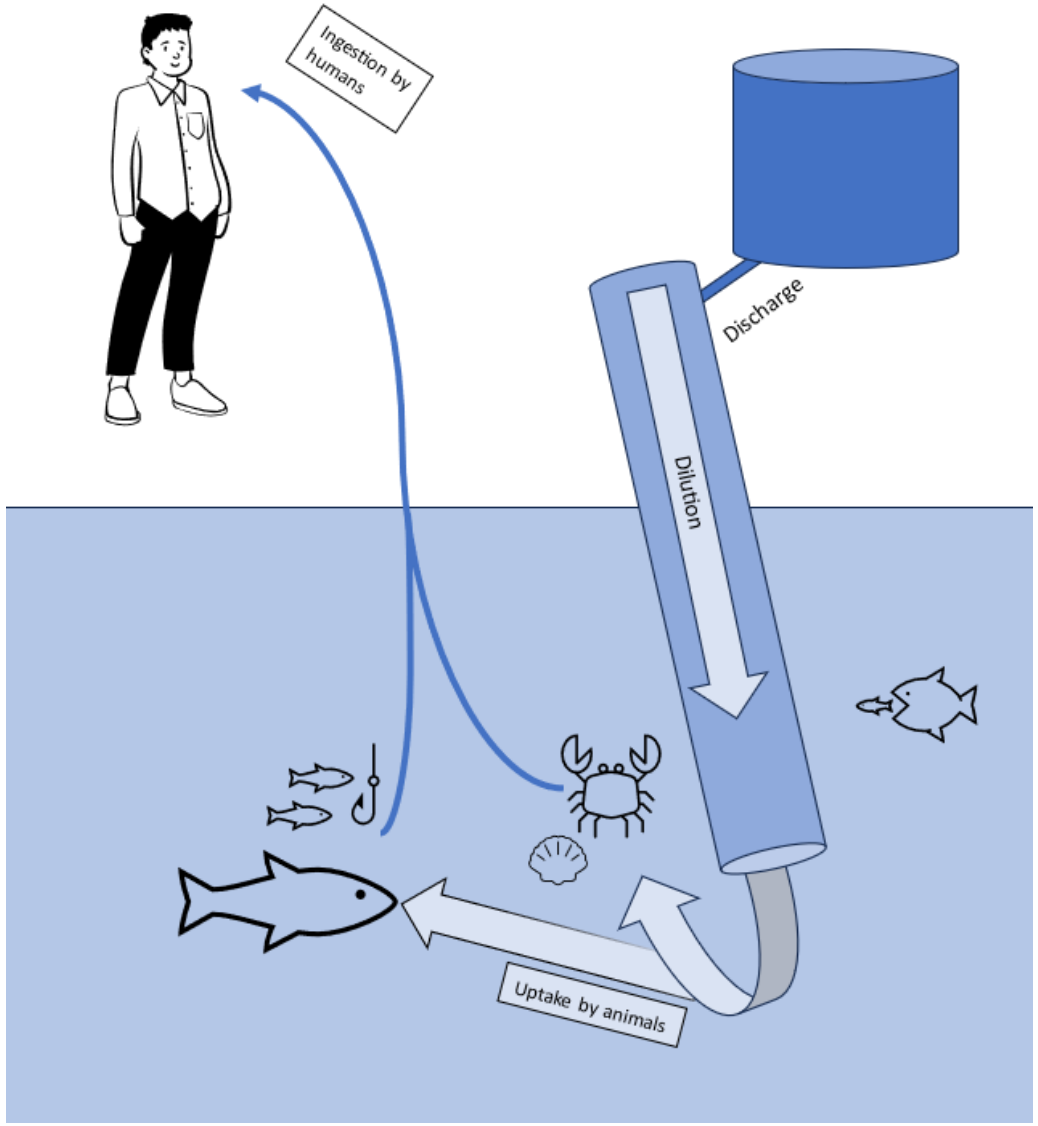
- Provides release requirements
  - Sampling
  - Concentration limits
  - Dose limits
- Releases measured prior to dilution in environment
- Provides information for dose calculations
- Results reported in Annual Radioactive Effluent Release Report (ARERR)



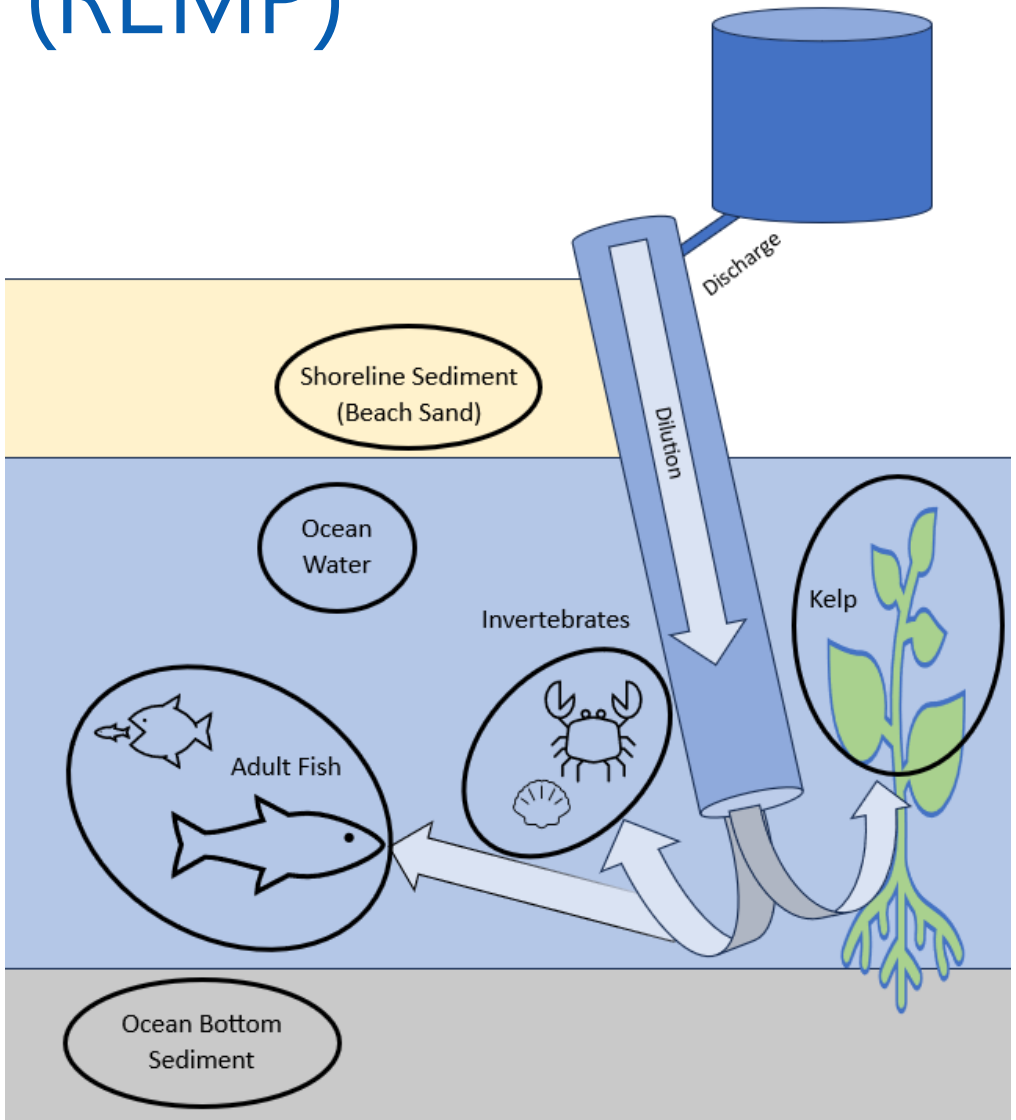
SONGS Radioactive Liquid Waste Effluent Systems from SONGS ODCM (Figure 4-5)

Liquid Dose Modeling

- Liquid release doses modeled for human ingestion
  - Other liquid exposure not significant
- Calculation process:
  - Released Concentration measured before discharge
  - Diluted with Saltwater Dilution Flow
  - Bioaccumulation factor for fish and invertebrates
  - Consumption of fish and invertebrates by humans
  - Dose calculated based on amount of activity ingested



Radiological Environmental Monitoring Program (REMP)



SONGS Marine REMP Sample Types

- Monitors for accumulation in the environment over time
- Validates releases from RECP are accounted for
- Direct measurement of important dose pathways
  - Ingestion
  - Inhalation
  - Direct Radiation
- Results reported in Annual Radiological Environmental Operating Report (AREOR)

Independent Marine Sampling and Analysis

- Sampling Performed by MBC Aquatic Sciences
  - Monthly
    - Ocean Water
  - Semiannual
    - Marine Animals
    - Ocean Bottom Sediment
    - Shoreline Sediment
- Analyzed by an independent environmental laboratory
  - Some Samples Split with CDPH
    - Ocean Water
    - Marine Animals
    - Kelp
  - Results in Annual Radiological Environmental Operating Report (AREOR)



Trawling near SONGS

Photo courtesy of MBC Aquatic Sciences

Marine Monitoring

Photos courtesy of MBC Aquatic Sciences

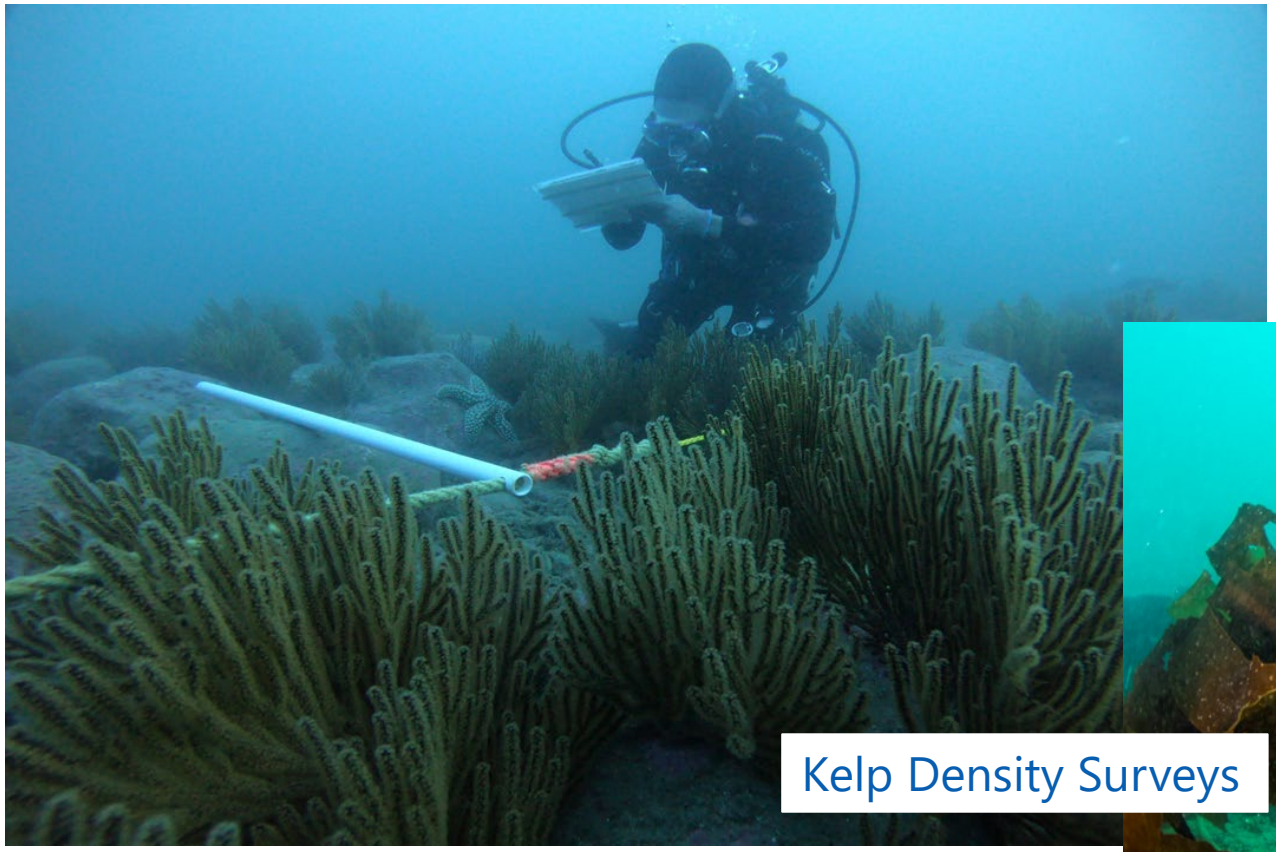


Bat Star with Gorgonian



Barred Sand Bass with Gorgonian

Marine Monitoring



Kelp Density Surveys



Kelp density marker

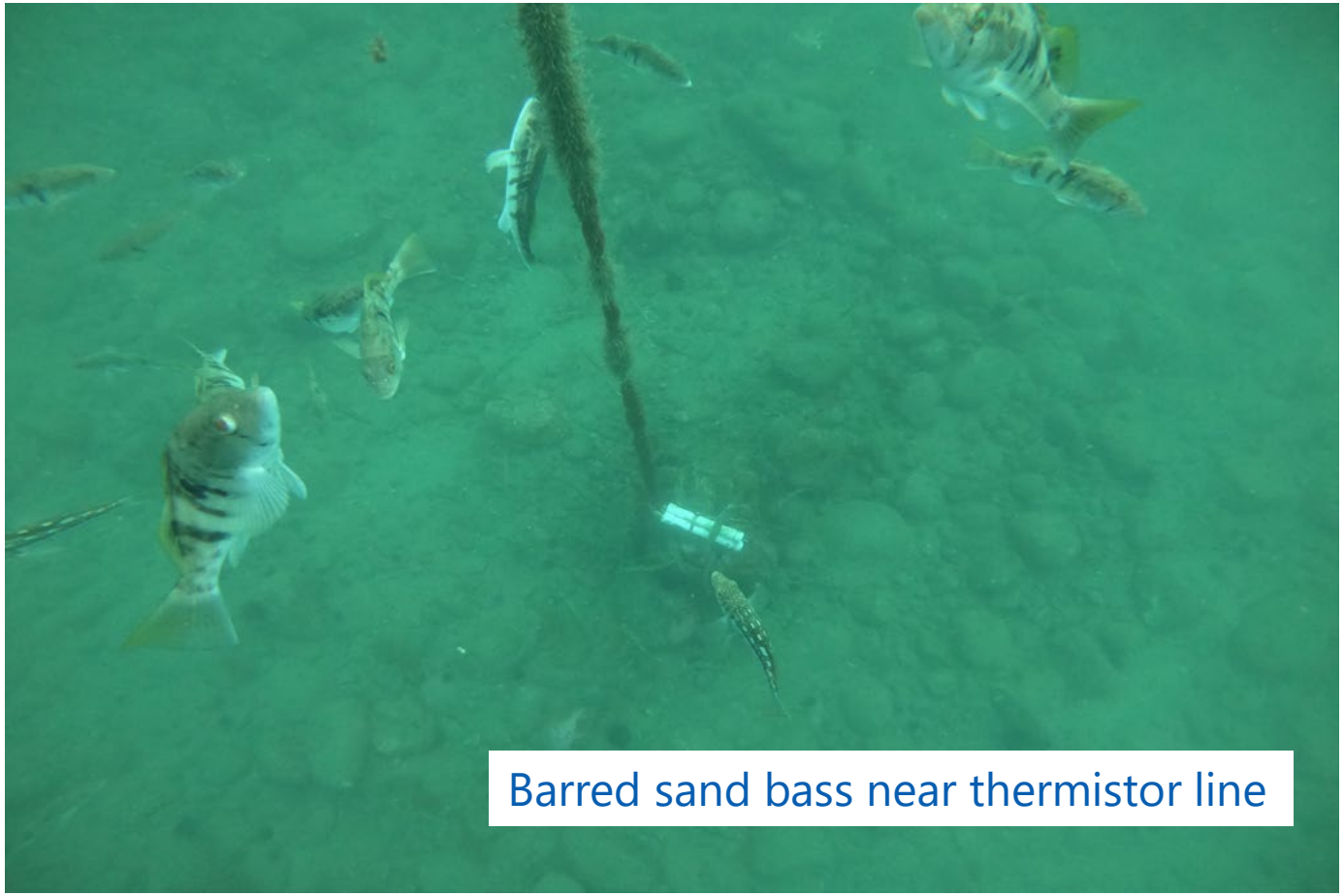


Photos courtesy of MBC Aquatic Sciences

Marine Monitoring


Giant black seabass


White sea goddess nudibranch on rock

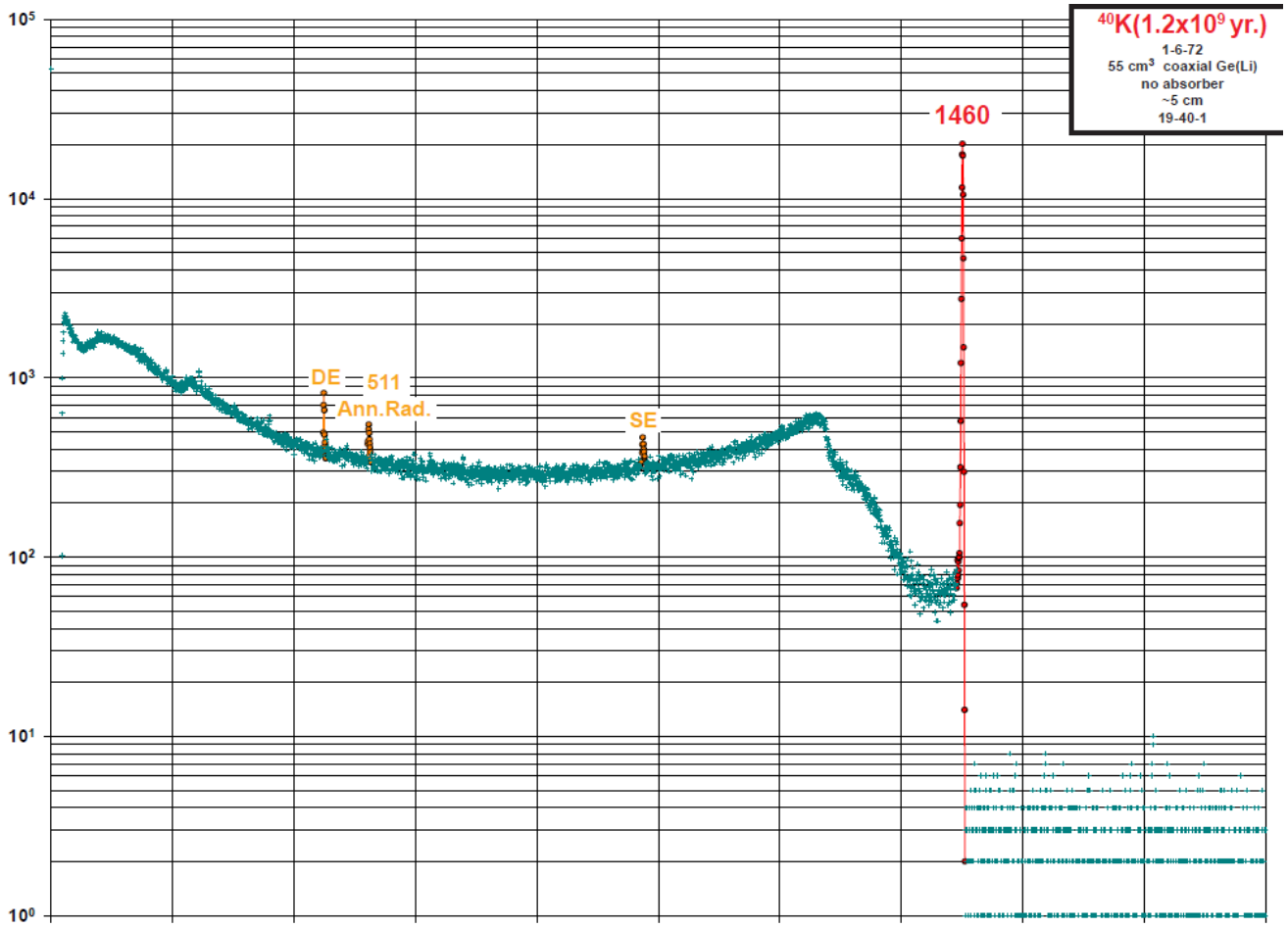

Barred sand bass near thermistor line

Photos courtesy of MBC Aquatic Sciences

REMP Sample Analysis Process

- Very sensitive instruments used
- Measurement process generally involves:
  - Measure calibration source
  - Measure blank
  - Measure sample
  - Quality Assurance Samples
  - Long count times used to reach low levels
- Results are evaluated individually and collectively
  - When positive, evaluated against expected concentration (based on effluent releases)

Example gamma spectrum for K-40



from Idaho National Labs Gamma-Ray Spectrum Catalogue
https://gammaray.inl.gov/SitePages/catalog_ge.aspx

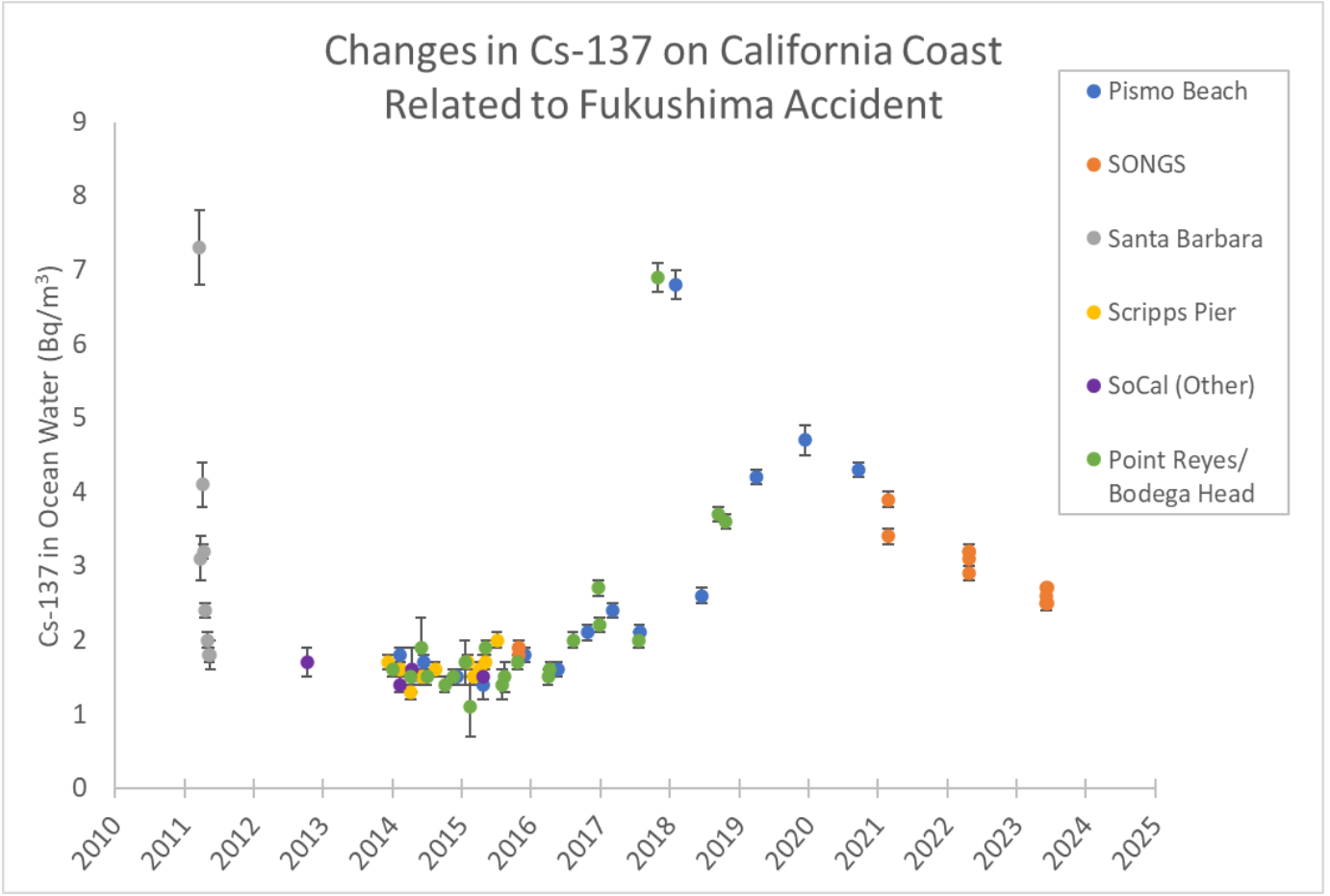
REMP Results Indicate No Impact



- **REMP Results indicate that SONGS has not had a detectable impact on the environment**
- Samples with Non-Natural Activity Identified not attributable to SONGS
  - Very low levels, not of health concern
  - Cs-137 from fallout in soil
    - Control and indicator locations have similar concentrations
  - Cs-137 in fish and invertebrates from fallout and Fukushima
    - Control and indicator locations have similar concentrations
  - I-131 in Kelp due to medical thyroid treatment (sewage)
    - Control and indicator locations have similar concentrations
    - I-131 has not been produced/released at SONGS since 2012
- SONGS REMP results available in Annual Radiological Environmental Operating Report (AREOR)
  - https://www.songscommunity.com/stewardship/environmental-monitoring-around-san-onofre

WHOI's Citizen Science Project (OurRadioactiveOcean.org)

- Tracked extremely low levels of Cs-137 in the Pacific Ocean to monitor releases from Fukushima Daiichi Accident.
  - Levels much lower than detectable by conventional analyses
  - Prior to accident, Cs-137 near California 2 Bq/m^3 (= 0.05 pCi/l)
    - Due to historical atmospheric weapon testing
- Observable Trends
  - Initial high concentrations at Santa Barbara in March-April 2011 due to airborne plume deposition/washout
    - Included Cs-134 detections initially
  - Return to prior levels ≤ 2 Bq/m^3
  - Increasing trend as plume of water reached coast
    - Spike at different sample locations in 10/2017 and 2/2018?
    - Trend peaks during 2019/2020
  - Decreasing concentrations as plume diffuses
    - Decreases too quickly to be due to decay
- Consistent with REMP results
  - No effect due to SONGS releases indicated



Data from Our Radioactive Ocean (from Woods Hole Oceanographic Institution, WHOI) indicates Cs-137 concentrations as observed at various California beach locations peaking around 2019 due to the Fukushima Daiichi accident. Results for SONGS are included from Our Radioactive Ocean (2015 results) and from data provided by Surfrider Foundation (2021, 2022, and 2023 results).

Data sources:

- https://ourradioactiveocean.org/current-results/
- https://www.surfrider.org/news/surfriders-beach-water-radiation-testing-at-san-onofre

Tritium (hydrogen-3)

- Naturally occurring isotope of hydrogen
  - One proton, two neutrons (H-3)
  - Low energy beta decay
    - No external dose hazard, only ingestion/inhalation
  - 12.3-year half-life
- Environmental Sources of Tritium
  - Atmospheric weapons testing
    - 5,030,000,000 Ci (5.03×10^9 Ci)
  - Natural H-3 produced in upper atmosphere due to cosmic particle interactions
    - 1,950,000 Ci/year (1.95×10^6 Ci/yr)
    - 34,600,000 Ci steady-state globally (3.46×10^7 Ci)
    - 54,600,000 Ci between 1970-1997 (5.46×10^7 Ci)
  - Global nuclear power (fuel reprocessing and power plant effluent releases)
    - 11,500,000 Ci (1.15×10^7 Ci) total through 1997
    - About 430,000 Ci/yr from 1970-1997 (4.30×10^5 Ci)



Data Source for environmental tritium source terms: UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes - Volume 1: Sources (https://www.unscear.org/unscear/en/publications/2000_1.html)

Note: UNSCEAR is United Nations Scientific Committee on the Effects of Atomic Radiation

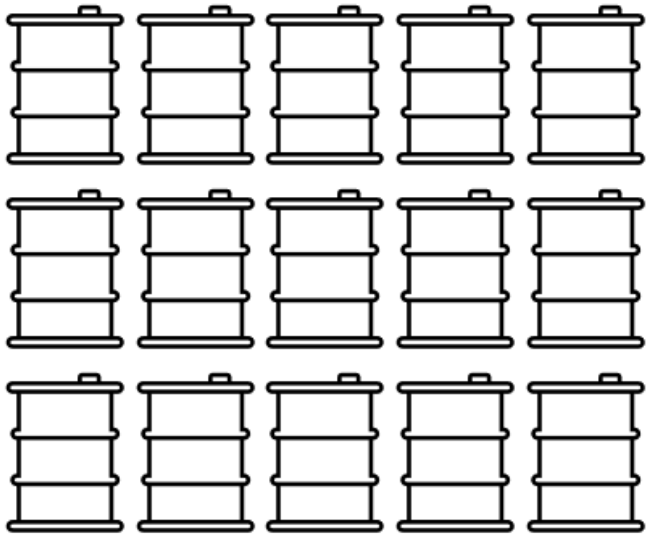
Tritium in the Environment

- Incorporated into water molecule
  - HTO (hydrogen-oxygen-tritium)
  - Disperses widely in water
  - Behaves like water in tissues
- Very low dose/risk nuclide
  - EPA Drinking Water Standard
    - 20,000 pCi/liter tritium in drinking water
      - Continuous use would result in 4 mrem/year
- Monitoring at SONGS
  - Not detectable in ocean water
  - Also monitored in onsite ground water
  - Minimum Detectible Activity <500 pCi/liter

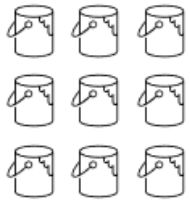


Comparison of Tritium Sources in the Environment

Atmospheric Testing
(827 gallons ≈ 15, 55-gal drums)



Natural
(9 gallons ≈ 9, 1-gal cans)



Global Nuclear Power
(1.9 gallons ≈ 2, 1-gal cans)



Note: Illustration not to scale.

- Converted to volume of tritiated water (HTO)
- Major sources normalized for comparison
  - Atmospheric weapons testing
    - All releases (most between 1961-1962)
    - 827 gallons (5.03×10^9 Ci)
  - Natural tritium production
    - From 1970-1997 to compare with power plant and fuel reprocessing releases
    - 8.98 gallons (5.46×10^7 Ci)
  - Global Nuclear Power releases
    - From 1970-1997
    - Includes both fuel reprocessing (major contributor) and effluent releases
    - 1.89 gallons (1.18×10^7 Ci)
- SONGS releases of tritium extremely small
  - For 2023, SONGS released 58 Ci of tritium
    - Equivalent to 36 µl (about 10/1,000,000 gal).
    - A drop of water is about 50 µl, so 2023 releases contained less than one drop of tritiated water. [NOTE: µl=microliters]

Data derived from: UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes - Volume 1: Sources (https://www.unscear.org/unscear/en/publications/2000_1.html)

SONGS Community Website



All samplings fall within the NRC limit guidelines. For a full analysis of the findings, please refer to the **2022 Annual Radioactive Effluent Release Report** and the **2022 SONGS Radiation Environmental Operating Report**.

See below for the most recent reports.

View Past Reports:
2023 | 2022 | 2021 | 2020

Ocean Water (WSA) Monthly	Marine Animals (MOA) Semi-Annually	Ocean Bottom Sediment (SEB) Semi-Annually	Shoreline Sediment (SSA) Semi-Annually	Kelp (AVC) Semi-Annually
January 2024				

- Interactive map and sample results for marine samples
  - Includes 9 indicator and 5 control sample locations
    - Monthly:
      - Ocean water
    - Semi-annually:
      - Marine animals
      - Ocean bottom sediment
      - Shoreline sediment
      - Kelp
- Links to current Annual Reports for SONGS (ARERR and AREOR)
- View past reports and data
  - Results continue to show no impact to the environment

https://www.songscommunity.com/stewardship/environmental-monitoring-around-san-onofre/interactive-map

Additional Resources

Health Physics Society Radiation Fact Sheets
- https://hps.org/hpspublications/radiationfactsheets.html
- https://hps.org/documents/tritium_fact_sheet.pdf

US Environmental Protection Agency, Radionuclide Basics: Tritium
- https://www.epa.gov/radiation/radionuclide-basics-tritium

US Nuclear Regulatory Commission Radiation Health Effects, Tritium Fact Sheet, Dose Calculator
- **https://www.nrc.gov/about-nrc/radiation/rad-health-effects.html**
- https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-tritium.html
- https://www.nrc.gov/about-nrc/radiation/around-us/calculator.html

American Nuclear Society
- https://www.ans.org/news/article-4450/the-trouble-with-tritium/

Fukushima InFORM (Canadian site for monitoring marine environment)
- https://fukushimainform.ca/

Our Radioactive Ocean, Woods Hole Oceanographic Institute (citizen science site)
- **https://ourradioactiveocean.org/current-results/**

Water Encyclopedia
- http://www.waterencyclopedia.com/Po-Re/Radionuclides-in-the-Ocean.html

FAQ Radiation
- **https://www.songscommunity.com/stewardship/environmental-monitoring-around-san-onofre/faq-radiation**

On a mission for radiation education
- https://www.songscommunity.com/decomm-digest/on-a-mission-for-rad-education

Radiation and Contamination by Dr. Patrick Papin (SDSU), May 20, 2020, CEP meeting
- **https://www.songscommunity.com/community-engagement/meetings/community-engagement-panel-meeting-20200421** - webpage contains the CEP meeting video and materials
- The Radiation and Contamination presentation is also provided in the appendix of this March 7, 2024, CEP presentation.

Public Comment

Dan Stetson

SAN ONOFRE COMMUNITY ENGAGEMENT PANEL

Directions for the public comment period:

To submit comments and questions in writing:

- Use the CEP Comment Form

To sign up to speak:

- Use the CEP Comment Form

Comments and questions will be addressed in the order received

Victor Cabral and Martha McNicholas will facilitate

SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

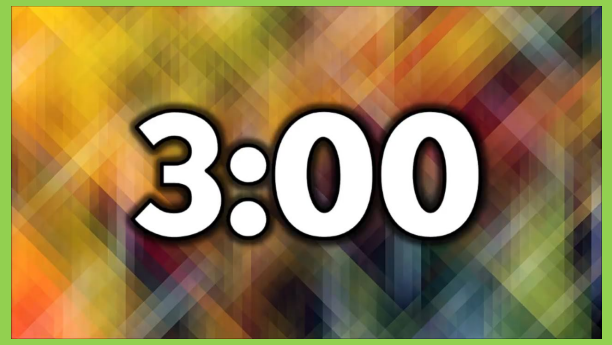
BREAK

Speaker Queue:

SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

Environmental Update
Public Comment

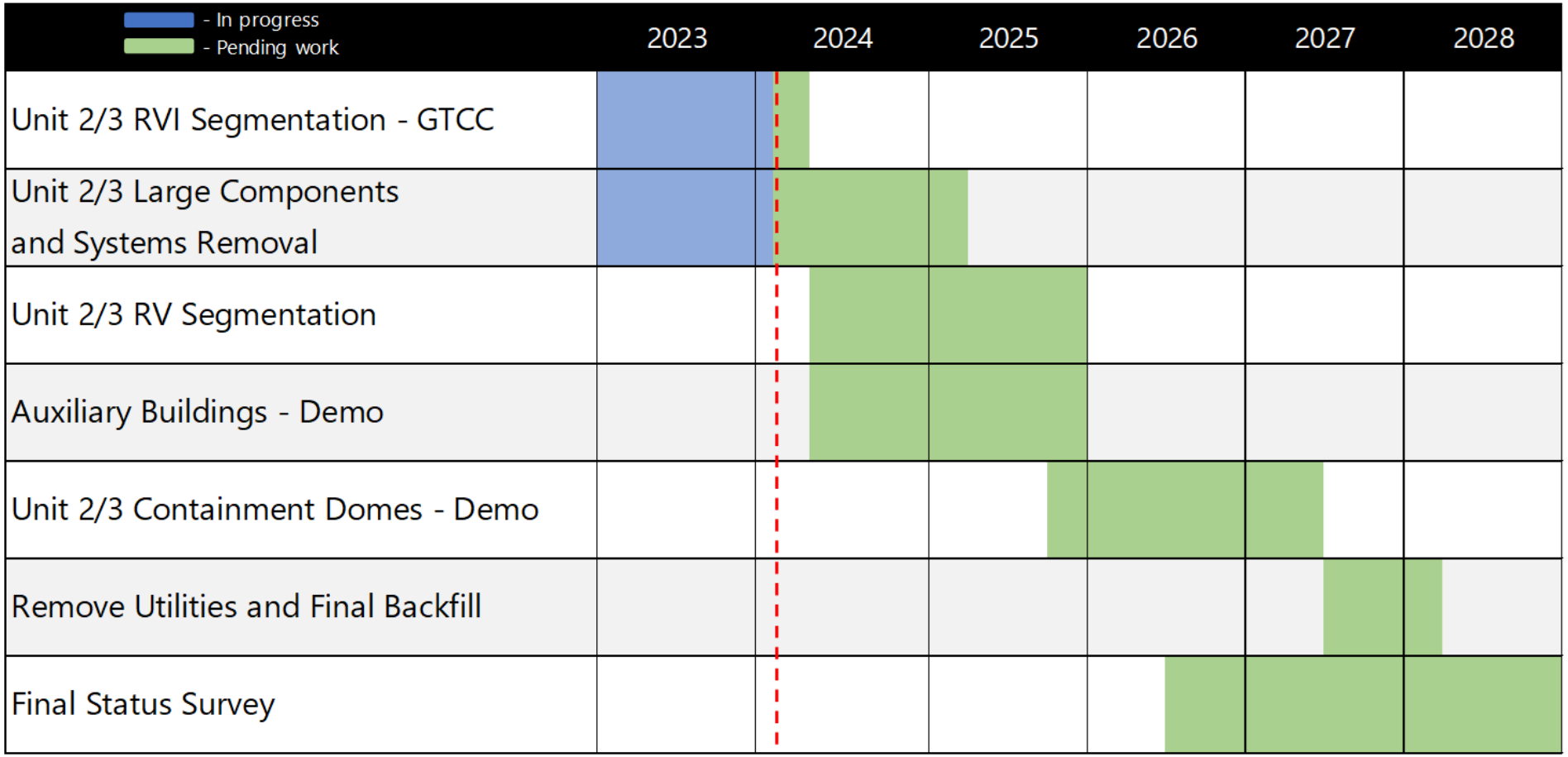
To sign up to speak online use the CEP Comment Form



SONGS Dismantlement Update

Vince Bilovsky
Director
Decommissioning Project

Dismantlement Project Schedule: Key Activities



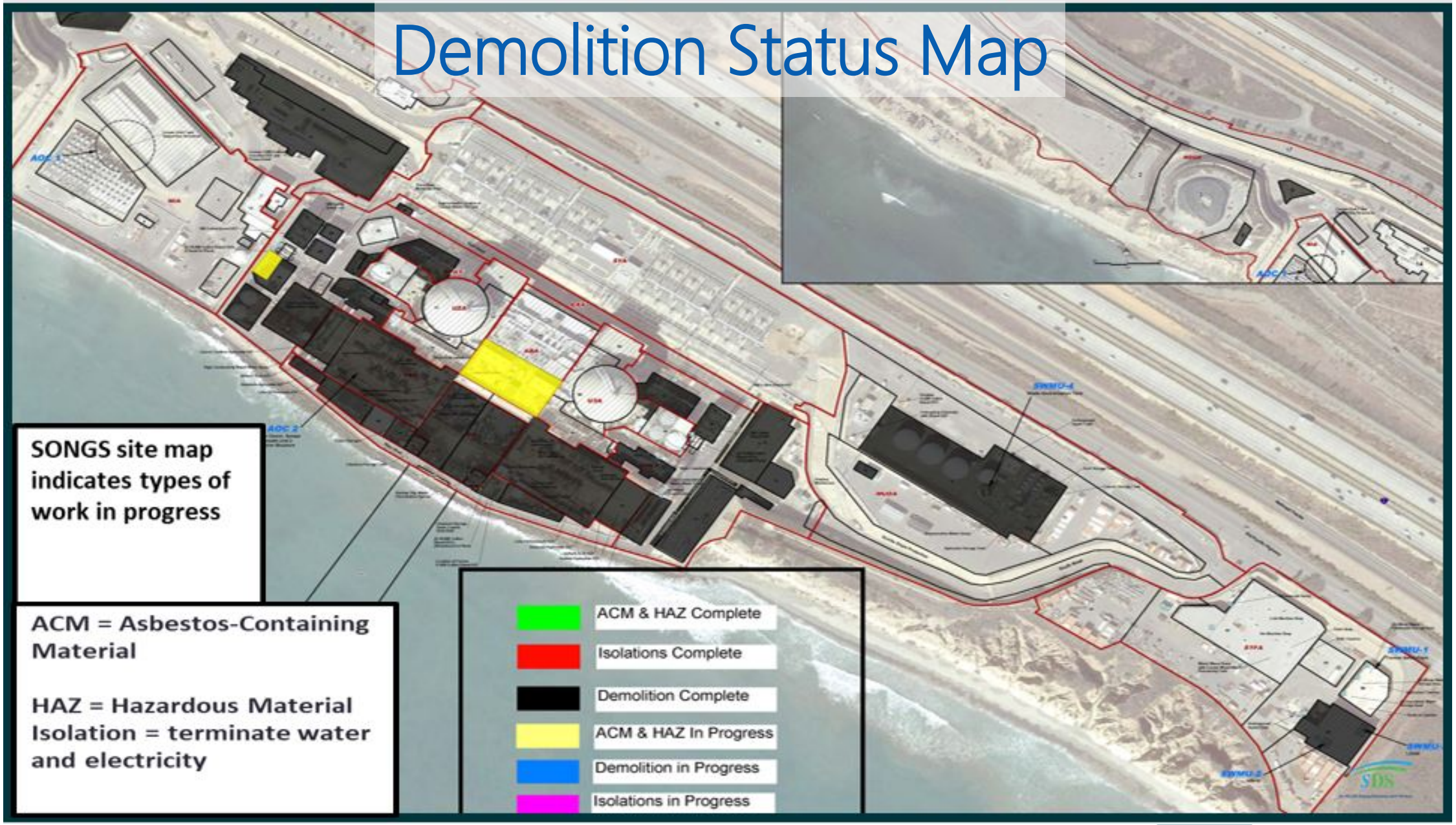
Demo - Demolition
GTCC - Greater Than Class "C" Waste
RV - Reactor Vessel (pressure vessel that houses reactor core and internal structures)
RVI - Reactor Vessel Internals (components that secured fuel in place during operation)

Decommissioning Work Activities

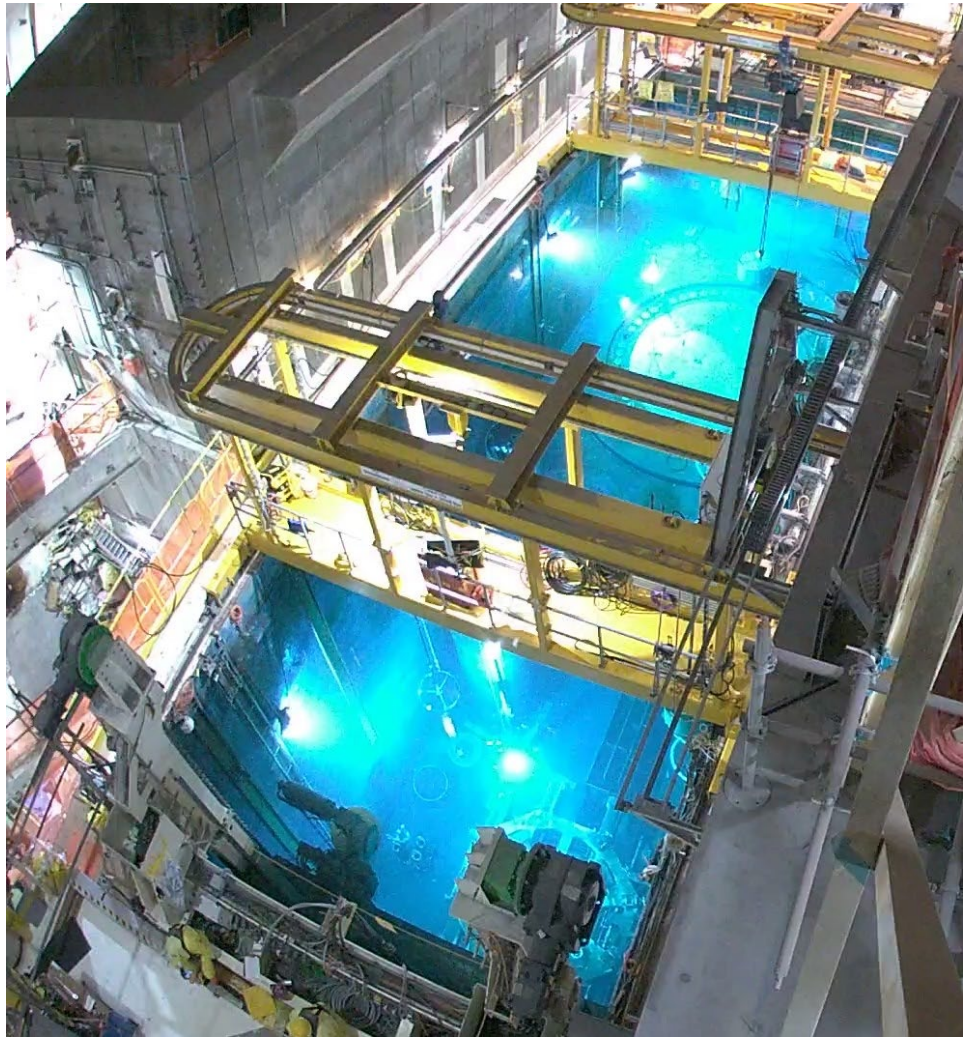
- Inside containment domes and power block buildings
  - Completed underwater cutting of Reactor Vessel Internals (RVI)
  - Ten of 12 GTCC[1] containers packaged, processed, and transferred to the Independent Spent Fuel Storage Installation (ISFSI)
  - Dismantlement of Steam Generators underway in Unit 2
  - Six of 8 Reactor Coolant Pump motors removed
  - Preparation for demolition of auxiliary buildings
- Outside work
  - Continued class A waste, recycling, and landfill shipments
  - Construction of a Materials Handling Facility nearly complete

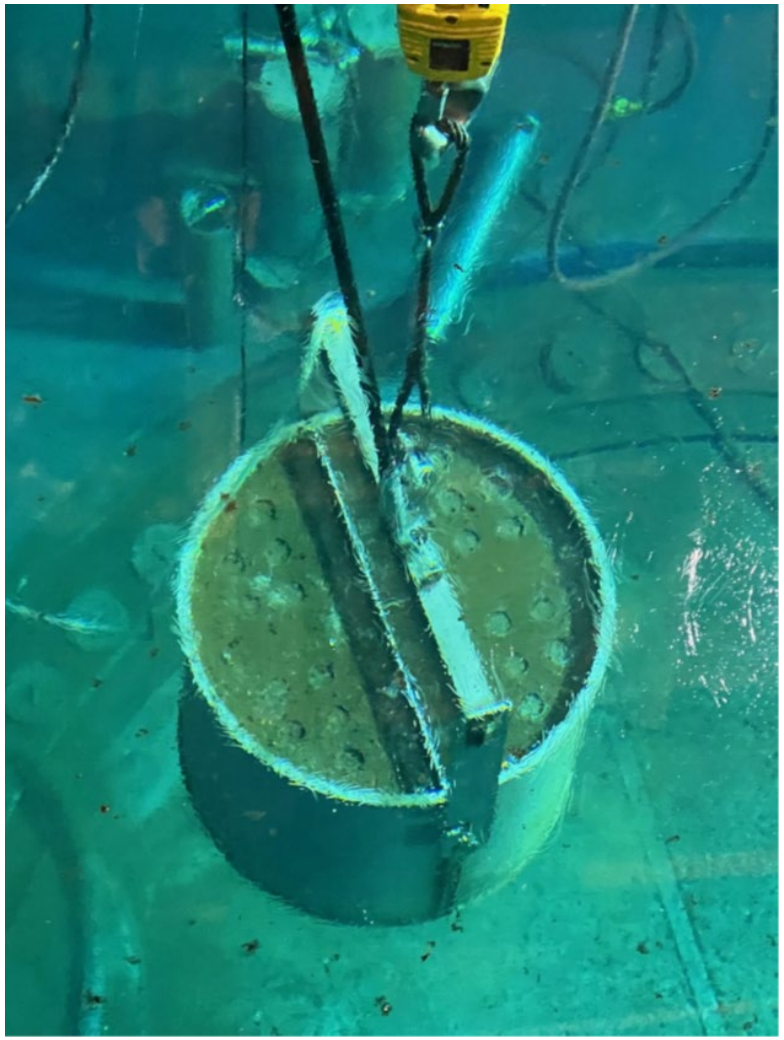
[1]Low-level radiological waste is characterized as Class A (most benign), B, C, or Greater-Than-Class C (GTCC); GTCC is most highly activated and stored much like spent fuel

Demolition Status Map

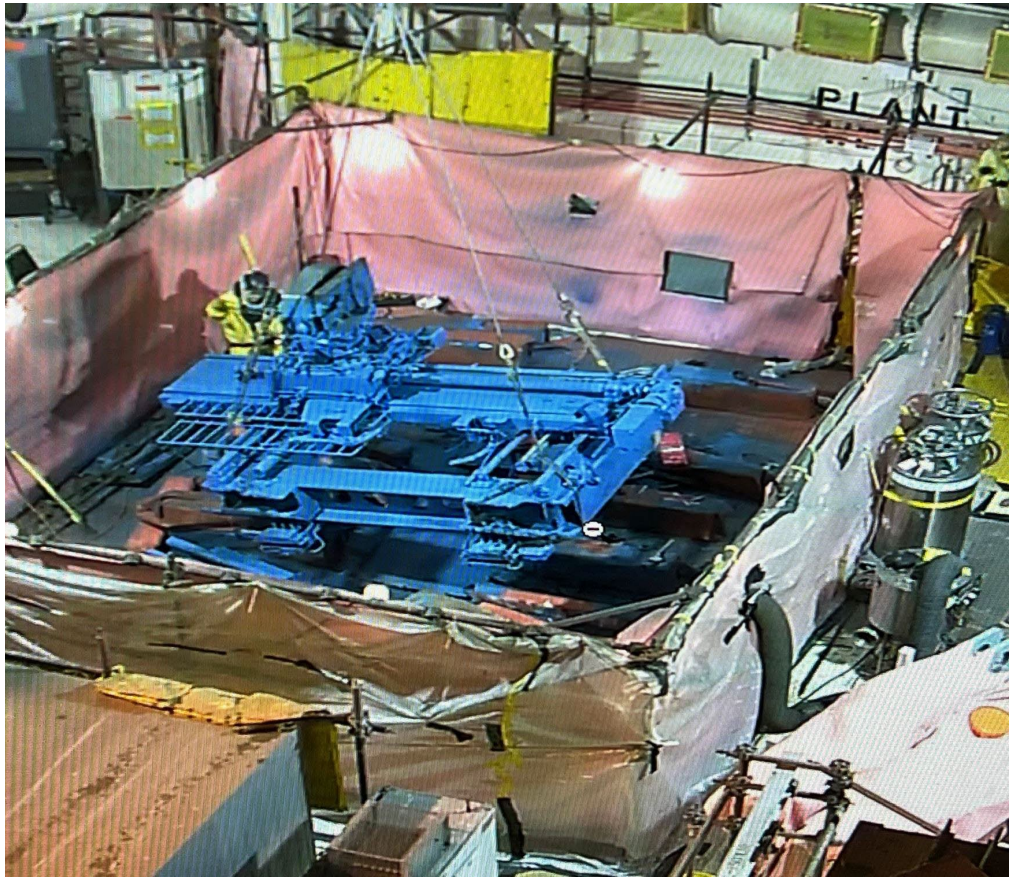


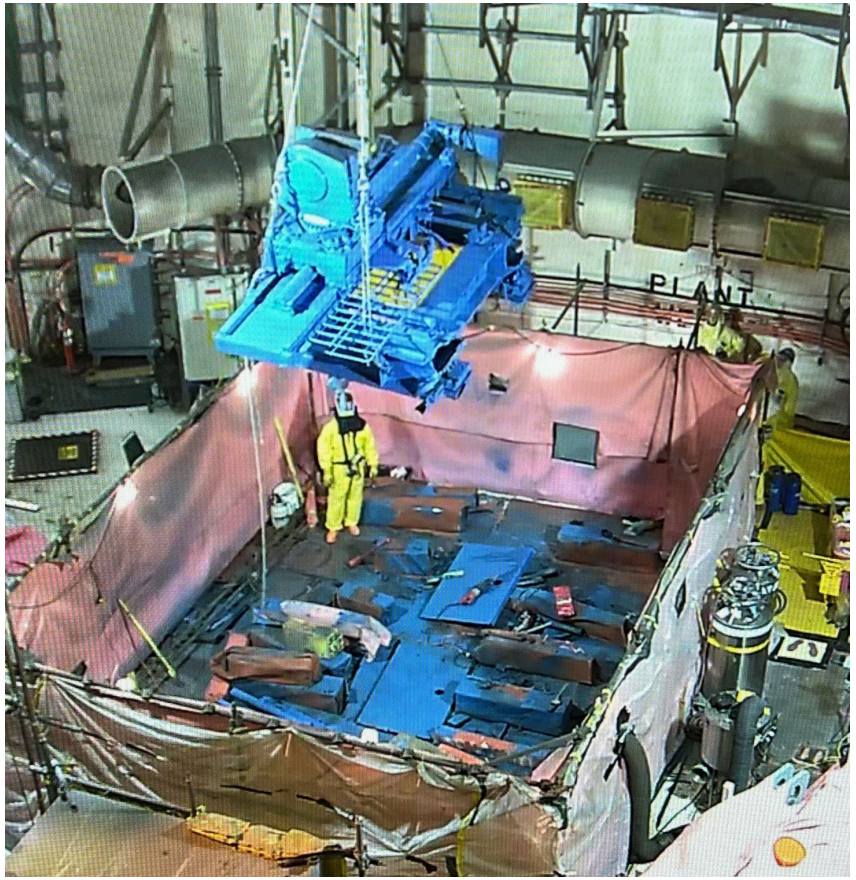
Unit 3 Containment, Chip Basket





RVI Cutting Station Disposal





Steam Generator Dismantlement



Reactor Coolant Pump Motor Removal





New Material Handling Facility Construction

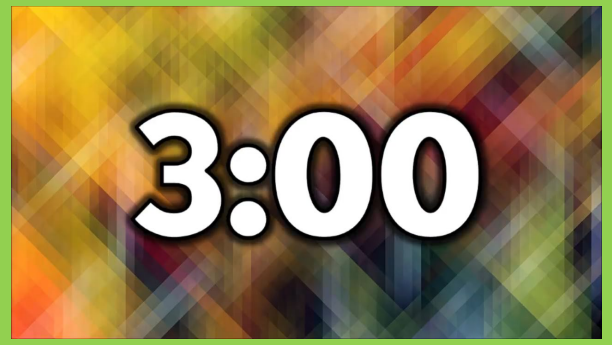


Speaker Queue:

SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

General Public Comment

To sign up to speak online use the CEP Comment Form



CLOSING COMMENTS

FRED BAILLY

KEY TAKEAWAYS

DAN STETSON

2024 CEP Meeting Schedule
(subject to change)

Focus Topics	Date
1Q CEP Regular Meeting SONGS Environmental Stewardship	March 7
CEP Member Consultation Meeting	April 9
2Q CEP Regular Meeting DOE Update on Consent-Based Siting for Federal Consolidated Interim Storage Facilities	May 23
3Q CEP Regular Meeting SONGS Plant Tour and Dismantlement Update by San Onofre Decommissioning*Solutions*	August 1
4Q CEP Regular Meeting SONGS Dismantlement Update	October 24
CEP Member Consultation Meeting	December 10

SAN ONOFRE
COMMUNITY
ENGAGEMENT
PANEL

Thank you
Stay safe and healthy

Acronyms

ACM	Asbestos Containing Material
AHSM	Advanced Horizontal Storage Module
ALARA	As Low As Reasonably Achievable
AMP	Aging Management Program
AREOR	Annual Radiological Environmental Operating Report
ASME	American Society of Mechanical Engineering
C&D	Cold & Dark
CAP	Corrective Action Program
CCC	California Coastal Commission
CBS	Core Barrel Support
CCR	Current Conditions Report
CDP	Coastal Development Permit
CDPH	California Department of Public Health
CEC	California Energy Commission; Cavity Enclosure Container
CEP	Community Engagement Panel
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH&S	Corporate Health & Safety
CIS	Consolidated Interim Storage
CNO	Chief Nuclear Officer
CPEN	Camp Pendleton
CPUC	California Public Utilities Commission
CSLC	California State Lands Commission
D&D	Decontamination & Dismantlement
DA	Decommissioning Agreement; Decommissioning Agent
DCE	Decommissioning Cost Estimate
DGC	Decommissioning General Contractor
DGCL	Derived Concentration Guideline Levels
DID	Defense-in-Depth
DOE	Department of Energy
DoN	Department of Navy

DOR	Division of Responsibility
DPH	Department of Public Health
DSAR	Defueled Safety Analysis Report (replaces FSAR)
DSC	Dry Storage Canister
D-SEIS	Draft Supplemental Environmental Impact Statement
D-SER	Draft Safety Evaluation Report
DSFM	Division of Spent Fuel Management (NRC)
DTF	Decommissioning Trust Fund
DTSC	Department of Toxic Substances Control
EAL	Emergency Action Level
EH&S	Environmental, Health & Safety
EIR	Environmental Impact Report (under CEQA)
EIS	Environmental Impact Study (under NEPA)
EP	Emergency Plan
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ERO	Emergency Response Organization
ET	Experts Team
FA	Fuel Assembly
FEIR	Final Environmental Impact Report
FERC	Federal Energy Regulatory Commission
FSAR	Final Safety Analysis Report
FSS	Final Status Surveys
FSSR	Final Status Survey Report
FTO	Fuel Transfer Operations; Field Training Officer
GTCC	Greater Than Class C (Waste)
HAZ	Heat Affected Zone
HI-TRAC	Holtec International Transfer Cask
Hi-PORT	Holtec International Transporter
HI-STORM	Holtec International Storage Module
HSM	Horizontal Storage Module

Acronyms

IOEP	ISFSI-Only Emergency Plan
IPC	Interjurisdictional Planning Committee
IRMS	ISFSI Radiation Monitoring System
ISA	Industrial Security Area
ISFSI	Independent Spent Fuel Storage Installation
LAR	License Amendment Request
LLRW	Low-Level Radioactive Waste
LOED	Large Organism Exclusion Device
LTP	License Termination Plan
MARSSIM	Multi-Agency Radiation Survey Site & Investigation Manual
MOU	Memorandum of Understanding
MPC	Multi-Purpose Canister
NDTF	Nuclear Decommissioning Trust Fund
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NOP	Notice of Preparation
NOV/IO	Notice of Violation and Investigative Order
NPDES	National Pollutant Discharge Elimination System
NPP	Nuclear Power Plant
NRC	Nuclear Regulatory Commission
NTP	Notice to Proceed
NUREG	Nuclear Regulation
NUHOMS	Nutech Horizontal Modular Storage
OC	Orange County
O&M	Operation & Maintenance
OE	Operating Experience
OSHA	Occupational Safety & Health Administration
PA	Protected Area
PDEP	Permanently Defueled Emergency Plan
PDTS	Permanently Defueled Technical Specifications
PPE	Personal Protective Equipment
PSDAR	Post-Shutdown Decommissioning Activities Report

Q&A	Questions and Answers
RECP	Radioactive Effluents Control Program
REIR	Request for Environmental Impact Review
REMP	Radiological Environmental Monitoring Program
RP	Radiological Protection
RPV	Reactor Pressure Vessel
RSI	Request for Supplemental Information
RV	Reactor Vessel
RVI	Reactor Vessel Internals
RWQCB	Regional Water Quality Control Board
SCE	Southern California Edison
SD	San Diego
SDDEH	San Diego Department of Environmental Health
SDS	SONGS Decommissioning*Solutions*
SFP	Spent Fuel Pool; Support Foundation Pad (ISFSI)
SFPI	Spent Fuel Pool Island
SLC	State Lands Commission (CA)
SLR	Sea Level Rise
STP	Sewage Treatment Plant
SWPPP	Storm Water Pollution Prevention Plan
T&D	Transmission & Distribution
TBA	To Be Announced
TBD	To Be Determined
TEDE	Total Effective Dose Equivalent
UFSAR	Updated Final Safety Analysis Report
UGS	Upper Guide Structure
UT	Ultrasonic Testing
UU	Unrestricted Use
VCT	Vertical Canister Transporter
VLLW	Very Low-Level Waste
VRS	Volume Reduction Station
WNR	Wheeler North Reef (Marine Mitigation)
WHOI	Woods Hole Oceanographic Institution

APPENDIX

RADIATION AND CONTAMINATION

SAN ONOFRE NUCLEAR GENERATING STATION COMMUNITY ENGAGEMENT PANEL MAY 28, 2020

DR. PATRICK PAPIN

DEPARTMENT OF PHYSICS

GRADUATE PROGRAM IN HOMELAND SECURITY

SAN DIEGO STATE UNIVERSITY

TOPICS OF DISCUSSION

- Radiation
- Exposure and Contamination
- Shielding
- Dose Perspective
- What is Safe?

RADIATION

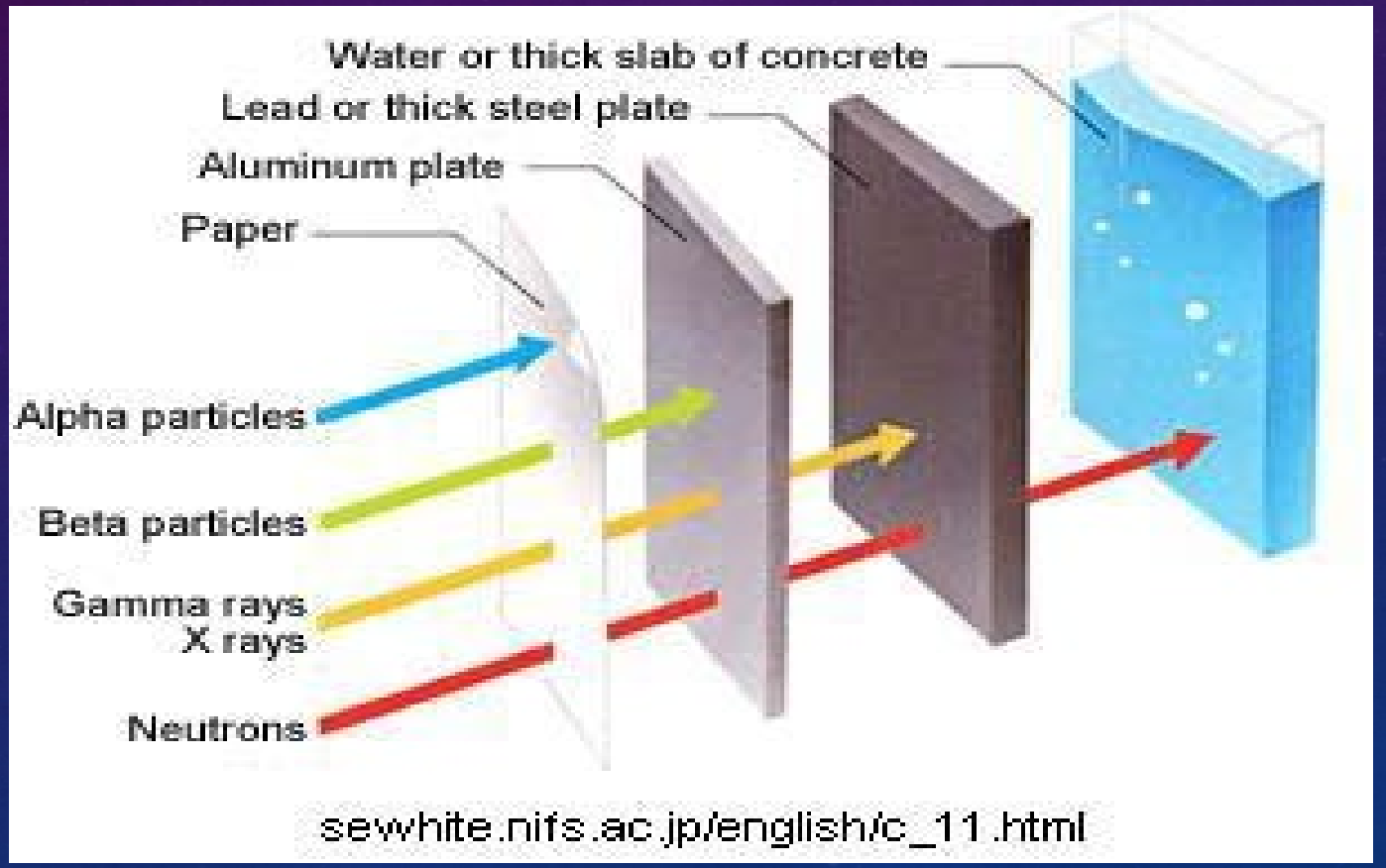
- Energy given off by matter in the form of rays or high-speed particles
- Ionizing radiation removes electrons from atoms, causing the atoms to become electrically charged ions
  - *Alpha particles*
  - ***Beta particles***
  - ***Gamma Rays***
  - *X Rays*
  - *Neutrons*

EXPOSURE AND CONTAMINATION

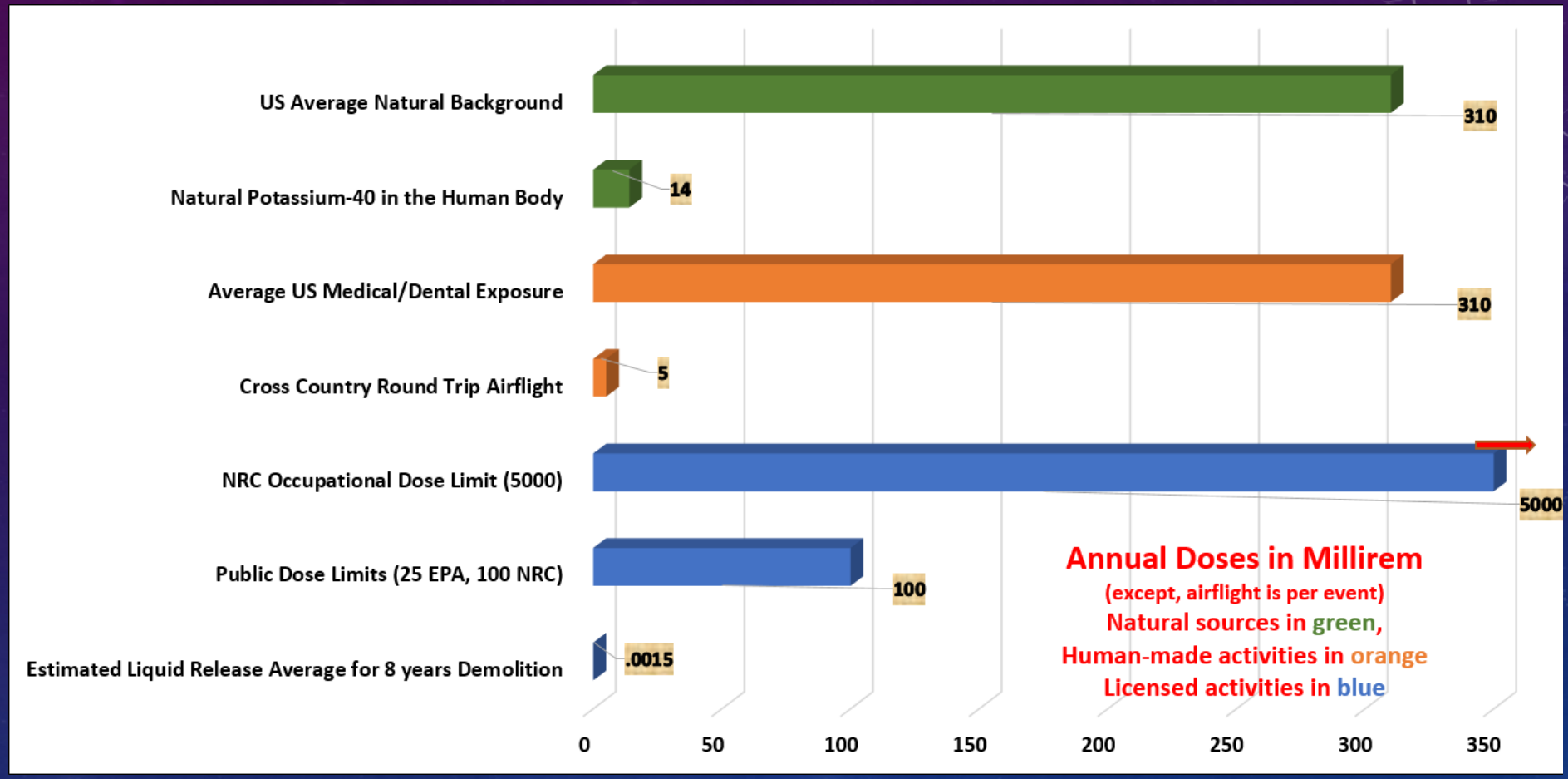
- Exposure
  - The act or condition of being subject to radiation
- Minimizing exposure
  - Time, distance and shielding (all used SONGS)
- Contamination
  - Radioactive material present in any substance, area, or on any surface where it is unwanted or unexpected
- Dose
  - Absorbed energy and potential biological effects

SHIELDING

Thick steel and concrete are used for dry storage at San Onofre



DOSE PERSPECTIVE



WHAT IS SAFE ?

- Radiation annual dose limits
  - Federal occupational dose limit 5000 millirem
  - (Lower) SONGS worker dose limit 1500 millirem
  - NRC and SONGS limits for the public 100 millirem
- Limits set to safe levels by NRC and recommended by various national and international agencies[1]
- At these limits there is:
  - Nearly no chance of deterministic effects (e.g. hair loss)
  - Minimal risk of stochastic effects (e.g. cancer)

[1] Safe levels are recommended by the National Council on Radiation Protection & Measurements and the International Commission on Radiological Protection

TO BE CONTINUED…….

QUESTIONS?

Contact Info:

ppapin@sdsu.edu

https://physics.sdsu.edu/ppapin/

https://homelandsecurity.sdsu.edu/