Enclosure 1
VBWR Environmental Report

Vallecitos Nuclear Center
GE-Hitachi Nuclear Energy

Vallecitos Boiling Water Reactor Environmental Report

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LIST OF ACRONYMS AND ABBREVIATIONS

A	
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
AMM	Avoidance and Minimization Measures
APE	Area of Potential Effects
B	
BMP	Best Management Practices
BSA	Biological Study Area
C	
CA	California
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
CPPR	Construction Permit Power Reactor
CRLF	California red-legged frog
CTS	California tiger salamander
CWA	Clean Water Act
D	
DOE	U.S. Department of Energy
DPR	Developmental Power Reactor
E	
ER	Environmental Report
ESA	Endangered Species Act
ESADA	Empire States Atomic Development Associates
EVESR	ESADA Vallecitos Experimental Superheat Reactor
F	
FEW	fresh emergent wetland
FSW	Forested shrub wetland
FT	Federally Threatened
G	
GE	General Electric
GEH	General Electric - Hitachi
GEIS	Generic environmental impact statement
GETR	GE Test Reactor (GETR)
H	
HASP	Health and Safety Plan
HEPA	High-Efficiency Particulate Air Filter
L	
LPSDAR	Limited Post Shutdown Decommissioning Activities Report
LLRW	Low-level radioactive Waste
M	
MBTA	Migratory Bird Treaty Act
N	
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service

NMSS	Nuclear Material Safety and Safeguards
NRC	Nuclear Regulatory Commission
O	
OSHA	The Occupational Safety and Health Administration
OSL	Optically Stimulated Luminescence
OWUS	Other Waters of the U.S.
P	
PG&E	Pacific Gas and Electric
S	
S2S	Surf to Snow Environmental Resource Management, Inc.
SFDFW	San Francisco dusky-footed woodrat
SHPO	State Historic Preservation Officer
SR	State Route
T	
THPO	Tribal Historic Preservation Officer
TLD	Thermoluminescent Dosimeter
TX	Texas
U	
USACE	U.S. Army Corps of Engineers
USCB	US Census Bureau
USFWS	U.S. Fish and Wildlife Service
V	
VBWR	Vallecitos Boiling Water Reactor
VNC	Vallecitos Nuclear Center
VOC	volatile organic compound
W	
WPT	Western pond turtle

1. INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

General Electric (GE)-Hitachi Nuclear Energy (GEH) operates a nuclear facility located in Sunol, California (see Figure 1-1). This document identifies the facility, Vallecitos Nuclear Center, as VNC.

It is the intent of GEH to decommission the Vallecitos Boiling Water Reactor (VBWR) at the VNC and terminate its Nuclear Regulatory Commission (NRC) license Developmental Power Reactor (DPR) -1. This decommissioning and license termination will be conducted in accordance with the applicable requirements of 10 CFR 50.82 as identified in removing and disposing of materials and decontaminating both facilities meeting conditions for unrestricted release in accordance with the criteria for decommissioning in 10 Code of Federal Regulations (CFR) 20.1401 and 20.1402. For the VBWR license termination, the residual radioactive materials will remain under the Empire State Atomic Development Associates Incorporate (ESADA) Vallecitos Experimental Superheat Reactor (EVESR) license until it is terminated.

GEH has prepared this Environmental Report (ER) to evaluate the potential radiological and non-radiological impacts associated with the removal and disposal of the VBWR in Building 300 Area at VNC.

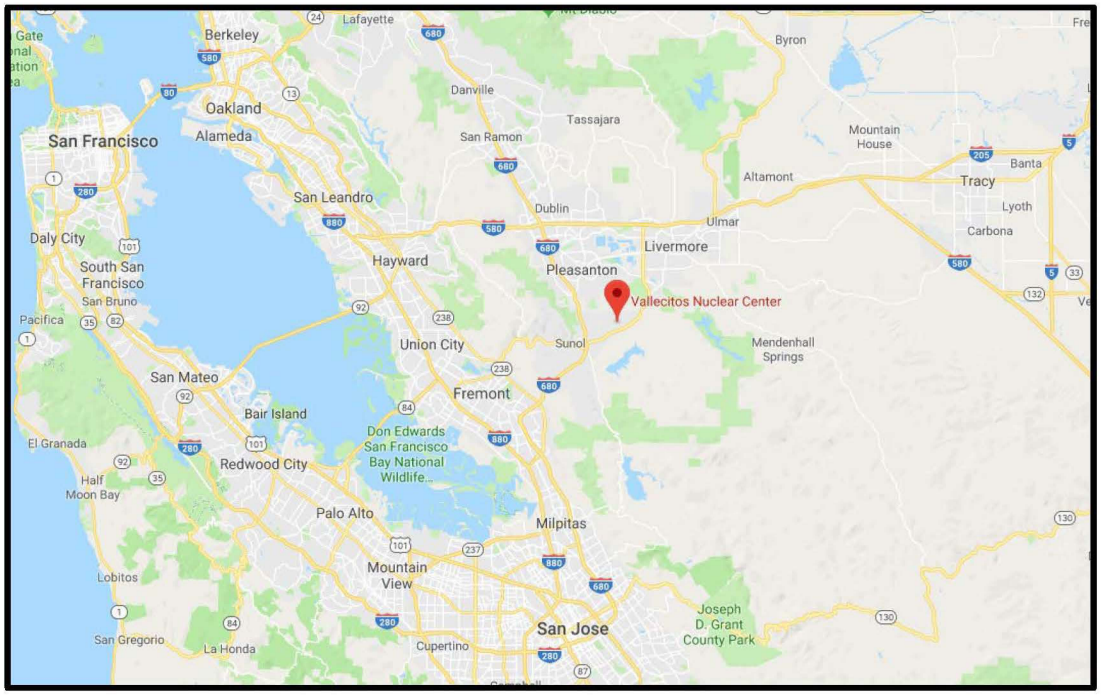

Figure 1-1: Regional Area Map

This ER is submitted in accordance with the requirements of 10 CFR 50.82 (a)(9) and 10 CFR 51.53 (d) to address the post-operating license stage of the facility. As required by these regulations this ER addresses new information and environmental changes associated with the proposed termination activities.

The NRC prepared a generic environmental impact statement (GEIS), NUREG-0586, *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* to assess the environmental effects associated with decommissioning alternatives for various types of nuclear facilities.

This evaluation led to the following conclusions:

1. The technology for decommissioning nuclear facilities is established and while technical improvements in decommissioning techniques are to be expected, decommissioning at the present time can be performed safely and at a reasonable cost. Radiation dose to the public due to decommissioning activities should be very small and be primarily due to the transportation of decommissioning waste to waste burial facilities. Radiation dose to decommissioning workers should be a small fraction of their exposure experienced over the operating lifetime of the facility and be well within the occupational exposure limits imposed by regulatory requirements. Decommissioning costs are reasonable and are, at least for the larger facilities such as reactors, a small fraction of the present worth of commissioning costs (i.e., less than 10%).
2. Decommissioning nuclear facilities is not an imminent health and safety problem. However, planning for decommissioning as an integral activity prior to commissioning as well as during facility life is a critical item that can have an impact on health and safety as well as cost. Essential to such planning activity is reasonable assurance that funds will be available for performing required decommissioning activities at the cessation of facility operations.
3. Decommissioning of a nuclear facility generally has a positive environmental impact. At the end of the facility life, termination of a nuclear license is the goal. Termination requires decontamination of the facility so that the level of any residual radioactivity remaining in the facility or on the site is low enough to allow unrestricted use of the facility and site. Commitment of resources, compared to operational aspects, is generally small. The major environmental impact of decommissioning is the commitment of small amounts of land for waste burial in exchange for reuse of the facility and site for other purposes. Since in many instances, such as at a reactor facility, the land is a valuable resource, return of this land to the commercial or public sector is highly desirable.

Where applicable, the VNC information is compared to the generic assessments of NUREG-0586.

1.2 History and Background

GE was issued license Construction Permit Power Reactor (CPPR)-3 to construct and operate the VBWR on May 14, 1956, as DPR. License CX-2 to operate DPR was issued July 29, 1957, and initial criticality was achieved on August 3, 1957. License DPR-1 was issued to GE on August 31, 1957, and full power was attained on October 19, 1957.

The VBWR ceased operations on December 9, 1963, was defueled on December 24 of that same year, and GE was issued a license to possess but not operate the VBWR reactor on September 9, 1965. The Atomic Energy Commission (AEC) issued GE an Order to Dismantle the VBWR on July 25, 1966. On October 22, 2007, license DPR-1 amendment 21 was issued, transitioning ownership of the VBWR from GE to GEH. From approximately 1956 to 1963, Pacific Gas and Electric Company (PG&E) installed and operated a turbine generator at VNC. From 1965 through 1975, and 1981 through 1982, portions of VNC were used by the U.S. Department of Energy (DOE) to conduct research work. GE also conducted research operations as a DOE subcontractor and later transitioned these operations to a private corporation in 1998.

1.3 Purpose

The purpose of this ER is to present a current evaluation of the actual or potential environmental impacts resulting from the preparation, removal, and disposal of the VBWR vessel. The vessel removal is the remaining component that is inseparable from the DPR-1 license.

The ER is to support the review and approval to remove and dispose of the vessel. The ER concludes all of the environmental effects as SMALL as noted in Table 1-1.

Environment Resource	Environmental Effect
Land Use	SMALL
Water Use	SMALL
Water Quality	SMALL
Air Quality	SMALL
Aquatic Ecology	SMALL
Terrestrial Ecology	SMALL
Threatened and Endangered Species	SMALL
Radiological	SMALL
Occupational	SMALL
Socioeconomics	SMALL
Environmental Justice	SMALL
Cultural and Historic Resources	SMALL
Aesthetics	SMALL
Noise	SMALL
Transportation	SMALL
Irretrievable Resources	SMALL

Table 1-1 Summary of Environmental Effects

1.4 DECOMMISSIONING ALTERNATIVES

The decommissioning alternatives described in NUREG-0586, *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* are: NO ACTION, DECON (immediate dismantlement), and SAFSTOR (long term storage followed by dismantlement).

NO ACTION: The alternative to decommissioning at the end of the licensing period is a "no action" alternative, implying that a licensee would simply abandon or leave the facility after ceasing operation.

DECON: A phase of reactor decommissioning in which structures, systems, and components that contain radioactive contamination are removed from a site and safely disposed of at a commercially operated low-level waste disposal facility or decontaminated to a level that permits the site to be released for unrestricted use.

SAFESTOR: A long-term storage condition for a permanently shut down nuclear power plant. During SAFSTOR, radioactive contamination decreases substantially, making subsequent decontamination and demolition easier and reducing the amount of low-level radioactive waste (LLRW) requiring disposal.

The VBWR was shut down in 1963 and NRC issued a possession-only license in 1965. The license was renewed in 1973 and has remained effective under the provisions of 10 CFR 50.51(b). The facility has been maintained in SAFSTOR condition. Since then, it has been

maintained in a monitored condition and the plant structures, external to the containment vessel, have been dismantled. In recognition of this GEH has evaluated several options for decommissioning of the facility in light of current facility conditions and factors external to the facility. Since the facility has been maintained in a condition equivalent to SAFSTOR for nearly 60 years, radioactivity levels at the facility have decayed naturally, hereby reducing occupational radiation exposure during future decontamination activities.

The two decommissioning alternatives that have been evaluated are: SAFSTOR with dismantlement deferred an additional 30 years; and DECON - Immediate Dismantlement and Site Restoration. The NO ACTION alternative, as described in NUREG-0586, implies that a licensee would abandon or leave a facility as is. This is not a viable decommissioning alternative and, therefore, is not considered. The most appropriate alternative for the facility is Immediate Dismantlement and Site Restoration for the following reasons:

- It can be accomplished at this time with no significant impact on the health and safety of the workers, public, and the environment.
- Nearly sixty years of radioactive decay have already reduced radiation exposure rates.
- The majority of personnel exposure savings to be gained from deferring dismantlement have already been achieved.
- Degradation of containment vessel systems and structural components (e.g., polar crane and related equipment) which are needed to support dismantlement activities could start to occur.
- A LLRW disposal facility is currently available to accept out of compact waste. Future export to the compact waste facility is uncertain, as well as associated costs for disposal.
- It eliminates the ongoing maintenance expense.

The licensee submitted a Limited Post Shutdown Decommissioning Activities Report in 2022 that describes a change to DECON of the VBWR. A license termination plan is scheduled to be submitted to NRC in September 2023. The spent fuel has been removed from both the reactor and the site.

1.5 Summary and Conclusions

This Environmental Report demonstrates that the removal and disposal of the reactor vessel will not result in any significant impact on the health and safety of the workers and public or on the environment. All of the environmental effects are SMALL.

2. SITE AND FACILITY DESCRIPTION

2.1 Location of the Site

The VNC site is located at 6705 Vallecitos Road (north side of State Route (SR) 84) in the unincorporated area of Sunol, Alameda County, California; a map is included as Figure 2-1. The site is east of San Francisco Bay, approximately 35 air miles east-southeast of San Francisco, and 20 air miles north of San Jose.

The properties surrounding the site are primarily used for agriculture and cattle raising, with some residences, which are mostly to the west of the property. The nearest cities are Pleasanton, with a population of approximately 80,000, located 4.1 miles to the north-northwest, and Livermore with a population of approximately 90,000, located 6.2 miles to the northeast.

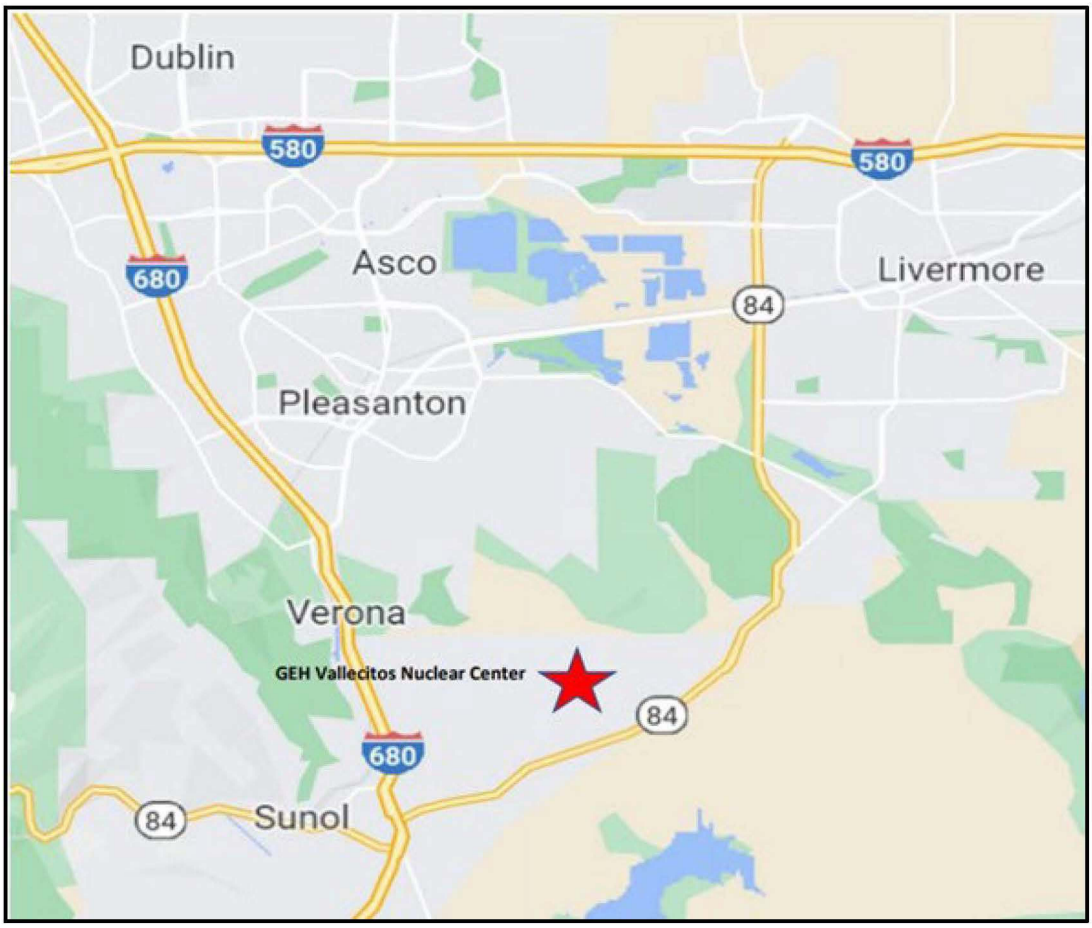

Figure 2-1: Vicinity Map

2.2 DESCRIPTION OF THE VALLECITOS NUCLEAR CENTER

The original VNC site is understood as an approximate 1600-acre site, which includes both the GE property (approximately 610 acres) and the VNC property (approximately 997 acres). The fenced area, commonly referred to as the Site Developed Area, encompasses the buildings and structures associated with all operations at the Site. The Site (Figures 2-1, 2-2, and 2-3) is bounded on the west, north, and east by hilly terrain; in some places, the hills are about 400 ft (120 m) above the general Site elevation. Vallecitos Road (SR 84) is at the southern boundary of the Site, from which an expanse of gently rolling grassland extends north for about 1.2 mi (2 km) at which point mountains form a northern barrier; completing the geographical encirclement of the Site.

The VBWR licensed area, also known as the Building 300 area, is approximately 3.2 acres within the 105.8-acre Site Developed Area. Maps of the areas are included in Figures 2-2 and 2-3.

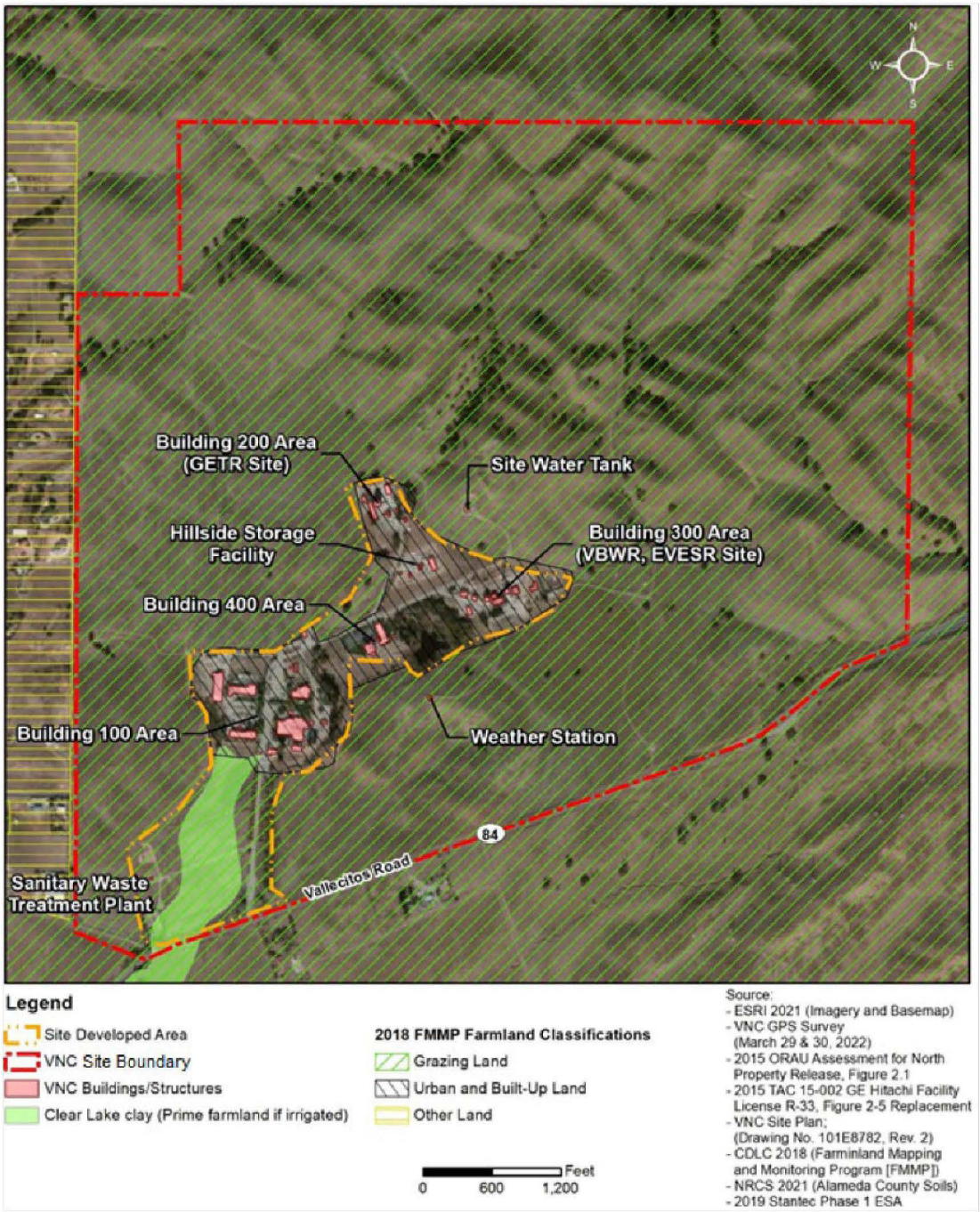

Figure 2-2 Vallecitos Nuclear Center

2.3 FACILITY DESCRIPTION

The VBWR (DPR-1 Docket 50-18) is licensed as a power reactor under Part 50, ‘‘Domestic Licensing of Production and Utilization Facilities,” of Title 10 of the CFR. The unit has permanently ceased operation and is in SAFSTOR with all nuclear fuel removed from the vessel unit.

VBWR is located in the Building 300 Area within the Site Developed Area shown in Figure 2-3.

Figure 2-3: Building 300 Area

The Building 300 Area is primarily retired and contains the remaining buildings listed in Table 2-1 and shown in Figure 2-4.

AREA	BUILDING	DESCRIPTION
300	300	Metallurgy and chemical building
	301	VBWR containment building
	302	Gas tech development building (turbine building)
	304	URC assembly building
	348	Stress corrosion facility
	351	EVESR containment building
	352	EVESR condenser building

Table 2-1: Facilities at Building 300 Area

Figure 2-4: Area 300 Buildings

3. DECOMMISSIONING ACTIVITIES AND PLANS

The proposed work consists of dismantling all systems and components inside the containment structure and removal of the boiling water reactor vessel. This is a general summary of the proposed activities to be conducted at the VBWR for DECON and license termination.

3.1 PREPARATION FOR REMOVAL OF BOILING WATER REACTOR VESSEL

Piping and structural steel will be rigged, sectioned, and lowered. Demolition will be via cutting torches, bandsaws, or reciprocating saws depending upon the pipe diameter and material. Cut lines and rigging points will be determined in the field by the rigger(s). Lead paint will be removed from cut lines where practical. Concrete bioshield segmentation via core bores and diamond wire cutting will be employed to access and cut the VBWR Vessel bottom support to allow vessel removal.

Localized ventilation controls will consist of a flex duct with a flame arrestor, connected to filtered negative air machines. Local containments or ventilation will be employed as necessary for contamination control purposes. Piping penetrations at the containment wall will be capped or sealed.

Scaffolds will be erected throughout various areas of the operating floor to access piping and valves. Alternatively, a narrow scissor lift may be utilized.

As stated in the license, all fuel has been removed from the reactor and transferred from the facility. In addition, some of the equipment used in the operation of the reactor (i.e., nuclear instrumentation, pumps, etc.) has been previously removed under separate actions. All residual

radiological materials would be transferred to the EVESR license and addressed in the decommissioning activities for the EVESR license.

3.2 Removal of Boiling Water Reactor Vessel

The proposed method is the removal of the boiling water reactor vessel by constructing a temporary opening in the roof approximately 12 feet in diameter. A protective covering will be used over the roof hole.

Man-lift and cutting tools would be used to remove the section of the roof. A boom crane would be used to lift and remove the vessel from the building and onto a tractor-trailer for hauling to an approved disposal site in Texas.

3.3 Radioactive and Non-Radioactive Waste Management

3.3.1 Radioactive

The characterization of VBWR has generally followed the MultiAgency Radiation Survey and Site Investigation Manual MARSSIM) described process. This process included a Historical Site Analysis (HSA) and Scoping surveys~~,~~ followed by Characterization surveys. Characterization will continue during the dismantling and remediation process, with surveys post vessel removal being used for a final radiological characterization prior to VBWR license termination request.

The removal and disposal of the reactor vessel, with associated internals, will leave the VBWR facility with minimal residual radioactive materials under License DPR–1, Docket 50–18.

The primary objective is to remove the reactor vessel, which contains the majority of the remaining radioactive material; and remediate the bio shield, as necessary for meeting ALARA. Based on current known radiological conditions of the external ventilation system, spent fuel pool and the external sump, no additional remediation is thought needed from an ALARA standpoint. Soil remediation is not anticipated as there is no soil associated with the VBWR license. Radiological remediation will be sufficient as needed for ensuring the potential radiation exposures to both workers and public from remaining radioactive materials will be ALARA with potential doses within 25 mrem/year. Residual radioactive materials will be controlled to prevent spread and contamination of the environment.

Following the removal of the reactor vessel, structures will be surveyed as necessary; contaminated materials will be remediated or removed and disposed of as radioactive waste. Residual contaminated structural surfaces that will be transferred to the EVESR license have been assessed). Any additional surveys necessary to determine remaining activity will be performed post dismantling / remediation. Decontamination will be performed only if determined to be ALARA for worker protection.

3.3.2 Non-Radioactive: Lead and Asbestos

Lead: All elemental lead in the form of brick has been removed and disposed of offsite. No elemental lead is expected in the areas currently inaccessible given the VBWR vessel location in the fixed bio shield. Should lead be found, it will be surveyed and/or sampled for radioactive contamination for characterization and disposal. The material will be packaged in transport containers, as necessary, removed from the containment building and eventually transported for disposal. Options for the beneficial reuse of lead will be evaluated and the most cost-effective method for final disposition pursued.

Lead Containing Coatings: Demolition work performed during the decommissioning activities for VBWR may require the removal of lead containing coatings. The most likely potential need for abatement will be cutting of dome structures to support VBWR vessel removal. Upon identification of these areas, a qualified lead abatement subcontractor, or qualified remediation team workers, will be used to remove the lead containing coatings. Any work performed that requires a torch to metal that has a lead containing coating, will have the coating removed by a qualified abatement subcontractor or qualified remediation team worker. The activities will be performed prior to any torch to metal work or grinding and will comply with the GEH and Vallecitos Site Specific Safety and Health Manual.

Asbestos Abatement: Asbestos containing materials have been abated in the VBWR containment and all generated material has been disposed of. Should asbestos be identified during the remaining work activities, it will be removed and packaged for disposal prior to any decommissioning activities in areas where these materials exist. Removal and disposal of asbestos will be accomplished by a licensed asbestos abatement contractor.

3.4 DEMOBILIZATION

Demobilization will include remediation of the sump, decontaminating and removing, if feasible, all project equipment and materials brought on site, disposal of project-generated waste such as concrete from expansion joint areas, reactor pit, etc., and returning the work area to a clean, safe condition. All equipment and materials will be decontaminated, as necessary, using standard non-destructive (e.g., damp wiping) methods and surveyed to meet limits for unrestricted release. Items exceeding the limits for unrestricted release will be packaged and disposed as LLRW.

3.5 SCHEDULE AND RESOURCES

The overall schedule duration to plan, prepare the site, remove the VBWR vessel, and subsequently demobilize from the VBWR is approximately six to eight months. The expected duration of on-site activities is between three and four weeks.

Up to 30 workers may be present at VBWR during the on-site decommissioning activities.

4. ENVIRONMENTAL EFFECTS OF DECOMMISSIONING ACTIVITIES

4.1 LAND USE

For the purposes of assessing decommissioning impacts, NRC defines operational areas in the Decommissioning GEIS as,

> the portion of the plant site where most or all of the site activities occur, such as reactor operation, materials and equipment storage, parking, substation operation, facility service, and maintenance. This includes areas within the protected area fences, the intake, discharge, cooling, and associated structures as well as surrounding paved, graveled, maintained landscape, or other maintained areas.

The property is located in the unincorporated area of Sunol, California on the north side of Vallecitos Road (SR 84), which is a two- and four-lane paved highway. Approximately 1,400 acres of the Property are leased for raising feed crops and cattle grazing. Land use near the property is agricultural, including orchards, vineyards, and pastures, although grazing is predominant. A small residential population exists along the western boundary of the property. The nearest incorporated area is the City of Pleasanton, located four miles to the north-northwest. There is light industrial activity within a 10-mile radius of the property. A United States Veterans Administration hospital is located about four miles to the east.

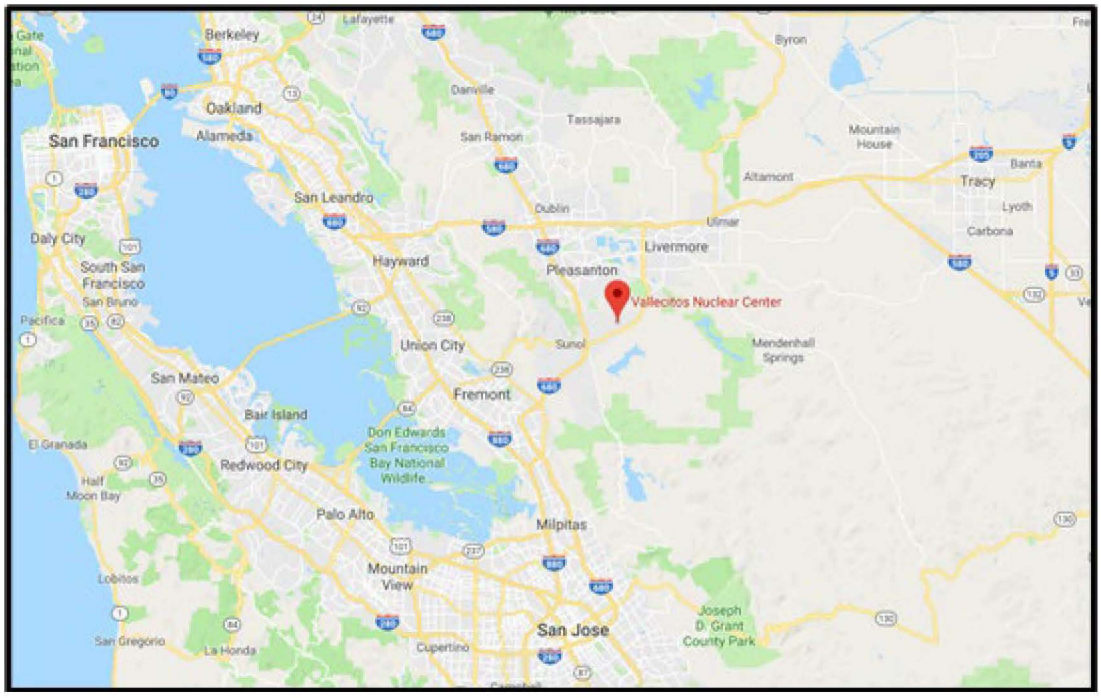

Figure 4-1: Regional Area Map

The 997-acre VNC site property along with the 610-acre GEH property encompasses approximately 1,600 acres. The VNC Site Developed Area shown in Figure 4-2 is 105.8 acres of the 1,600 acres. The VBWR and EVESR are located in the Building 300 Area shown in Figures 4-2 and 4-3. The VNC site also includes the Building 100 Area and Building 400 Area that host operations, maintenance, and administrative structures and activities. The other shutdown (test) reactor, GETR, is located in the Building 200 Area. During the operation and since the shutdown of VBWR, they have been supported by the site for maintenance, material storage, staff offices, site infrastructure, parking, etc. Therefore, the operational area for decommissioning of VBWR is the Site Developed Area.

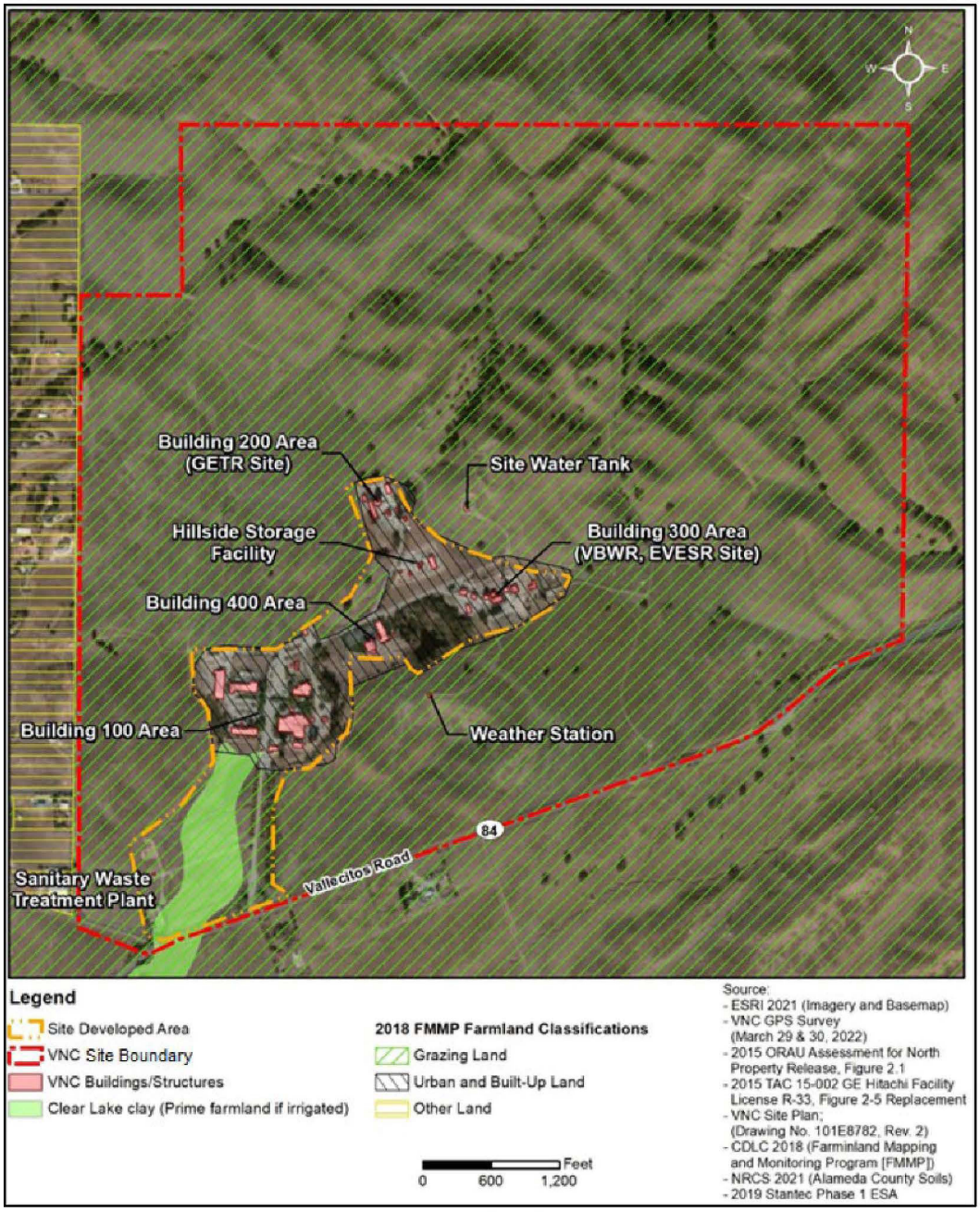

Figure 4-2: VNC Site Area

Figure 4-3: Aerial View of VBWR Site

4.1.1 On-Site Land Use

The activities at VNC to remove and dispose of the boiling water reactor vessel do not have any measurable impact to on-site land use. There would be no change to land use caused by the activities to prepare and remove the vessel. The major activity expected to occur is the temporary staging of equipment at the Site Developed Area. This activity would not change the fundamental purpose of the site.

Up to approximately 30 temporary workers are needed to support the activity requiring the use of existing on-site parking, training, site security access, office space, and change areas.

Activities would occur at the VNC's Site Developed Area, and no on-site land use would occur during the removal of the vessel.

4.1.2 Off-Site Land Use

No offsite land is needed to support the preparation and removal, and disposal of the vessel. Existing public roads and highways would be used to transport workers and equipment. All activities would be within the Site Developed Area.

No off-site land is required to build, extend, or improve roads, highways and if required railways to transport the vessel to an approved site in Texas.

4.1.3 Land Use Effects

The impacts on land use are not detectable or destabilizing since activities to remove the boiling water vessel would be all on the VNC Site Developed Area and the transport of the vessel for disposal would not require any new or improvements to the transportation infrastructure.

The potential impact to on-site and off-site is SMALL; impacts are not detectable or destabilizing and no new or improvements to the transportation infrastructure, respectively.

4.2 Water Use

For the purposes of assessing decommissioning impacts, as noted in Section 4.3.5 of the GEIS, aquatic ecology includes "all of the plants, animals, and species assemblages in the rivers, streams, oceans, estuaries, or any other aquatic environments near a nuclear power facility." This section will focus on protected aquatic habitat regulated by the Clean Water Act (CWA), the Endangered Species Act (ESA), and the Fish and Wildlife Coordination Act. The facility currently has adequate water supply for operations and maintenance activities.

4.2.1 *Water Use During Construction*

Decommissioning activities will have a temporary increase in water use for VBWR for such activities as concrete cutting and dust abatement during the dismantling and transportation process, however this temporary increase will be minimal and of short duration. The majority of the impacts for dismantling of the VWBR will be on paved and previously disturbed areas of the facility. These water uses will be supplied by the existing VNC potable water supply and GEH will ensure that water use is within existing water rights/allocations and withdrawal permits. Wastewater streams created from these water uses will be managed and treated within existing VNC wastewater infrastructure and in accordance with their permits. There is no visible or detectable water in the vessel. The vessel is sealed through either welded or bolted means dependent on penetration. Bolted flanges will be additionally sealed with RTV to meet disposal site criteria. In the case of an inadvertent release, existing protocols will be used to manage and clean up the release.

4.2.2 *Water Supply Effects*

GEH concludes that the water supply will not be impacted by the project, therefore the impacts would be categorized as SMALL.

4.3 Water Quality

Decommissioning activities with the potential for impacting both surface and ground water quality include decontamination and dismantlement activities. Since work may occur year-round, there is a risk of stormwater runoff from structure dismantlement areas and accidental releases (spills) are also potential sources of pollutants entering surface waters during decommissioning. This section considers the impact on water quality during the removal of the boiling water reactor vessel.

4.3.1 *Water Quality Impacts*

VNC will continue to manage water in accordance with its existing infrastructure, permits, and Best Management Practices (BMPs). The existing spill control and prevention practices and procedures will also remain in place and may be modified as necessary for decommissioning activities. Any land-disturbing activities will be conducted in accordance with BMPs for soil management and in accordance with state and local erosion control and sediment permits and regulations. It is not anticipated that there will be any direct contact with groundwater due to the lack of excavation for this activity. Any water used during the dismantling of the boiling water reactor vessel will be treated and managed in accordance with the current onsite treatment facility. No offsite removal or disposal of wastewater is anticipated. All wastewaters will be collected and treated within existing VNC wastewater treatment infrastructure. VNC will continue to sample existing monitoring wells on site according to the existing monitoring plan.

4.3.2 *Potential Releases During Construction*

If there happens to be an inadvertent spill or discharge of hazardous or contaminated material during construction, those materials will be contained and cleaned up in accordance with current Spill Prevention Plans as well as other established procedures at the facility. Additionally, there

will be temporary BMP measures implemented and installed before construction to help prevent accidental contamination of ground water. Those plans will be in compliance with both State and Federal Laws protecting natural resources such as ground water. All construction vehicles will be inspected to make sure they are in good working order with no leaks of oil or hydraulic fluid. Refueling of vehicles will take place on approved paved surfaces away from bare soil and any existing waterways.

4.3.3 *Water Quality Effects*

GEH concludes that compliance with the standard erosion control and BMPs listed in current permits and plans impacts to water quality would be categorized as SMALL.

4.4 Air Quality

The activities to remove and dispose of the boiling water reactor vessel at VNC do not have any measurable impact on the local air quality, and no significant criteria or hazardous air pollution emissions occur. Any potential air quality-related emission associated with the removal of the vessel at VNC result from gaseous pollutant emissions from diesel-powered construction equipment and fugitive dust emissions.

The following construction equipment would be required to remove the vessel:

- Mobile crane
- ½ ton pickup truck
- Man-lift
- Forklift
- Portable generators
- Portable air compressors
- Thermal cutting/welding equipment

•• An Over-The-Road transport vehicle will transport the reactor vessel off-site to a nearby railyard. The reactor vessel will then be loaded into a railcar for transport to an approved LLRW disposal facility in TX.

Approximately up to 30 workers during onsite activities for approximately 3 to 4 weeks.

4.4.1 *Climate, Meteorology and Topography*[1]

The project is located within the Livermore Valley climatological subregion of the San Francisco Bay Area Air Basin (SFBAAB), as defined by the Bay Area Air Quality Management District (BAAQMD). Air basins have natural characteristics that limit the ability of natural processes to either dilute or transport air pollutants. The major determinants of air pollution transport and dilution are climatic and topographic factors such as wind, atmospheric stability, terrain that influences air movement, and sunshine. Wind and terrain can combine to transport pollutants away from upwind areas, while solar energy can chemically transform pollutants in the air to create secondary photochemical pollutants such as O_3.

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[1] SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project Final Environmental Impact Report/Environmental Assessment with FONSI. State of California, Department of Transportation, and the Alameda County Transportation Commission. April 2018.[2] U.S. Census Bureau. Census - Geography Profile Block Group. Livermore and Sunol : U.S.
Census Bureau, 2020.

The Bay Area has a Mediterranean climate characterized by wet winters and dry summers. During the summer, a high-pressure cell centered over the northeastern Pacific Ocean results in stable meteorological conditions and a steady northwesterly wind flow that keep storms from affecting the California coast. During the winter, the Pacific high-pressure cell weakens, resulting in increased precipitation and the occurrence of storms. The highest air pollutant concentrations in the Bay Area generally occur during inversions, when a surface layer of cooler air becomes trapped beneath a layer of warmer air. An inversion reduces the amount of vertical mixing and dilution of air pollutants in the cooler air near the surface.

The Livermore Valley is a sheltered inland valley within the Diablo Range near the eastern border of the SFBAAB. In the summer, the Livermore Valley is characterized by clear skies and relatively warm weather with maximum temperatures ranging from the high 80s to low 90s (degrees Fahrenheit). Cold water upwelling along the coast and hot inland temperatures during the summer can cause a strong onshore pressure gradient, which translates into a strong afternoon wind. In the winter, the air flow in the Livermore Valley is often affected by local conditions. Winter temperatures are mild and usually range from the high 30s to low 60s (degrees Fahrenheit). The mean precipitation in the winter is about 14 inches.

For the Livermore Valley, the air pollution potential is high, especially for photochemical pollutants. The Livermore Valley not only traps locally generated pollutants but can be the receptor of O_3 and O_3 precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties.

4.4.2 Regional Air Quality Conformity[1]

The BAAQMD monitors pollutants of concern and air quality conditions throughout the SFBAAB. Table 4-1 includes a summary of the applicable air quality standards and the SFBAAB's attainment status with respect to the air quality standards. For the NAAQS, the SFBAAB is currently designated a maintenance area for the 8-hour CO standard and a nonattainment area for the 8-hour O3 standard and 24-hour $PM_{2.5}$ standard. For the California Ambient Air Quality Standards (CAAQS), the SFBAAB is designated a nonattainment area for the 1-hour and 8-hour O_3 standards, the annual average and 24-hour PM_{10} standards, and the annual average $PM_{2.5}$ standard. The SFBAAB is classified as attainment or unclassified for the remaining NAAQS and CAAQS.

Table 4-2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard	Federal Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Ozone (O3)	1 hour	0.09 ppm	-3	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.	Nonattainment	Nonattainment
	8 hours	0.070 ppm	0.070 ppm (4th highest in 3 years)				(Marginal)
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines, and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Attainment	Attainment-Maintenance
	8 hours	9.0 ppm1	9 ppm				(Moderate)
Respirable Particulate Matter (PM10)4	24 hours	50 µg/m3 6	150 µg/m3 (expected number of days above standard < or equal to 1)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air & other aerosol and solid compounds are part of PM10.	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Nonattainment	Unclassified
	Annual	20 µg/m3	--4				
Fine Particulate Matter (PM2.5)4	24 hours	---	35 µg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the PM2.5 size range. Many toxic & other aerosol and solid compounds are part of PM2.5.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemicals and photochemical reactions involving other pollutants NOX, sulfur oxides (SOx), ammonia, and ROG.	Nonattainment	Attainment-Unclassified (Annual standard); Nonattainment (Moderate; 24-hour standard)
	Annual	12 µg/m3	12.0 µg/m3				
	Secondary Standard (annual; also for conformity process4)	---	15 µg/m3 (98th percentile over 3 years				
Nitrogen Dioxide (NO2)	1 hours	0.18 ppm	0.100 ppm5	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.	Attainment	Attainment (Annual standard); Designation
	Annual	0.030 ppm	0.053 ppm				

Pollutant	Averaging Time	State Standard	Federal Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
							pending (1-hour standard)
Sulfur Dioxide (SO2)	1 hour	0.25 ppm	0.75 ppm6 (99th percentile over 3 years)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especial local and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Attainment	Designation pending
	3 hours	---	0.5 ppm7				
	24 hours	0.04 ppm	0.14 ppm (for certain areas)				
	Annual	---	0.030 ppm (for certain areas)				
Lead (Pb)9	Monthly	1.5 µg/m3	---	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in in soils along major roads	N/A	Attainment
	Calendar Quarter	---	1.5 µg/m3 (for certain areas)				
	Rolling 3-month average	---	0.15 µg/m3 9				
Sulfate	24 hours	25 µg/m3	---	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Attainment	N/A
Hydrogen Sulfide (H2S)	1 hours	0.03 ppm	---	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Unclassified	N/A
Visibility Reducing Particles (VRP)	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70%	---	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under FCAA, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurements methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.	Unclassified	N/A

Pollutant	Averaging Time	State Standard	Federal Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Vinyl Chloride8	24 hours	0.01 ppm	---	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.	No information available	N/A

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[1] State standards are "not to exceed" or "not to be equaled or exceeded" unless stated otherwise.

[2] Federal standards are "not to exceed more than once a year" or as described above.

[3] Prior to June 2005, the 1-hour ozone NAAQS was 0.12 ppm. Emission budgets for 1-hour ozone are still in use in some areas where 8-hour ozone emission budgets have not been developed, such as the S.F. Bay Area.

[4] Annual PM10 NAAQS revoked October 2006; was 50 $\mu g/m^3$. 24-hr. $PM_{2.5}$ NAAQS tightened October 2006; was 65 $\mu g/m^3$. Annual $PM_{2.5}$ NAAQS tightened from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ December 2012 and secondary annual standard set at 15 $\mu g/m^3$.

[5] Final 1-hour NO2 NAAQS published in the Federal Register on 2/9/2010, effective 3/9/2010. Initial area designation for California (2012) was attainment/unclassifiable throughout. Project-level hot spot analysis requirements do not currently exist. Near-road monitoring starting in 2013 may cause re-designation to nonattainment in some areas after 2016.

[6] USEPA finalized a 1-hour SO_2 standard of 75 ppb (parts per billion [thousand million]) in June 2010. Nonattainment areas have not yet been designated as of 9/2012.

[7] Secondary standard, set to protect public welfare rather than health. Conformity and environmental analysis address both primary and secondary NAAQS.

[8] The CARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both the CARB and USEPA have identified lead and various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There are no exposure criteria for adverse health effect due to toxic air contaminants, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong.

[9] Lead NAAQS are not considered in Transportation Conformity analysis.

4.4.3 *Local Ambient Air Quality*[1]

The BAAQMD operates a network of air monitoring sites throughout the SFBAAB. The nearest and most representative air monitoring station to the project area is currently the Livermore station at 793 Rincon Avenue in Livermore, approximately 3.5 miles north of the project area. The criteria air pollutants monitored at this station are O_3, NO_2, and $PM_{2.5}$. The nearest station where CO levels are measured is the Oakland station, located at 9925 International Boulevard, approximately 17 miles northwest of the project area. The nearest station where PM_{10} levels are measured is the Concord station, located at 2956-A Treat Boulevard, approximately 22 miles north of the project area. These stations are considered representative of the project area as they are located within the closest proximities to the project area and experience similar meteorological conditions. Table 4-2 presents ambient air quality data recorded at the three stations from 2011 through 2015. As Table 4-2 shows, exceedances of California standards for 1-hour O_3 occurred in 2011, 2012, 2013, and 2015. Exceedances of the California standards for 24-hour PM_{10} occurred once in 2011. The national and California standards for 8-hour O_3 were exceeded in all five years. Exceedances of the national standards for 24-hour $PM_{2.5}$ occurred in 2011, 2013, and 2014. No exceedances of either the state or national standards were recorded for CO.

Table 4-2: Criteria Air Pollutants Data Summary (Livermore, Oakland, and Concord Air Monitoring Stations)

Pollutant	Standard	2011	2012	2013	2014	2015
Ozone (O^3)	**1-Hour**					
	Maximum concentration (ppm)	0.115	0.102	0.096	0.093	0.105
	Days > CAAQS (0.09 ppm)	3	2	3	0	1
	8-Hour					
	Maximum Concentration (ppm)	0.084	0.090	0.077	0.080	0.081
	Days >NAAQS (0.075 ppm)	2	3	1	4	1
	Days > CAAQS (0.07 ppm)	9	4	2	7	7
Particulate Matter (PM_{10})	**24-Hour**					
	Maximum Concentration (µg/m^3)	55.9	33.7	47.6	40.8	22.5
	Days >CAAQS (50 µg/m^3)	1	0	0	0	0
	Days >NAAQS (150 µg/m^3)	0	0	0	0	0
	Annual					
	Annual Arithmetic Mean (µg/m^3) [a]	15.2	12.3	15.5	13.8	12.5
Particulate Matter ($PM_{2.5}$)	**24-Hour**					
	Maximum Concentration (µg/m^3)	45.5	31.1	40.2	42.9	31.2
	Days >NAAQS (35 µg/m^3)	2	0	4	1	0
	Annual					
	Annual Arithmetic Mean (µg/m^3)	8.5	6.6	8.7	7.6	8.8
Carbon Monoxide (CO)	**1-Hour**					
	Maximum Concentration (ppm)	4.1	2.9	3.6	2.8	2.4
	Days >CAAQS (20 ppm)	0	0	0	0	0
	Days >NAAQS (35 ppm)	0	0	0	0	0
	8-Hour					
	Maximum Concentration (ppm)	1.7	1.5	1.3	1.5	1.4
	Days > CAAQS (9.0 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)	**1-Hour**					
	Maximum Concentration (ppm)	0.057	0.053	0.051	0.049	0.050
	Days >NAAQS (0.10 ppm)	0	0	0	0	0
	Days >CAAQS (0.18 ppm)	0	0	0	0	0
	Annual					
	Annual Arithmetic Mean (ppm)	0.011	0.011	0.012	0.010	0.010

Source: CARB 2017a. California Air Quality Data (PST) Query Tool. https://www.arb.ca.gov/aqmis2/aqdselect.php

Notes: µg/m3 = micrograms per cubic meter; ppm = parts per million

Ambient data for SO2 and airborne lead are not included in this table since the SFBAAB is currently in compliance with state and federal standards for these pollutants

4.4.4 *Fugitive Dust*

Outside activities would be on VNC's Site Developed Area on pavement or graveled area. Since there is no earth moving or use of unpaved roadways and work areas, there is no source for fugitive dust.

4.4.5 *Equipment and Vehicle Emissions*

Of the combustion sources, vehicle emissions would be the dominant source. Vehicles that would be operating on the site during construction would consist of a variety of vehicles and construction equipment and vehicles used for workers traveling to the site. Volatile organic compounds (VOCs) emissions would be from the storage and loading of diesel fuel and gasoline for onsite construction equipment.

Up to 30 workers over an approximate 3-to-4-week period would occur to prepare and remove the vessel.

4.4.6 *Asbestos*

Asbestos containing materials have been abated in the VBWR containment and all generated material has been disposed of. Should asbestos be identified during the procedure to prepare for the vessel removal, it will be removed and packaged for disposal prior to any decommissioning activities in areas where these materials exist. Removal and disposal of asbestos will be accomplished by a licensed asbestos abatement contractor. Additional asbestos materials discovered during decontamination activities will be abated by the asbestos contractor as needed.

4.4.7 *Airborne Radioactive Waste*

Activities would be performed in a manner that reduces or eliminates generation of airborne radioactive materials.

Activities will be performed in a manner that reduces/eliminates generation of airborne radioactive materials. To keep exposure to airborne radioactivity As Low As Reasonably Achievable (ALARA), the following processes/procedures will be used as determined appropriate in accordance with the VNC Radiation Protection program:

- Enclosures will be used during major cutting and demolition activities to prevent the spread of airborne radioactive materials.
- Portable ventilation systems with High Efficiency Particulate Air (HEPA) filters will be used for minimizing work area airborne and limiting releases to the environment.
- Fixatives and/or protective covering will be used for preventing generation of airborne activity during movement of highly contaminated components. Dry surfaces will be wetted to minimize resuspension during demolition activities.

There are no radioactive gases at VBWR that require evaluation and control; all radioactive noble gases have decayed or previously released under appropriate control and in compliance with regulatory requirements.

4.4.8 *Air Quality Effects*

The predominant potential for the removal of the vessel would be particulate matter and fugitive dust. This material would generally be released and remain within the building.

No earth movement or use of unpaved roads and work area are required for the vessel removal, therefore no fugitive dust.

The mix of vehicles used for work transportation or activities associated with the preparation, removal and disposal of the vessel is significantly less than during plant construction, the change in air quality should not be detectable or destabilizing at this site.

Supplement 1 of NUREG-0586 concludes the impacts of decommissioning on air quality are neither detectable nor destabilizing. Therefore, the impact to air quality is SMALL.

4.5 AQUATIC ECOLOGY

For the purposes of assessing decommissioning impacts, as noted in Section 4.3.5 of the GEIS, aquatic ecology includes "all of the plants, animals, and species assemblages in the rivers, streams, oceans, estuaries, or any other aquatic environments near a nuclear power facility." This section will focus on protected aquatic habitat regulated by the Clean Water Act (CWA), the Endangered Species Act (ESA), and the Fish and Wildlife Coordination Act.

4.5.1 EVALUATION OF AQUATIC ECOLOGY EFFECTS

To support the preparation of the LPSDAR and accurately evaluate any potential impacts to aquatic species and their habitat from decommissioning activities, Kleinfelder performed a delineation of aquatic resources within the fenced portion of GEH's facilities, which encompassed a 106-acre Biological Study Area (BSA). The report, titled Preliminary Delineation of Aquatic Resources for the Vallecitos Nuclear Center Decommissioning Project (Aquatic Delineation Report), was prepared in September 2022 for submission to the U.S. Army Corps of Engineers (USACE) to comply with Section 404 of the CWA. The delineation followed the routine methods and guidelines described in the USACE Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008), and the guidelines described in the Corps Regulatory Guidance Letter No. 05-05 Ordinary High Water Mark Identification (USACE 2005).

Based on desktop evaluations of aerial imagery, topographical maps, and soil maps of the study areas as well as field investigations, the Aquatic Delineation Report concluded that there were four potentially jurisdictional non-wetland waters or other waters of the U.S. (OWUS) and two wetland features within the study area. OWUS included three unnamed ephemeral channels (0.486 acre) and one open water pond feature (1.00 acre), which totaled approximately 1.486 acres, and two wetland features (forested/shrub wetland and fresh emergent wetland) totaling approximately 4.68 acre. In addition, 290.72 linear feet (0.077 acre) of potentially jurisdictional culverted waters of the U.S. were identified in the BSA.

As displayed in the Aquatic Resources Map in the Aquatic Delineation Report, the closest features to the VBWR are a forested shrub wetland (FSW) approximately 300 feet to the west. Further west, the FSW transitions into fresh emergent wetland (FEW) and then an open water pond (locally known as Lake Lee) mapped as OWUS. In addition, there are non-jurisdictional waters and associated culverts mapped approximately 250 feet northwest of VBWR. The Aquatic Delineation Report is available upon request due to the lack of aquatic habitat within or adjacent to the VBWR facility.

Lake Lee provides potentially suitable habitat for aquatic species, such as turtles, frogs, and salamanders, among other species. Potential impacts to these species will be further discussed in Section 5.06 and 5.07.

The VBWR facility is located in disturbed habitat consisting of graded and graveled areas and paved roads surrounding the facilities. There will be no direct impacts to aquatic habitat (jurisdictional or non-jurisdictional waters) or undisturbed land as all work areas, staging locations, and equipment will be confined to developed areas and no ground disturbing activities are anticipated as part of the decommissioning. No direct impacts will occur to aquatic habitats,

and although not anticipated, decommissioning activities could have a potential to indirectly impact aquatic habitats near the VBWR via stormwater runoff from structure dismantlement/decontamination and/or accidental releases (spills). Best Management Practices (BMPs) and Avoidance and Minimization Measures (AMMs)will be implemented to mitigate any potential indirect impacts to aquatic features. VNC will continue to manage stormwater in accordance with its existing infrastructure, permits, and BMPs. The existing spill control and prevention practices and procedures will also remain in place and be modified as necessary for decommissioning activities.

4.5.2 Aquatic Ecology Effects Conclusion

Potential impacts to aquatic ecology are considered SMALL, temporary, and mitigatable. With implementation of the standard erosion control, BMPs, and the AMMs listed below, no detectable impacts to aquatic features are anticipated.

- **Dry Season Construction.** Scheduling construction activities in the dry season, generally between May and October, is recommended, primarily for any off pavement staging or planned ground disturbing activity.

- **Environmental Training and Clearance Survey.** Prior to construction, a qualified biologist may provide construction personnel with environmental training. The training should include a discussion of the listed species and other sensitive biological resources potentially occurring in the VNC, as well as a description of their habitats, their legal status and protection under the federal and State Endangered Species Acts, and a list of measures being taken to reduce impacts to biological resources during Project construction and implementation. A brochure with color photos of listed species should also be provided to construction personnel. The qualified biologist should also conduct a survey of all work areas prior to construction to identify any special-status species for avoidance.

- **Wetland Avoidance.** No construction impacts, dredge, or fill to any wetlands or waterways should occur. Site work away from aquatic habitats. If work is planned within any potentially jurisdictional aquatic features, coordination with the USACE, California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board may be required.

- **Standard Best Management Practices.** The potential for adverse effects to water quality could be avoided by implementing the following suggested temporary and permanent BMPs:

  a) No discharge of pollutants from vehicles and equipment cleaning should be allowed into storm drains or water courses.

  b) Vehicle and equipment fueling, and maintenance operations should be located at least 50 feet away from water courses, and secondary containment should be provided

  c) Concrete waste should be collected in washouts, and water from curing operations should be collected and disposed of so it does not enter water courses.

  d) Dust control should be implemented, including using water trucks and tackifiers to control dust in excavation and fill areas, rocking temporary access road entrances and exits, and covering temporary stockpiles when weather conditions require.

  e) Coir rolls should be installed along or at the base of slopes during construction to capture sediment, and temporary organic hydro-mulching should be applied to all unfinished disturbed and graded areas.

  f) Monofilament plastic should not be used for erosion control.

g) All grindings and asphaltic-concrete waste should be stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any aquatic habitat, culvert, or drainage feature.

4.6 TERRESTRIAL ECOLOGY

For the purposes of assessing decommissioning impacts, as noted in Section 4.3.6 of the GEIS, "terrestrial ecological resources may be impacted during the decommissioning process via direct or indirect disturbance of native plant or animal communities in the vicinity of the plant site." This section will focus on non-listed/native species and birds protected under the Migratory Bird Treaty Act of 1918 (MBTA). Based on Executive Order 13186 in 2001, it is the responsibility of federal agencies, such as the NRC, "to ensure the protection of migratory birds and to consider potential impacts to migratory birds during the preparation of National Environmental Policy Act (NEPA) documents." The next section, section 5.07, will focus on endangered and threated species protected under the Endangered Species Act (ESA) of 1973.

4.6.1 EVALUATION OF TERRESTRIAL ECOLOGY EFFECTS

A comprehensive biological report titled Biological Resources Report Vallecitos Nuclear Center Decommissioning Project (Bio Report), prepared by Kleinfelder in 2022 and available in ADAMS as ML22264A328, evaluated the potential for migratory birds to nest within the Biological Study Area (BSA) which encompasses a 106-acre area surrounding building 200 and building 300, where VBWR is located. According to the Wildlife Species with Potential to Occur in the BSA table included in the Bio Report, seven birds with an agency designated status were identified as having a potential to use the BSA. Of those seven, six (American peregrine falcon, golden eagle, great blue heron, prairie falcon, tricolored blackbird, and burrowing owl) have a low potential to occur and one (California least tern) is not expected to occur. Along with the six species with protected status in the Bio Report table, there is potential for other migratory bird species to use the BSA for nesting habitat.

The grasslands, trees/shrubs, and riparian areas within the BSA provide suitable nesting habitat, however there are also certain species like the killdeer (*Charadrius vociferus*) that nest on barren ground. During the onsite survey conducted by Kleinfelder in 2022, the only nests identified during the survey were swallow nests located on certain buildings and structures within the BSA.

Decommissioning activities for VBWR will be restricted to previously disturbed/graded areas, however there are trees and riparian habitat approximately 300 feet away that could be used for nesting by migratory birds. No tree or vegetation removal will be necessary to facilitate decommissioning activities, however, migratory birds could be indirectly temporarily disturbed from increased noise and activity associated with project related activities. In addition, there is potential for swallows to be nesting on nearby buildings.

4.6.2 TERRESTRIAL ECOLOGY EFFECTS CONCLUSION

There is a potential for project related activities to temporarily disturb nesting birds, however the impacts would be considered small, and can be further reduced through the implementation of avoidance and minimization measures (AMMs), listed below.

There will be no direct or indirect impacts on native plants from the decommissioning activities associated with VBWR as all work and equipment will be confined to previously disturbed areas.

With implementation of the AMMs listed below no detectable impacts (alterations to habitat or local population size, direct mortality) are anticipated.

- **Environmental Training and Clearance Survey.** Prior to construction, a qualified biologist should provide construction personnel with environmental training. The training

should include a discussion of the listed species and other sensitive biological resources potentially occurring in the VNC, as well as a description of their habitats, their legal status and protection under the federal and State Endangered Species Acts, and a list of measures being taken to reduce impacts to biological resources during Project construction and implementation. A brochure with color photos of listed species should also be provided to construction personnel. The qualified biologist should also conduct a survey of all work areas prior to construction to identify any special-status species for avoidance.

- **Preconstruction Surveys and Work Window for Nesting Birds.** If tree and vegetation removal, clearing and grubbing, or construction must occur during nesting bird season (February 1 to September 30), a qualified biologist should conduct a preconstruction survey for nesting birds within seven days of construction. To the extent practicable, clearing, and grubbing activities should be conducted during the non-nesting season (October 1 to January 31). If there is a significant break during active construction, a new survey is recommended prior to resuming work.

- **No-Disturbance Buffer for Nesting Birds.** If work is to occur within 300 feet of active raptor nests or 50 feet of active passerine nests, a no-disturbance buffer should be established at a distance sufficient to minimize disturbance based on the nest location, topography, cover, the species' sensitivity to disturbance, and the intensity/type of potential disturbance.

- **Active Swallow Nest Removal.** If construction occurs on structures with active swallow nests or within 100 feet of active swallow nests, nests should be scraped off and old nesting material removed during non-nesting season (October 1 to January 31). If nest building is observed after this process, a qualified biologist should conduct frequent nest checks at an interval suitable to avoid new nest establishment. Nest checks may need to be as frequent as once daily.

4.7 Threatened and Endangered Species

This section reviews potential impacts to State and Federally protected species as well as potential impacts to their habitat, especially designated critical habitat, as set forth by the U.S. Fish and Wildlife Service (USFWS) and the CDFW. Any potential impacts will be evaluated and mitigated, as appropriate.

For the purposes of assessing decommissioning impacts on threatened and endangered species, Section 4.3.7.2 of the GEIS regarding decommissioning of nuclear power plants states that "The greatest potential for impact to protected species is associated with physical alteration or dismantlement of the facilities, landscape, or aquatic environment." In terms of quantifying and evaluating impacts, the GEIS further states that "Impacts to endangered or threatened species are considered detectable if there are changes (attributable to the facility) in the species behavior or in the local population size that are greater than normal year-to-year variation. Impacts would be considered destabilizing if they result in direct mortality or major behavior changes (such as abandonment of most suitable habitat areas in the plant vicinity) or if they otherwise jeopardize the local population."

4.7.1 Evaluation of Threatened and Endangered Species Effects

A comprehensive biological report titled Biological Resources Report Vallecitos Nuclear Center Decommissioning Project (Bio Report), prepared by Kleinfelder in 2022 and available in ADAMS as ML22264A328, evaluated a 106-acre biological study area (BSA) that included Building 200 (GETR) and Building 300, which encompasses VBWR and EVE SR. Kleinfelder's biological resources review consisted of searches of California Native Plant Society (CNPS),

CDFW, and National Marine Fisheries Service (NMFS) databases for federal and state threatened, endangered, and other special-status species occurrences. Biologists generated a USFWS list for the BSA using their Information Planning and Consultation (IPaC) tool, as referenced in the Bio Report. All species included on the USFWS were evaluated in the Bio Report. Biologists also conducted field reconnaissance to evaluate the habitat conditions and suitability of the survey area. Using these results, site photographs, and aerial imagery, Biologists assessed the BSA for potential presence of special-status species or their habitats.

Through desktop reviews and onsite surveys, the Bio Report identified five special status species that have a moderate or moderate/high potential to occur within the BSA; California red-legged frog (*Rana draytonii*) (Federally Threatened-FT, California species of special concern- SSC), California tiger salamander (*Ambystoma californiense*) (FT, State Threatened-ST), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) (SSC), western pond turtle (*Emys marmorata*) (SSC), and pallid bat (*Antrozous pallidus*) (SSC).

The VBWR facility is located in disturbed habitat consisting of graded and graveled areas and paved roads surrounding the facilities. The closest riparian and grassland habitat is approximately 300 feet to the west. Desktops reviews showed that there is no critical habitat for listed species recorded within the BSA. During the VBWR decommissioning activities, a hole will be cut in the top of the dome facility using a crane stationed on graded land. The vessel will be removed, loaded onto a truck, and properly disposed of. The top of the dome tank will be welded shut. All decommissioning project related activities and equipment will be confined to previously disturbed areas. As such, there will be no impacts to critical habitat, protected species habitat, or any undeveloped habitat. No vegetation or tree removal is anticipated to facilitate decommissioning activities. Since all work will take place on previously disturbed land and vegetation removal is anticipated, rare plants are not expected to occur or be impacted by the VBWR decommissioning activities. As stated in the Bio Report, "Due to the highly disturbed and paved nature of the work sites within the building 200 and 300 Areas, the location within an urbanized landscape, and lack of recent species occurrences, the Project is not expected to directly impact state or federally listed wildlife species."

However, there is potential for California red-legged frog (CRLF), California tiger salamander (CTS), and western pond turtle (WPT) to use the aquatic habitat to the west of VBWR. In addition, CRLF and CTS could use the grasslands surrounding VBWR as dispersal and refuge habitat. Moreover, woody areas with trees and shrubs in the vicinity could potentially provide habitat for the San Francisco dusky-footed woodrat (SFDFW) to build middens, however no direct or indirect impacts should occur to WPT or SFDFW middens since all work will occur within paved areas. Buildings and structures throughout the BSA provide marginally suitable roosting habitat for the pallid bat, while aquatic features and grassland habitat provide potential foraging habitat for them. There is a potential to encounter CTS or CRLF, especially during a rain event, as they disperse from the aquatic habitat to find burrows in the grasslands. However, since most of the work is scheduled to take place in the dry season and there will be no ground disturbing impacts to potential burrows, the risk of impacting CTS or CRLF is very low. The risk to these species can be reduced even further with the implementation of avoidance and minimization measures (AMMs).

4.7.2 Threatened and Endangered Species Effects Conclusion

The risk of impacting threatened or endangered species as a result of VBWR decommissioning activities is considered low. Impacts are considered small, temporary, and mitigatable. With implementation of the AMMs listed below, no detectable impacts (alterations to habitat or local population size, or direct mortality) are anticipated.

- **Dry Season Construction.** Scheduling construction activities in the dry season, generally between May and October, is recommended, primarily for any off pavement staging or planned ground disturbing activity.

- **Environmental Training and Clearance Survey.** Prior to construction, a qualified biologist should provide construction personnel with environmental training. The training should include a discussion of the listed species and other sensitive biological resources potentially occurring in the VNC, as well as a description of their habitats, their legal status and protection under the federal and State Endangered Species Acts, and a list of measures being taken to reduce impacts to biological resources during Project construction and implementation. A brochure with color photos of listed species should also be provided to construction personnel. The qualified biologist should also of survey all work areas to before construction to identify any special-status species for avoidance.

- **Avoidance of Burrows.** To the greatest extent practicable, work should remain on paved surfaces or on previously disturbed areas to prevent impacts to burrows or potential habitats. Park vehicles and equipment on paved or gravel surfaces. Use established access roads.

- **Preconstruction Survey for Roosting Bats.** If work is to begin from October 15 to March 1 or April 15 to August 3 (sensitive periods to bats), a qualified biologist should conduct a preconstruction survey at least one week prior to the start of construction. Likewise, if there is a significant break in construction, a repeat survey is recommended.

4.8 RADIOLOGICAL

The NRC considers radiological doses to workers and members of the public when evaluating the potential consequences of decommissioning activities. Radioactive materials are present in the reactor and support facilities after operations cease and the fuel has been removed from the reactor core. Exposure to these radioactive materials during decommissioning may have consequences for workers. Members of the public may also potentially be exposed to radioactive materials that are released into the environment during the decommissioning process. All decommissioning activities were assessed to determine their potential for radiation exposures that may result in negative health effects to workers and the public. This section considers the impacts on workers and the public during to prepare and remove the boiling water reactor vessel.

4.8.1 WORKER AND PUBLIC EXPOSURE

Due to limited quantities of radioactive materials and the low levels of radioactivity, potential releases of radioactivity to the surrounding environment are considered minimal, well within the limits of 10 CFR 20. Decommissioning activities will be performed under the VNC Radiation Protection Program and in a manner that minimizes potential for creating airborne activity and controls any liquid waste existing or generated.

4.8.2 RADIOLOGICAL ACCIDENT ANALYSES

Table ES-1 of NUREG-0586, Final GEIS provides a summary of the environmental impacts of decommissioning nuclear power facilities. Since all special nuclear material and used nuclear fuel have been removed before decommissioning, the only possible accidents are those characterized in NUREG-0586 as "other radiological – (nonfuel) – related accidents" which are identified in Table ES-1 as having a SMALL impact on the environment.

4.8.3 *Radiological Environmental Monitoring*

GEH VNC conducts routine radiological environmental monitoring covering all operations at the VNC site. The program includes the routine sampling of air, vegetation, soil, and groundwater. Samples are analyzed for radioactivity and results are evaluated to ensure any releases from the site are well within regulatory limits and are consistent with ALARA practices. Dosimeters (Thermoluminescent Dosimeter (TLDs)/Optically stimulated luminescence (OSLs)) are placed around the site to monitor ambient radiation levels and evaluate any increase attributable to facility operations. This program will continue during the decommissioning activities to verify that the decommissioning activities have little to no impact on the environment and public health and safety. VNC uses an established process to evaluate non-routine activities (e.g., decommissioning activities) and will evaluate the need to enhance monitoring requirements using best management practices and apply such measures in the project specific plans as identified.

4.8.4 *Radiation Protection Program*

All radiological decommissioning work activities will be performed under the VNC Radiation Protection (RP) Program, using current VNC work processes, Radiation Work Permits (RWPs), and As Low as Reasonably Achievable (ALARA) reviews and approvals. The VNC RP Program supports all radiological operations at VNC; this program fully implements the requirements of 10 CFR 20 and has undergone years of NRC inspection. Throughout the various VNC operations, contaminated structures, systems, and components were/are decontaminated in order to perform maintenance or repair actions. The techniques used during such operations are the same or similar to the techniques used during decommissioning to reduce personnel exposure to radiation and contamination and to prevent the spread of contamination from established contaminated areas.

The performance of the dismantling and remediation activities will be evaluated, planned, and controlled under the VNC Work Control Process. This process integrates a detailed examination of the hazards, risks, and safety measures necessary for worker protection. The RP RWP process is an integral element of this work planning and control.

ALARA evaluations are an integral part of the RWP process. ALARA goals will be established for major dismantling activities, such as the reactor vessel removal; pre-job brief will be conducted; doses will be tracked using electronic personal (radiation) dosimeters (EPDs), appropriate radiation safety measures, such as personal protective equipment (PPE), including respiratory protection, will be evaluated. RP job coverage is provided where needed for monitoring RP practices, controlling exposures, and minimizing dose.

The only major dismantling/decommissioning activity is the reactor vessel removal. A preliminary dose estimate has been performed for the removal and packaging of the reactor vessel. This estimate is summarized in the following table. Dose rates from gamma exposure have been estimated based on characterization surveys supplemented by the reactor vessel dose profile estimated by DW James Consulting [6]. There are no other major work activities that are anticipated to represent potentially significant radiological work. However, all work processes will be conducted under the RP Program, including pre-job dose estimates, and establishing RP controls.

ALARA Dose Estimate for Reactor Vessel Removal

Project Step	Gamma Dose Rate (estimate)	Exposure Time (hours)	Number Workers	Cumulative Dose Estimate (person-rem)
Install equipment for VBWR vessel removal	1 mrem/h (general area on 539' level); 10 mrem/h (lower-level general area)	8 hours/day for 20 days = 160 hours	6	0.48 (539') 4.8 (lower-level)
Lift vessel & move to outside Containment	1 mrem/h (general area) on 539' level – middle of building, 15 mrem/hr @ 2m estimated on lower VBWR Vessel – mid core region	8 hours for 1 day GA = 8 hours, 4 hours for 3 Days @ 2m from vessel mid core = 12 hours	2	0.016 (539') 0.36
Place vessel on transport equipment	15 mrem/h @ 2m estimated on lower VBWR Vessel – mid core region	3 hours	2	0.09
Total				5.75 person-rem

4.8.5 Radiological Effects

GEH concludes that the radiological impacts of decommissioning activities at the VNC are bound by those in the decommissioning GEIS / prior environmental assessments. The impact is categorized as SMALL.

4.9 Occupational

Occupational issues are related to human health and safety. This section includes physical, chemical, ergonomic, and biological hazards; it does not include radiological impacts.

4.9.1 Occupational Safety and Health Administration

The Occupational Safety and Health Act of 1970 is designed to increase the safety of workers in the workplace. It provides that the Department of Labor is expected to recognize the dangers that may exist in workplaces and establish employee safety and health standards. Applicable regulations are found in 29 CFR 1910 for general industry and 29 CFR 1926 for construction activities. The Occupational Safety and Health Administration (OSHA) regulates mitigation requirements and mandates proper training and equipment for workers.

4.9.2 Health and Safety Plan

General work practices and controls are identified in VNC's Health and Safety Program (HSP) to address the applicable health and safety regulations contained within Federal and State of California OSHA regulations, VNCs regulatory and license requirements, and recognized industry standards. The HSP was developed to support the decommissioning work of VBWR, EVESR, and GETR nuclear facilities.

This HSP supplements project work plans and/or instructions for the administration, development, and issuance of project-specific procedures and/or job hazard analyses to ensure proper work controls. Unforeseeable site conditions or changes in the scope of work may warrant a reassessment of protection levels or controls and will be addressed in task-oriented work plans or work instructions.

4.9.3 Occupational Effects

Training and strict adherence to the HSP would protect workers from physical, chemical, ergonomic, and biological hazards. GEH concludes the occupational impacts of decommissioning activities at the VNC as SMALL.

4.10 Socioeconomics

There are two primary pathways that create socioeconomic impacts on the area surrounding VNC. The first is expenditures in the local community by the facility workforce and direct purchases of goods and services. The second is the effects on local government tax revenues and services.

The NRC indicates socioeconomic changes related to direct expenditures in the local community are considered not detectable if there is little or no impact on housing values, education, and other public services, and local government finances, are not distinguishable from normal background variation due to other causes. Impacts on housing are considered not detectable when no discernable change in housing availability occurs, changes in rental rates and housing values are similar to those occurring statewide, and little or no housing construction or conversion occurs.

Socioeconomic changes related to tax revenues and services (education, transportation, public safety, social services, public utilities, and tourism and recreation) are not considered detectable if the existing infrastructure (facilities, programs, and staff) could accommodate changes in demand related to plant closure and decommissioning without a noticeable effect on the level of service.

4.10.1 Socioeconomic Effects

VNC currently has a workforce of 50 to 60. VNC is scheduled to be decommissioned by 2030. The ongoing maintenance and surveillance activities at the shutdown at VBWR have assigned staff. Workforce reduction at VNC, if any, as a result of transitioning the reactors from shutdown to decommissioning and completion of decommissioning will be SMALL. This transition is also not expected to impact VNC's tax liability that would affect state and local tax revenues.

GEH will self-perform and/or engage a qualified contractor(s) to conduct the preparation and removal of the boiling water reactor vessel with strict adherence to NRC and both Federal and State of California OSHA safety standards, practices, and procedures. This work will commence as early as 2023 for 3 to 4 weeks with up to 30 workers.

This small workforce will have zero to SMALL impact, both adverse due to demand for community services or benefits due to workers' wages and spending, on the local socioeconomic conditions.

4.11 Environmental Justice

Most of the environmental justice impacts relate to land use, environmental and human health, and socioeconomics. Impacts due to onsite land disturbance are likely to be not detectable because the amounts of land disturbance are generally very small and usually occur in areas of the site previously disturbed by construction or operation of the facility. Impacts from disturbances to offsite land will generally not occur because offsite land generally is not disturbed as a result of decommissioning.

Socioeconomic impacts on minority and low-income populations due to plant closure could range from nondetectable to destabilizing, depending on the distribution of job impacts within the community and the effects of plant closure on local tax revenues and public services; however, the impact of decommissioning would generally not be detectable.

GEH has assessed the concerns of environmental justice as it relates to the effects of VBWR decommissioning. GEH examined the geographic distribution of minority and low-income populations within a 50-mile radius of the VNC site using the US Census Bureau (USCB) 2020 Redistricting Data (PL 94-171) for minority populations and the USCB 2020 American Community Survey 5-year estimates for low-income populations. Minority populations are disbursed throughout the region. Low-income populations are sparse and concentrated in cities. None of the locations of identified low-income minority populations when considered in the context of impact pathways described in this section are expected to be disproportionately impacted.

The minority populations closest to the VNC site are about 1.8 miles from the plant in USCB Block Group 060014507011. In 2020, the block group contains an Asian population and an Aggregate and Hispanic population.) [23]The closest low-income block group that meets the guidance criteria for both individuals and families, using the region as the geographic area for comparison, is located 3.9 miles north of the VNC site (Block Group 060014507411).[1]

4.11.1 Environmental Justice Effects

GEH determined that impacts from decommissioning activities to all resource areas will be SMALL. No disproportionately high and adverse impact or effects on members of the public, including minority and low-income populations, are expected to result from the decommissioning of VBWR and EVESR.

4.12 Cultural and Historic Resources

Cultural resources include any sites, buildings, structures, objects, or districts that are of value for their associative significance in history, architecture, archaeology, engineering, and culture. Cultural resources that meet the eligibility requirements for inclusion in the National Register of Historic Places are considered "historic properties" for the purposes of review under the National Historic Preservation Act and National Environmental Policy Act. The Federal agency (in this case the NRC) is responsible for identifying cultural resources that meet the definition of historic properties and that may be affected by a project, in consultation with the State Historic Preservation Officer (SHPO), or, if appropriate, the Tribal Historic Preservation Officer (THPO) having jurisdiction over the state or tribal lands in which the project is located.

The NRC is also responsible for including other consulting parties during the identification process, particularly federally recognized Native American tribes. Disagreements between the parties are resolved by the Advisory Council on Historic Preservation.

4.12.1 Affected Environment

A baseline cultural resources assessment (Appendix A) for the VNC site was performed by Montrose Environmental in June 2023.

A cultural resources record search was conducted at the Northwest Information Center of the California Historical Resources Information System, at California State University, Sonoma, for cultural resource records and studies on file for the VNC site and vicinity. The search consisted of a review of records for built environment as well as archaeological resources within 0.25 miles of the VNC. The following State of California inventories were reviewed for the VNC site:

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[2] U.S. Census Bureau. Census - Geography Profile Block Group. Livermore and Sunol : U.S. Census Bureau, 2020.

[3] —. Census - Geography Profile State. Livermore and Sunol : US Census Bureau, 2020.

- Five views: An Ethnic Historic Site Survey for California,
- California Points of Historical Interest,
- California Historical Landmarks,
- Archaeological Determinations of Eligibility, and
- *Build Environment Resources Directory for Contra Costa County.*

Appendix A Section 4(f) of the Caltrans' SR-84 Widening Project's Final Environmental Impact Report/Environmental Assessment documented two resources in the project site as possible historic properties: a prehistoric archaeological site; and the GE-Hitachi Vallecitos Nuclear Center. The GE-Hitachi Vallecitos Nuclear Center may be significant for its association with early nuclear power research and generation.

4.12.2 Cultural, Historic, And Archaeological Resources Effects

The activities to prepare and remove the boiling water reactor would not include any ground disturbance activities with the potential to disturb archeological sites and would not affect the qualities that would make the Vallecitos Nuclear Center eligible for the National Register of Historic Places. Although the removal of the VBWR vessel would require a temporary opening in the roof, the extraction would require only an approximately 12-foot-in-diameter hole in a portion of the building that is not visible from ground level in the Operating Area. The hole will be carefully created with man-lifts and cutting tools to avoid disturbance to other portions of the building. Following the extraction, the building's roof will be restored as close to pre-project conditions as possible, with materials that are compatible with the existing building fabric.

GEH concludes the potential impacts on cultural, historic, and archeological resources are SMALL.

4.13 Aesthetics

The NRC indicates that decommissioning activities could have impacts on aesthetic resources. However, there are no regulations that relate to the degree to which aesthetics may be impacted by a Federal project. In addition, the landscape has been previously altered by the facility, so decommissioning activities would likely not have an adverse impact on aesthetics.

The facility is located in a rural area of Alameda County in which there are minimal visual receptors, including highways and roads, residences, or sensitive receptors such as schools or parks. The removal of the VBWR will ultimately not change the visual characteristics of the facility.

The impacts to aesthetic resources will not be impacted by the project, therefore impacts would be considered small.

4.14 Noise

Noise is defined as unwanted or disturbing sound. High levels of noise can damage hearing, cause sleep deprivation, interfere with communication, and disrupt concentration. Even at low levels, noise can be a source of irritation, annoyance, and disturbance to people and communities when it significantly exceeds normal background sound levels. In the context of protecting public health and welfare, noise implies adverse effects on people and the environment.

4.14.1 Construction

Construction activities at VNC to prepare and remove the boiling water reactor vessel would require the use of heavy equipment such as a crane and dump truck, as well as the use of

generators, compressors, pneumatic tools, and jackhammer. Noise generated from this type of equipment would range from 70 to 90 dBa at approximately 50 feet.

NOISE-GENERATING CONSTRUCTION EQUIPMENT[4]

EQUIPMENT TYPE	SPL LMAX AT 50 FEET
All Other Equipment > 5 hp	85
Compressor (air)	78
Concrete Saw	90
Mobile Crane	81
Flat Bed Truck	74
Generator	81
Jackhammer	89
Man Lift	75
Pickup Truck	75
Pneumatic Tools	85
Welder/Torch	74

The following construction equipment would be required to remove the vessel:

- Mobile crane
- ½ ton pickup truck
- Man-lift
- Forklift
- Portable generators
- Portable air compressors
- Thermal cutting/welding equipment

An Over-The-Road transport vehicle will transport the reactor vessel off-site to a nearby railyard. The reactor vessel will then be loaded into a railcar for transport to an approved LLRW disposal facility in TX.

Approximately up to 30 workers during onsite activities for approximately 3 to 4 weeks.

4.14.2 Noise Receptors in the Vicinity of the Proposed Work

The determination of noise impacts is based on the relationship between the ambient noise levels and the established noise abatement criteria for the project area. Noise-sensitive areas are created to represent common noise environments within the same activity category, and are represented by receptors, which represent a discrete or representative location within a noise-sensitive area. Activity categories include land uses such as residences, hotels, motels, active sports areas, schools, places of worship, hospitals, parks, and others.

A small residential population exists along the western boundary of the property; approximately ¾ miles from the work site. The nearest sizable town is Pleasanton, located four miles to the

[4] Federal Highway Administration. 2005. Acoustical Measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054.

north-northwest. There is light industrial activity within a 10-mile radius of the property. A United States Veterans Administration hospital is located about four miles to the east.

4.14.3 Noise in the Vicinity of the Proposed Work

Noise sources in the vicinity of the site include ambient noise from the natural setting and highway noise from State Route 84.

4.14.4 Noise Effects

The noise would come predominantly from construction equipment and traffic. Construction activities would be temporary and limited to daytime working hours. The nearest residence is approximately 0.75 miles west from the work area and the closest recreational area (Sunol Mount Regional Preserve) is approximately 0.3 south of the work area.

In some cases, such as the use of equipment to demolish concrete, the noise level offsite cold be sufficiently loud (60 to 65 dBA at the nearest receptor) that activities may need to be curtailed during early morning and evening hours; however, concrete demolition to remove the vessel would be inside the building and the noise level is expected to be much less to the nearest receptor.

Noise level during operations would be within the U.S. Department of Housing and Urban Development guidelines[5]. In addition, GEH commissioned an environmental noise survey in 2022 and resulted in operational noise levels for Alameda County being below designated for both day and night activities. Alameda's Countywide Noise Element are based on Federal noise level standards.

Local agencies typically do not set noise level limits for construction activities occurring during allowed hours (usually between 7 AM and 6 PM). They require that construction contractors use available noise suppression devices and techniques to minimize disturbance to nearby businesses and residences. Significance criteria for construction related noise activities are not established because of the temporary nature of noise generated from construction activities.

The potential noise impacts are not detectable or destabilizing and therefore, the impacts are SMALL.

4.15 Transportation

GE-Hitachi (GEH) plans to use trucks and common carriers to deliver equipment and materials to prepare, remove and dispose of the boiling water reactor vessel at VNC. Workers would commute from home or nearby lodging. Up to approximately 30 workers would be at the site from approximately 3 to 4 weeks.

The mode of transportation for construction would be ranging from tractor trailer for a crane, dump truck, flatbed trucks and pickups. The primary transportation mode for the workforce to and from the site will be by car, truck, or van.

Existing highways and roads would be used by workers, trucks, and common carriers. The shipment of the reactor vessel for disposal will be via truck and rail to Texas.

[5] U.S. Department of Housing and Urban Development. 2009. The Noise Guidebook.

4.15.1 *Construction and Workforce*

Shipments of materials and equipment to prepare and remove the vessel are minimal and for only a short period of time; approximately 3 to 4 weeks. Construction equipment and supplies, including heavy equipment, would be from local sources and distance traveled would be minimal. The workforce would commute from nearby lodging facilities.

4.15.2 *Vessel Disposal*

The reactor vessel and internals assembly has been characterized as Class A waste in accordance with 10 CFR Part 61.GEH has determined intact removal and disposal is the best method for the scope of work to be performed. No Class C or Greater Than Class C (GTCC) is present at the VBWR facility. *NP* All LLRW will be packaged and shipped for disposal in accordance with applicable US Department of Transportation (DOT) regulations for Class 7 (Radioactive) Hazardous Material. The transportation of decommissioning waste over public roads and private railways involves no additional technical considerations beyond those for routine shipments of radioactive material.

Applicable regulations covering transport of radioactive material can be found in 10 CFR Parts 71 (NRC) and 49CFR Subchapter C (DOT Hazardous Material Regulations). *NP* Transportation via both highways and rail will be used for the LLRW generated during reactor removal operations. An on-site rail siding does not exist at VNC, so rail shipments will originate as truck shipments to a nearby rail transload facility. Shipments to Andrews County, TX may travel across Interstates 680, 580 and 205 for a total distance of less than 50 miles on public highwa.

4.15.3 *Transportation Effects*

The shipment of equipment, materials, and workforce commute to prepare and remove the vessel would be from nearby locations for a short duration and would not significantly impact the overall traffic volume or compromise the safety of the public. The disposal of the vessel would only require one shipment and not significantly impact overall traffic volume or compromise the safety of the public.

The transportation impacts are not detectable or destabilizing; therefore, the potential transportation impacts are SMALL.

4.16 Irretrievable Resources

Environmental Review Guidance for Licensing Actions Associated with National Material Safety and Safeguards (NMSS) Programs [NUREG-1748 (NRC, 2003)], defines an “irreversible” commitment and an “irretrievable” commitment as follows:

- “Irreversible” refers to the commitment of environmental resources that cannot be restored.
- “Irretrievable” refers to the commitment of material resources that once used cannot be recycled or restored for other uses by practical means.

4.16.1 *Irreversible and Irretrievable Resources*

Implementation to prepare and remove the boiling water reactor vessel would involve the consumption of fuel, oil, and lubricants for construction vehicles, and loss of natural resources. These resources are irreversible in that they would be used for the removal of the vessel when they could have been used for other purposes. Human labor would also be expended and is considered an irretrievable resource.

Most impacts would be short term and temporary or, if long lasting, would be negligible. Therefore, it would not result in major irreversible commitment of resources.

4.16.2 *Irreversible and Irretrievable Resources Effects*

The potential impacts of removing the boiling water vessel on irreversible and irretrievable resources are SMALL.

4.17 Cumulative Impacts

Cumulative impacts are those that result from past, present, and foreseeable future actions in the area, combined with the potential impacts of this proposed project. The proposed project will not have significant impacts on the environment; therefore, no cumulative impacts would be expected from the proposed project.

4.17.1 *Current and Foreseeable Actions*

In addition, there are no current projects in the proposed project area. A recently completed Caltrans project, the widening of State Route 84 (SR 84) is located just south of the proposed project. It was concluded that impacts from the project would not result in incremental effects that would be cumulatively considerable.

There are not any resources that would be affected cumulatively by the proposed project.

5. SUMMARY OF ENVIRONMENTAL EFFECTS

The decommissioning activities to prepare, remove and dispose of the boiling water reactor are not anticipated to require activities, techniques, or methods beyond those considered by NRC in the Decommissioning GEIS, NUREG-0586. In the Decommissioning GEIS, NRC issued generic determinations for all the environmental issues with the exceptions of threatened and endangered species and environmental justice, which require site-specific assessments. Site-specific assessments are also required for land use when offsite areas are needed to support decommissioning, and terrestrial ecology, aquatic ecology, and cultural resources when decommissioning activities are planned for areas outside of the operational area.

For the purposes of assessing decommissioning impacts, NRC defines operational areas in the Decommissioning GEIS as "the portion of the plant site where most or all of the site activities occur, such as reactor operation, materials and equipment storage, parking, substation operation, facility service, and maintenance. This includes areas within the protected area fences, the intake, discharge, cooling, and associated structures as well as surrounding paved, graveled, maintained landscape, or other maintained areas." The 997-acre VNC site property along with the 610 acre GEH property encompasses approximately 1,600 acres. The VNC Site Developed Area is 105.8 acres of the 1,600 acres.

All the decommissioning activities and supporting activities such as staging, managing equipment and waste, and decommissioning staff workspace and parking are anticipated to be confined to the VNC operational area (i.e., existing developed area of VNC). Primary decommissioning construction activities (e.g., dismantlement, excavation, staging, and decontamination) are anticipated to occur within or be localized around the Building 300 Area.

NRC has established a standard of significance for assessing environmental impacts. Each impact is assigned one of the follow three significance levels:

- SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE: The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.
- LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Summarized below are the significance levels for the respective resource areas.

5.1 LAND USE

SMALL: The activities to prepare, remove, and dispose of the boiling water reactor vessel alter the land use of the existing site, as well, as not require additional land outside of VNC. Preparation would be in an existing building and activities associated with removing the vessel would be on VNC's Site Operated Area. Transport and disposal would use existing roads, highways and rail, and an existing approved LLRW disposal site.

Mitigation: None required.

5.2 WATER USE

SMALL: Water use during construction would be temporary and for a short duration. Supply is from GEH's existing source. No significant use of water would occur during the preparation and disposal of the vessel.

Mitigation: None required.

5.3 WATER QUALITY

SMALL: Activities would be in paved or graveled areas and not require ground disturbing activities. The facility's existing system and plans would avoid inadvertent discharge in the event of a rainstorm.

Mitigation: Non required.

5.4 AIR QUALITY

SMALL: Activities to prepare the removal are inside an existing building. Equipment to support the preparation and removal would use paved or graveled areas not generating fugitive dust. The mix of vehicles for work and transportation is significantly less than during plant construction.

Mitigation: In the event of equipment or vehicles use unpaved or graveled areas, dust control measures would be employed.

5.5 AQUATIC ECOLOGY

SMALL: No direct impacts will occur to aquatic habitats. Although not anticipated, decommissioning activities could have a potential to indirectly impact aquatic habitats via stormwater runoff from structure dismantlement/decontamination and/or accidental releases (spills).

Mitigation: Best Management Practices (BMPs) and Avoidance and Minimization Measures (AMMs)will be implemented to mitigate any potential indirect impacts to aquatic features. Thus, potential impacts to aquatic ecology are considered small, temporary, and mitigatable.

5.6 TERRESTRIAL ECOLOGY

SMALL: There will be no direct or indirect impacts on native plants from the decommissioning activities as all work and equipment will be confined to previously disturbed areas. There is a potential for project related activities to disturb nesting birds indirectly temporarily, however the impacts would be considered small, and can be further reduced through the implementation of AMMs.

Mitigation: Implement AMMs.

5.7 Threatened and Endangered Species

SMALL: The risk of impacting threatened or endangered species as a result of decommissioning activities is considered low. Impacts are considered small, temporary, and mitigatable.

Mitigation: With implementation of the AMMs, no detectable impacts (alterations to habitat or local population size, or direct mortality) are anticipated.

5.8 Radiological

SMALL: VNC uses an established process to evaluate non-routine activities (e.g., decommissioning activities) and all activities would be performed under the VNC Radiation Protection Program. All nuclear fuel has been removed prior to decommissioning.

Mitigation: None required.

5.9 Occupational

SMALL: Training and strict adherence to VNC's Health and Safety Program would protect workers from physical, chemical, ergonomic, and biological hazards.

Mitigation: None required.

5.10 Socioeconomics

SMALL: The small workforce up to 30 for 3 to 4 weeks would not increase demand for community services or impact VNC's tax liability.

Mitigation: None required.

5.11 Environmental Justice

SMALL: Locations of identified low-income populations are not near the proposed work area; the closest low-income block group is located 3.9 miles north of VNC.

Mitigation: None required.

5.12 Cultural and Historic Resources

SMALL: Work activities do not require ground disturbance that may affect cultural resources and the roof top would be restored to near pre-construction appearance.

Mitigation: None Required

5.13 Aesthetics

SMALL: The work area is distant from sensitive receptors. The boiling water reactor vessel is inside the existing building and not visible; removal of it would not have any aesthetic impacts. The temporary hole cut in the roof to remove the vessel would be restored to near pre-construction appearance with indiscernible aesthetic effects.

Mitigation: None Required.

5.14 NOISE

SMALL: Noise generating equipment would operate during daytime working hours and only for a short duration of up to approximately 3 to 4 weeks. A significant amount of work would occur inside the existing building to prepare the removal of the vessel. Noise level during operations would be within the U.S. Department of Housing and Urban Development guidelines.

Mitigation: None required.

5.15 TRANSPORTATION

SMALL: The shipment of equipment, materials and workforce commute would be from nearby locations for a short period of time and not significantly impact the overall volume of traffic or compromise the safety of the public.

Mitigation: None required.

5.16 IRRETRIEVABLE RESOURCES

SMALL: The consumption of irreversible resources, such as fuel, oil, and lubricant, is for a short term and temporary.

Mitigation: None required.

6. ENVIRONMENTAL EFFECTS OF ACCIDENTS AND DECOMMISSSIONING EVENTS

6.1 PROTECTIVE ACTION GUIDELINES

The EPA has established protective action guides[6] (PAGs) that specify the potential offsite dose levels at which actions should be taken to protect the health and safety of the public. The EPA PAGs are based on the total effective dose equivalent (TEDE) resulting from the exposure to external sources and the committed effective dose equivalent (CEDE) incurred from the significant internal pathways (inhalation, ingestion, and skin absorption) during the early, intermediate, and late phases of an event.

Because there is no irradiated fuel being removed or transported from the site, there are no radioactive noble gases or radioiodines available for release. This preempts the possibility of accidental offsite radiological releases that could approach the PAGs for the thyroid. As a result, the PAG for TEDE is the limiting criteria for the removal and transport of the boiling water reactor vessel.

6.2 ACCIDENT AND EXPOSURE ANALYSES RELATED TO DECOMMISSIONING EVENTS

Compliance with NRC & DOT regulations for packaging & transport of radioactive material protects from the release of radioactive material. Appropriate notifications and emergency response measures will be made in accordance with Emergency Response Guide 162 (Radioactive Materials - Low to Moderate Level Radiation) in the unlikely event of an incident in transport. Emergency Response Instructions and Information will accompany the shipment in accordance with 49CFR Part 172 Subpart G.

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[6] EPA-400/R-17/001. PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents. January 2017

7. FACILITY RADIOLOGICAL STATUS AND ENVIRONMENTAL MONITORING

7.1 EFFLUENT MONITORING PROGRAM

GEH VNC's effluent monitoring program includes measuring radioactive constituents in water discharged through the site sanitary and industrial wastewater systems and air discharged through building exhaust stacks.

7.1.1 WATER EFFLUENT

Effluent water discharged from VNC is made up of industrial wastewater, sanitary wastewater, and clean water.

Industrial wastewater discharges are held in one of three available 50,000-gallon retention basins used for non-potable purposes. Sanitary waste (sludge) is collected in an Imhoff tank before undergoing sand filtration and chlorination by addition of sodium hypochlorite solution. Processed sanitary wastewater is collected in a fourth 50,000-gallon retention basin.

Samples are collected from each retention basin prior to discharge via on-site irrigation. In addition, composite samples from all basin discharges are accumulated and analyzed at specified intervals for gross alpha, gross beta, tritium, and a variety of non-radiological constituents. After July 1st, 2003, no discharges to surface water have been made from these sources. Effluent releases continue to be monitored so that no surface runoff occurs.

Discharges of clean water consist of storm water runoff and small quantities of water with no known contaminants. These waters flow directly to drainage ditches that enter Vallecitos Creek.

7.1.2 AIR EFFLUENT

While several operations at GEH VNC use exhaust stacks, there is no regularly active ventilation at the VBWR containment. For operating stacks, air is collected from single or multiple operating areas via a ventilation system comprised of ductwork, particulate filtration systems, blowers, and exhaust stack.

Air effluent is monitored or sampled to determine particulate and halogen releases. Noble gas releases, which are primarily Argon-41, are obtained from charts or electronic integrators on monitoring equipment. Local action levels for each stack are generally established as 10% of the license release limits.

7.1.3 VBWR DECOMMISSIONING EFFLUENTS

Radioactive air and water effluents from VBWR decommissioning activities will be controlled at the source of generation. Work controls will be evaluated and implemented for minimizing the generation of airborne activity and preventing release of liquid radioactive waste. These measures ensure that the potential for offsite releases are minimized and maintained well within the limits of 10 CFR 20 for exposure to members of the public.

If exhaust stacks are required to safely complete decommissioning activities, air effluent monitoring and sampling will be implemented in the same manner as other stacks at VNC. No radioactive liquid releases to the offsite environment will be allowed. Any industrial and sanitary effluent water will collected and analyzed for radioactivity prior to discharge via on-site irrigation as described previously.

7.2 ENVIRONMENTAL MONITORING

In addition to effluent monitoring, GEH VNC performs environmental monitoring to verify adequacy of controls and ensure any offsite releases are ALARA and well below established regulatory limits for exposures to members of the public. Samples of ambient air, groundwater, stream bottom sediment, and vegetation are collected at the periodicities defined in GEH VNC local procedures. A summary of the environmental monitoring program is shown in Table 7-1.

GEH VNC employs four environmental air samplers and located approximately 90 degrees apart around the operating facilities of the site. Each air sampler is equipped with a membrane filter and charcoal cartridge. The membrane filters are changed weekly and counted for gross alpha and beta radioactivity; the charcoal filter is changed as needed to monitor releases of radioiodine.

Groundwater is monitored by sampling eight wells located on or near GEH VNC. Water is drawn from the wells either quarterly or annually and analyzed for gross alpha, gross beta, strontium-90, and tritium activity. Wells GN, GP, and GS are sampled quarterly, and wells MW-1, MW-7, MW-8, MW-9S, MW-9D, MW-10, and EVESR-SE are sampled annually. These groundwater wells are shown in Figure 7-1. Samples of vegetation and stream bottom sediment are collected annually and analyzed for gross alpha and gross beta activity. Vegetation is collected at two points, one near the easternmost stream crossing the south boundary of GEH VNC and one west of the GEH VNC boundary, about 500 feet down Little Valley Road. Stream bottom sediment is collected from the stream at the southwest boundary of the site near the retention basins.

GEH VNC also has 20 environmental dosimeters around the vicinity of the site for dose monitoring. The external dosimetry processing laboratory reports the measurements for each dosimeter, which is reviewed for compliance 10 CFR 20.1301. The location of the each dosimeter is shown in Figure 7-2, denoted by numbers 1 through 20.

Sample Type	Number of Sample Locations	Sampling Frequency	Analysis
Groundwater Wells	10	Quarterly (3) or Annually (7)	Gross alpha, gross beta, tritium, Sr-90
Sediment	1	Annually	Gross alpha, gross beta
Vegetation	2	Annually	Gross alpha, gross beta
Ambient Air	4	Continuous. Air filter collected weekly, charcoal cartridge collected as needed	Gross alpha, gross beta, radioiodine (charcoal only)
Environmental Dosimeters	20	Annual	Gamma dose

Table 7-1: Summary of Environmental Monitoring Program

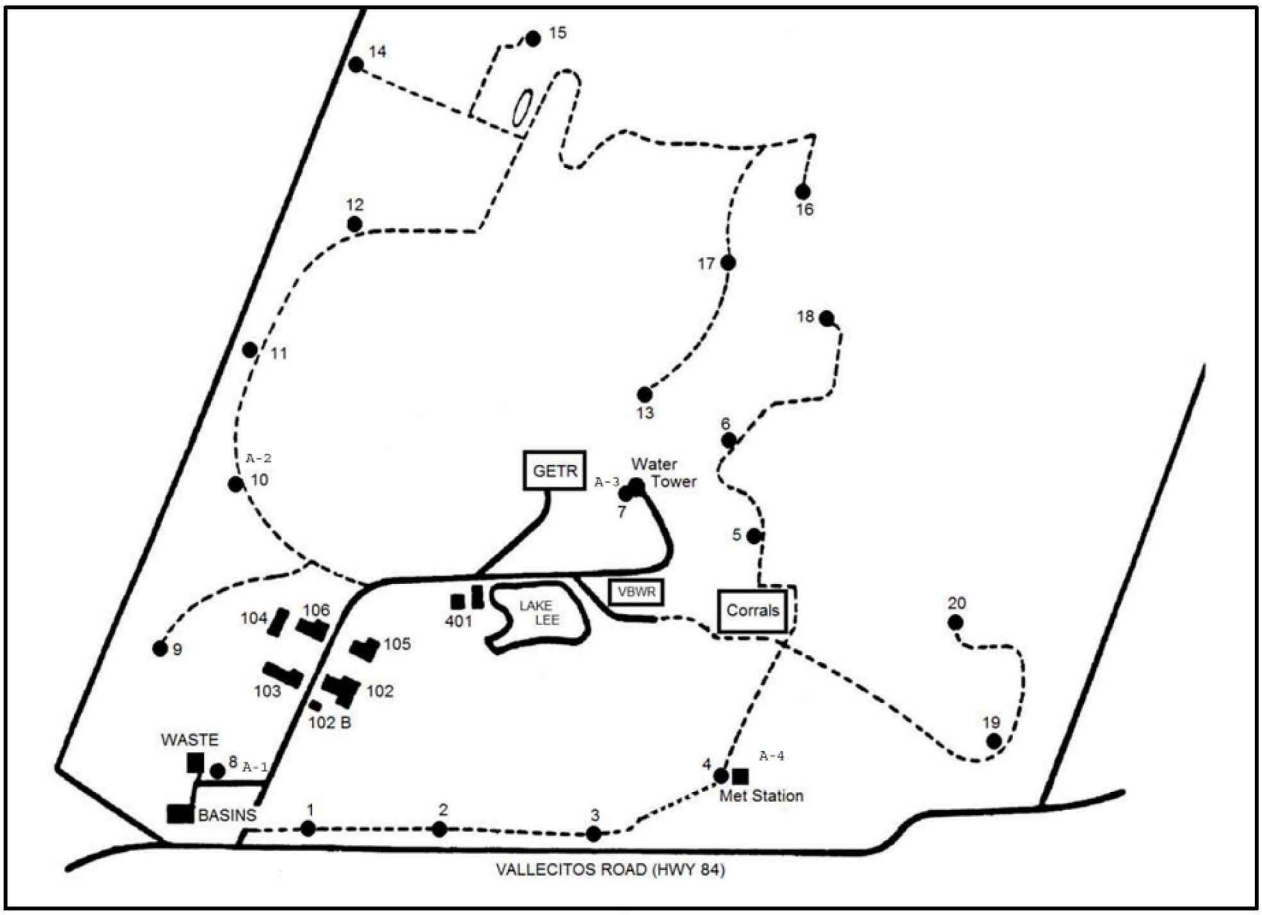

Figure 7-1: Air Sampling Locations and Gamma Monitoring Points

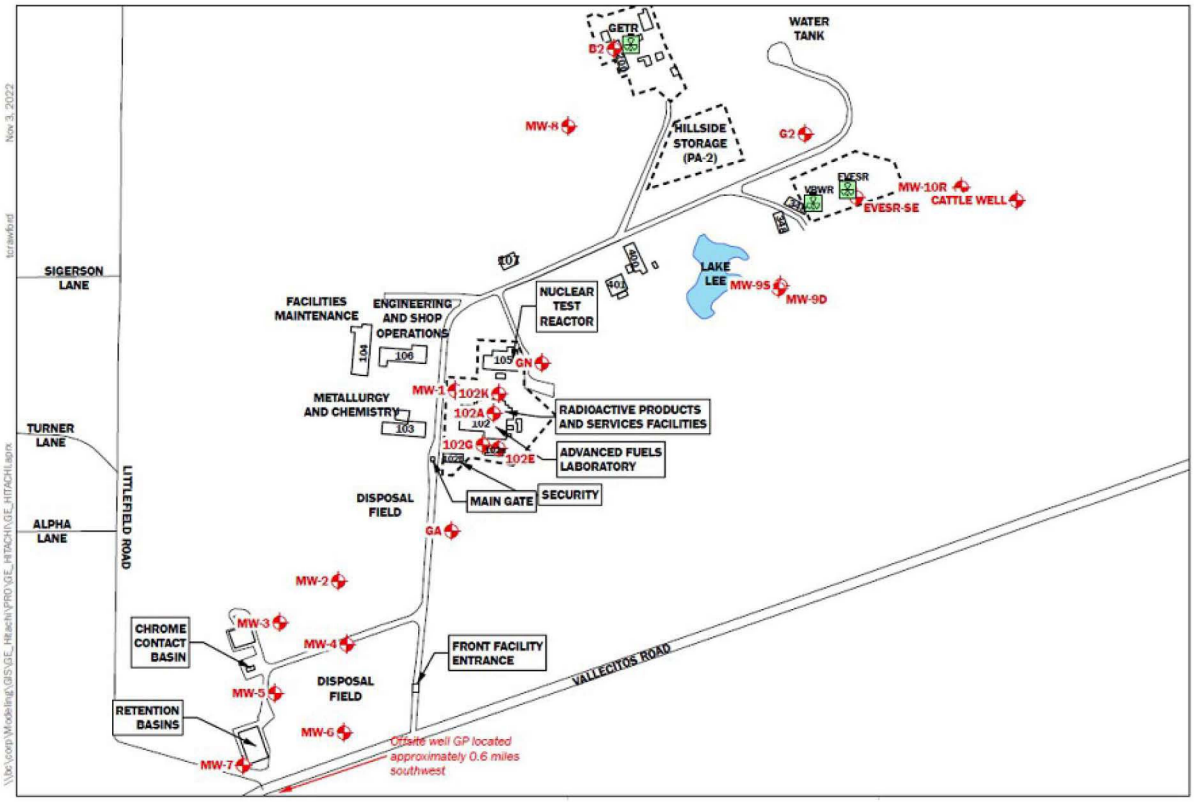

Figure 7-2: Groundwater Well Sampling

7.3 FINAL STATUS SURVEY

With the transfer of residual radioactive material from the VBWR license to EVESR license, there is no final status survey. The final status survey plan will be submitted in its entirety as a component of the EVESR License Termination Plan prior to April 15, 2028.

8. REGULATORY APPROVAL

This section provides a summary of the Federal, state, and local approvals applicable to the preparation and removal of boiling water reactor vessels.

8.1 FEDERAL REQUIREMENTS

NRC: The Atomic Energy Act of 1954, as amended, gives the NRC regulatory jurisdiction over the design, construction, operation, and decommissioning of the facility specifically with regard to assurance of public health and safety.

8.2 STATE AND LOCAL REQUIREMENTS

California Department of Transportation: The California Department of Transportation (Caltrans) has discretionary authority with respect to highways under its jurisdiction and may, upon application and if good cause appears, issue a special permit to operate or move a vehicle or combination of vehicles or special mobile equipment of a size or weight of vehicle or load exceeding the maximum limitations specified in the California Vehicle Code. The Caltrans Transportation Permits Issuance Branch is responsible for the issuance of these special transportation permits for oversize/overweight vehicles on the State Highway System.

Alameda County: Construction/demolition related permits are not anticipated but would be obtained if required.

Texas Commission on Environmental Quality (TCEQ): The TCEQ's mission is to protect the State of Texas' public health and natural resources consistent with sustainable economic development having clean air, clean water, and the safe management of waste. TCEQ is responsible for licensing the Texas LLRW waste disposal facility and sets the disposal rates for LLRW.

Generators of commercial low-level radioactive waste (LLRW) seeking to utilize the Texas Compact Waste Disposal Facility (CWF) are required to receive advanced approval prior to placing any shipment of LLRW in transit. No shipment may be accepted for disposal unless advance notification has been provided and the waste shipment has been inspected by the TCEQ.

Texas Department of State Health Services (DSHS): DSHS regulates shipping and transportation of LLRW to the Texas Disposal Facility.

Transport of radioactive material would require a license by DSHS unless exempted under Texas Administrative Code §289.257(c) 257-2 (c)

Texas Low-Level Radioactive Waste Disposal Compact Commission (TLLRWDCC): The TLLRWDCC is responsible for setting policies and rules providing for the efficient management of the Texas LLRW disposal facility under the Texas and Vermont waste disposal compact agreement. The TLLRWDCC is independent and not a State agency.

An agreement with TLLRWDCC would be required for the importation of LLRW for disposal that was generated in a non-party state.

Southwestern Low-Level Radioactive Waste Compact Commission: The Southwestern Low-Level Radioactive Waste Compact Commission, established under Public Law 100-712, is the governing body for the Southwestern Low-Level Radioactive Waste Disposal Compact among Arizona, California, North Dakota, and South Dakota.

California, as the host state, is required to develop a regional disposal facility. A regional disposal facility has not yet been developed, so the Commission's key duties include controlling the

exportation of low-level waste out of the region. As a separate legal entity, it can make recommendations and comments appropriate to its charge under law to do whatever is reasonably necessary to ensure that low-level waste is safely disposed of and managed within the region.

LLRW generators of the need to submit a petition to the Southwestern Low-Level Radioactive Waste Compact Commission (SWLLRWCC) for an export permit, prior to shipping LLRW outside of California.

9. REFERENCES

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10. APPENDIX A:

Montrose Environmental Vallecitos Nuclear Center: Cultural Resources Screening (June 2023)

Portions of this Appendix are to be withheld from public disclosure in accordance with 36 CFR Section 800.11(c). As such, the Cultural Resources Screening will be transmitted separately.