



**HITACHI**

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# **Release of North Section of Vallecitos, California Site**

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**Executive Summary:**

Vallecitos Nuclear Center (VNC), located at 6705 Vallecitos Road Sunol, California is an approximately 1600 acre site, of which only approximately 135 acres have ever been used for principal activities. GEH operates VNC as a research and development facility licensed under 10 CFR 50 and 70 as well as a State of California radioactive material license. VNC has never used the northern approximately 610 acres for principal activities and plans to remove reference to this section of the site in order to allow sale to a non-GE controlled entity. The areas identified as Areas C1 and C2 have undergone an environmental assessment including limited sampling to support the sale. GEH has also reviewed site history and operations to determine that Areas C1 and C2 are non-impacted areas and will be released without any limitations or conditions as defined in applicable regulations.

## **Overview:**

The primary purpose of the GE – Hitachi Nuclear Energy Americas LLC (GEH) Vallecitos Nuclear Center (VNC) was to provide research and development and engineering studies of Boiling Water Reactors and their fuel. Over time, much of the reactor related activities have ceased leaving only R-33 Nuclear Test Reactor (NTR) still in operation while DPR-1 Vallecitos Boiling Water Reactor (VBWR), TR-1 GE Test Reactor (GETR), DR-10 Empire State Atomic Development Agency Vallecitos Experimental Superheat Reactor (EVESR) are all in SAFSTOR. The principal activity currently performed on site is the by-product material activities covered under the State of California license CA-0017-01 including sealed source manufacture and research and development.

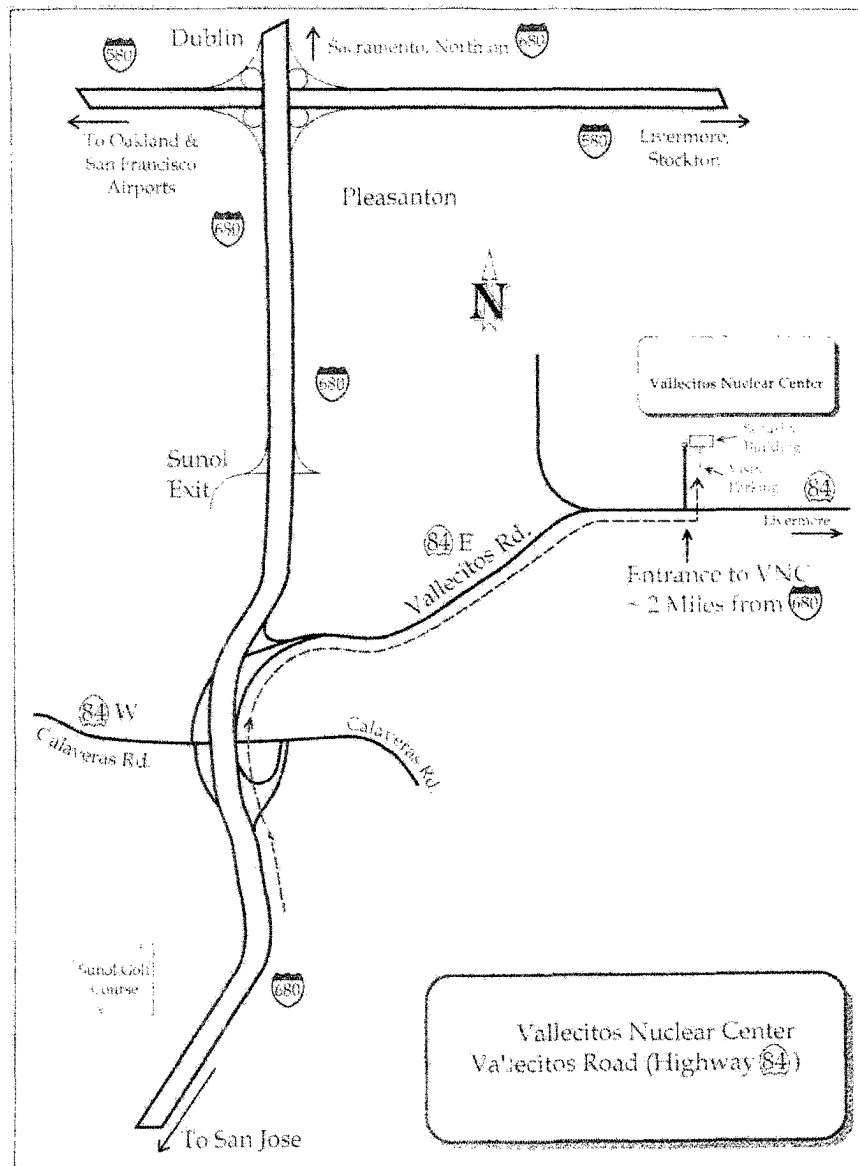
VNC is located near the center of the Pleasanton quadrangle of Alameda County, California. The site is east of San Francisco Bay, approximately 35 air miles east-southeast of San Francisco and 20 air miles north of San Jose. The site is indicated on the area map, Figure 1. The properties surrounding the site are primarily used for agriculture and cattle raising, with some residences, which are mostly to the west of the property. The nearest sizeable towns are Pleasanton located 4.1 miles to the north-northwest and Livermore located 6.2 miles to the northeast.

The site is on the north side of Vallecitos Road (State Route 84), which is a two and four-lane paved highway. A Union Pacific railroad line lies about two miles west of the site. There is light industrial activity within a 10-mile radius of the plant. San Jose (20 miles south), Oakland (30 miles northwest) and San Francisco (35 miles northwest) are major industrial centers.

The property boundary, which has not changed since the original property purchase in 1956, is fenced and posted "No Trespassing". A security gate at the entrance provides access control to the active area of the site.

The site is located in the Livermore Upland physiographic area. The majority of the site is undeveloped with hills ranging in elevation from approximately 400 to 1,200 feet above mean sea level. Approximately 135 acres located in the southwest corner of the property and situated between the 400 and 600-foot topographic contours are developed. The property on which the buildings are located slopes to the southwest and is drained by ditches leading to Vallecitos Creek. This creek discharges to Arroyo de la Laguna near the north end of Sunol Valley, two or three miles southwest of the property.

FIGURE 1  
Area Map  
(Not to Exact Scale)



**Methodology:**

Because VBWR was licensed as a power reactor and EVESR has similar possession only license conditions, a 10CFR50.83 release request will be followed. Other licenses have different requirements, but the 50.83 requirements are bounding and should sufficiently demonstrate the adequacy of the release. For the purpose of this report, the requirements from 10CFR50.83 are presented in italics at the beginning of each section. Then a description, encompassing both VBWR and EVESR possession only reactor facilities at VNC, is provided on how that requirement is met.

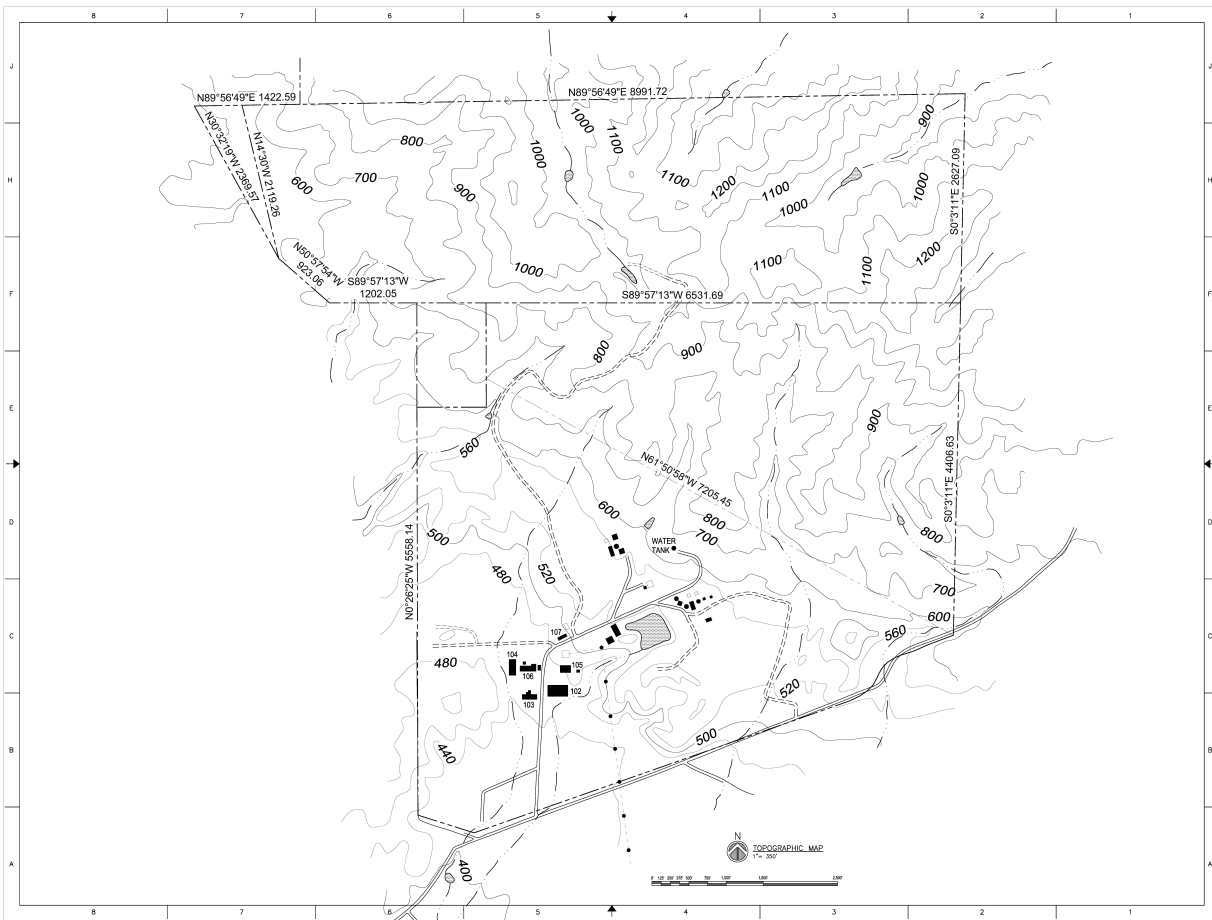
**Section 1: (a)(1) Evaluate the effect of releasing the property to ensure that--**

***(i) The dose to individual members of the public does not exceed the limits and standards of 10 CFR Part 20, Subpart D;*** The reactors in question have permanently ceased operations and are being maintained in a possession only SAFSTOR status. Direct dose measurements in and around Area C have all been consistent with background (Ref. 4, 5 and 6).

***(ii) There is no reduction in the effectiveness of emergency planning or physical security;*** The areas being released are not part of emergency planning and are not referenced in the plan. Administrative update will be made to the security plan where the current total site area of 1,600 acres is listed. Removing the reference to the number of acres will not reduce the effectiveness of the plan.

***(iii) Effluent releases remain within license conditions;*** The reactors in question are being maintained in a possession only SAFSTOR status with limited air emissions and Areas C1 and C2 are uphill from principal site activities so no liquid surface effluents would impact them (Figure 2).

**Figure 2: Topographical map of VNC. Note the higher elevation north of the active area of the site.**



**(iv) The environmental monitoring program and offsite dose calculation manual are revised to account for the changes;** The reactors in question are being maintained in a possession only SAFSTOR status. The site monitoring plan has been updated to move samples in Area C to areas of the site that will be retained. In addition, the air monitoring from NTR was confirmed to be sufficient as documented in an associated License Amendment Request for NTR in letter TAC 15-002, from Tom Caine to US NRC dated February 16, 2015 (Ref 3).

**(v) The siting criteria of 10 CFR Part 100 continue to be met;** The reactors in question are being maintained in a possession only SAFSTOR status. The criteria are being met.

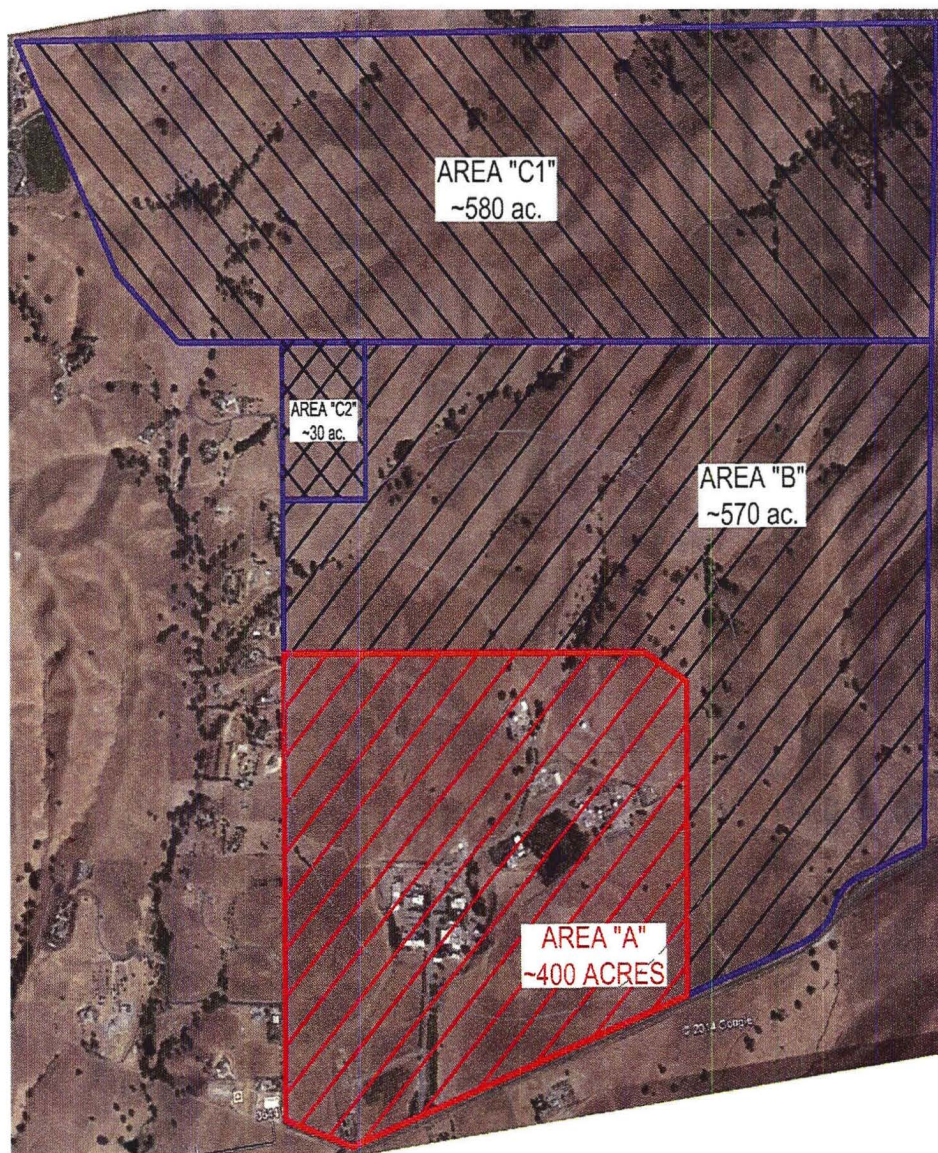
**(vi) All other applicable statutory and regulatory requirements continue to be met.** Yes.

**Section 2:** (a)(2) Perform a historical site assessment of the part of the facility or site to be released;

VNC is located near the center of the Pleasanton quadrangle of Alameda County, California. 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.

GEH has decided to divest approximately 610 acres in an unused portion of the site shown as Area C in Figure 3. Area C is further broken down into two areas C1 and C2. Area C consists generally of undeveloped land and is currently used for cattle grazing. The land has not been used for processing or storage of radioactive material.

**Figure 3: Overhead view of VNC Site layout**





An Environmental Assessment was conducted by Brown and Caldwell (BC) for Area C (Ref. 1). The results of the assessment were:

**Recognized Environmental Conditions**

- No adverse or recognized environmental conditions were identified on the Site.
- One recognized environmental condition (GE Vallecitos Nuclear Center) has been identified within one-half mile of the Site.

**Environmental Concerns**

No environmental concerns were found on the Site.

**Historical Recognized Environmental Conditions**

No Historical Recognized Environmental Conditions were found on the Site based on the review of aerial photographs and the EDR [Environmental Data Resources] Report.

Consistent with the MARSSIM approach (NUREG-1575 Section 2.2.5) the site has been determined to be non-impacted. The categorization decision is based on four sources of information: visual inspection, historical records review, process knowledge, and the results of sentinel measurements.



1) Visual Inspection:

**Figure 4: Current Site Boundary to Area C. Fence of golf driving range located north west of property seen on right.**



**Figure 5: Near C2 toward the Vallecitos operations.**



Field observations in the Brown and Caldwell Environmental Site Assessment did not note any indications of industrial materials.

## 2) Historical Record:

The site history, as documented in Brown and Caldwell's (BC) Environmental Site Assessment of the VNC Site Ref. 1, did not indicate the presence of any radioactive material.

Brown and Caldwell's (BC) Environmental Site Assessment, Section 4.1 Historical Use Information

*As no historical records were found specific to the Target Property, BC has reviewed the information provided in the EDR Report for the site. Based on information obtained during interviews with site personnel at the Vallecitos Nuclear Center, the Site has been maintained as an open range with cattle grazing since it was purchased by GE-H in the 1950s.*

In addition a review of historical site aerial photographs concluded:

*No environmental concerns, RECs [Recognized Environmental Conditions], or HRECs [Historic Recognized Environmental Conditions] were observed in BC's review of historical aerial photographs.*

Further GEH review of site records indicates that activities with licensed material were limited to the approximately 135 acres on the south-west end of the site which is well away from Area C. No documentation was identified that indicate an impact on Area C.

## 3) Process Knowledge

A survey was taken of current and past site personnel, and there are no known events that occurred in the process area that would have contaminated Area C. The survey included the current and past site managers and the GEH current and past General Managers (who were located in Wilmington, NC).

Name	Title	Approximate Service Years at VNC
Thomas Caine	Site Manager	2004-Present
Timothy Christman	General Manager	2013-Present
Anthony McFadden	Site Manager	2011-2013
Christopher Monetta	GEH EHS Manager and General Manager	1996-2007
Scott Murray	Licensing	1998-present
Louis Quintana	Site Manager	2001-2004
Michael Schrag	Facilities Manager	2004-Present
David Turner	Site Manager and Site EHS Manager	2003-2011
Mark Varno	General Manager	2011-2013

#### **4) Sentinel Measurements**

The only potential impact on Areas C1 and C2 from the site would have been due to airborne releases from the reactors or other site facilities. Any impact from the site airborne releases would have been fairly uniformly dispersed across the areas of interest. As part of an environmental assessment, Brown and Caldwell collected soil samples from 11 locations that were analyzed for gross alpha and gross beta activity (See Figure 6). These locations were selected because they were local low points where any contamination would expect to be concentrated. The alpha results had a mean value of 8.6 pCi/g (not including reanalysis) with a maximum result of 17.7 pCi/g (including reanalysis). The beta results had a mean value of 11.1 pCi/g with a maximum result of 23.5 pCi/g. As sentinel results these confirmed the historical record that the area was non-impacted by operations on the site. The results of the soil samples are provided in Table 1.



Figure 6: Gross alpha and beta sample locations.

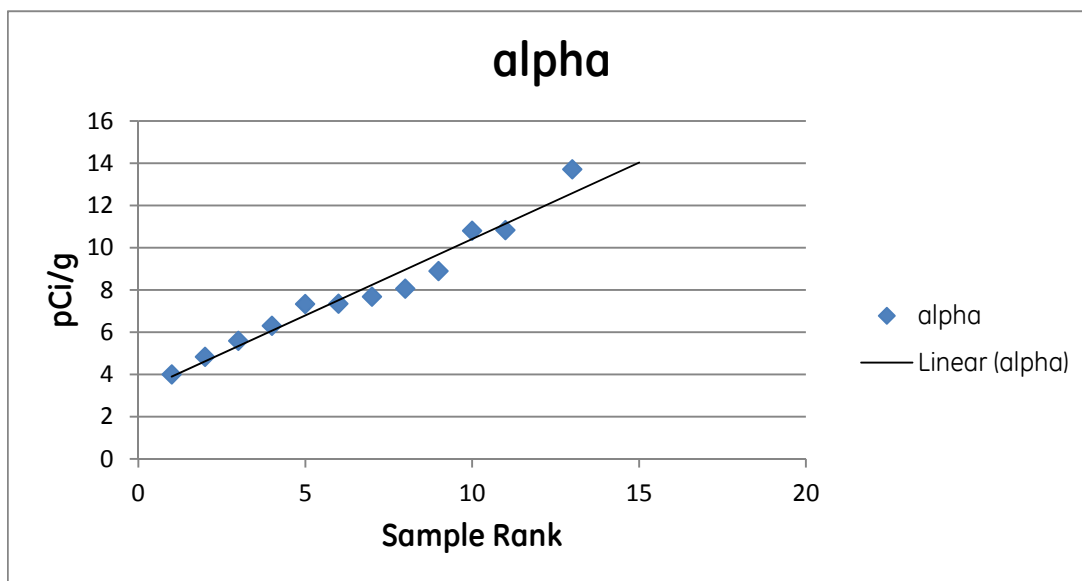


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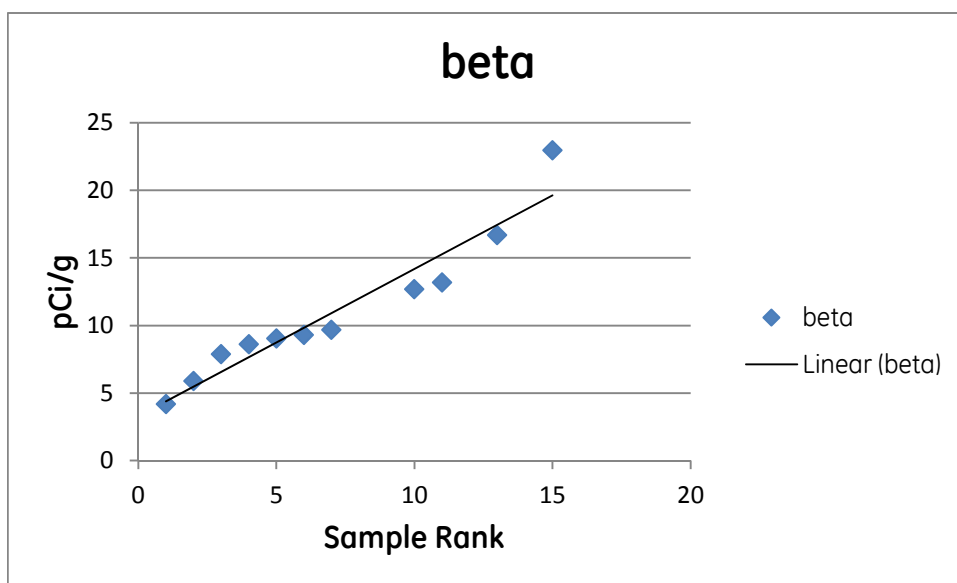
Table 1: Gross Alpha Beta Results

Sample	Alpha pCi/g	+/-	Beta pCi/g	+/-
C1-1	6.29	3.47	9.04	3.38
C1-2	13.70	4.82	22.96	4.49
C1-3	7.35	3.66	12.67	3.90
C1-4	5.58	2.42	9.68	3.48
C1-5	8.06	3.89	13.17	4.06
C1-6	7.33	3.11	7.87	3.22
C1-7	8.88	3.60	16.67	3.09
C1-8	10.80	3.40	5.89	2.49
C1-9	7.67	2.99	9.29	2.75
C1-9 Replicate	11.16	4.19	10.85	2.86
C2-1	4.83	2.27	4.18	2.75
C2-2	10.82	3.24	8.60	2.18
C1-1 Reanalysis	3.99	4.95	15.74	2.87
C1-2 Reanalysis	11.65	5.11	23.52	4.39
C2-2 Reanalysis	17.65	8.24	12.02	2.67

**Figure 7: Rank order of gross alpha results of initial analysis. The highest reading was from sample C1-2.**



**Figure 8: Rank order of gross beta results. Sample C1-2 had the highest result.**



For both the alpha and beta cases sample C1-2 appeared to be above the linear result expected for background samples (Figures 7 and 8). In addition, the samples were slightly above the screening levels, of 11 pCi/g for alpha and 21 pCi/g beta, recommended in the Lawrence Livermore National Laboratory (LLNL) background value document (Ref. 2). The LLNL report is a publicly available document that describes the background samples that were collected and analyzed at LLNL. Since LLNL is located near VNC, these results should provide a good data set for general comparisons. While one result was outside of the screening level it was well below results accepted and used to calculate background in the LLNL report indicating consistency with natural background characteristic of the area.

Because the C1-2 results were above screening levels and appeared to be above the rank order line, a gamma spectroscopy analysis was also performed. The gamma results did not indicate increased levels of non-naturally occurring isotopes. In particular, Cs-137 and Co-60, which are the dominant isotopes present at Vallecitos, were not detectable. In addition, gamma scan results for locations C1-1 and C2-2 were also conducted with all results provided in Attachment 1. Results for C1-1 and C2-2 were consistent with C1-2 results in that only naturally occurring isotopes were identified, and in expected concentrations. Therefore, the result of the analysis is that no non-naturally occurring isotopes above background levels have been identified.

### **Conclusion of MARSSIM type review**

None of the 4 reviews indicate that radioactive material was ever used on Areas C1 and C2 and the areas are characterized as non-impacted.

**Section 3: (a)(3) Perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402 for impacted areas.** Not applicable. The area being released is a non-impacted area.

**Section 4: (b) For release of non-impacted areas, the licensee may submit a written request for NRC approval of the release if a license amendment is not otherwise required. The request submittal must include--**

**(1) The results of the evaluations performed in accordance with paragraphs (a)(1) and (a)(2) of this section;** See Sections 1 and 2.

**(2) A description of the part of the facility or site to be released;** See Section 2

**(3) The schedule for release of the property;** The property will be released as soon as approval is received from the NRC. The property is currently being marketed and will transfer as soon as regulatory release is approved and commercial considerations are found to be acceptable.

**(4) The results of the evaluations performed in accordance with § 50.59; and:** Both VBWR and EVESR have permanently ceased operations and are being maintained in a possession only SAFSTOR status. The site acreage is not explicitly used in any of the analyses supporting the licensing basis of either VBWR or EVESR. Results of 10CFR50.59 analysis provided below.

#### **Would the installation, change, test, or experiment:**

- 1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated;** No, the change in site size has no impact on either probability or consequences of any previously evaluated accident.
- 2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated;**  
No
- 3. Result in more than a minimal increase in the consequences of an accident previously evaluated;** No
- 4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated;** No

5. **Create a possibility for an accident of a different type than any previously evaluated;**  
No, the change in site size does not create the possibility of a new or different kind of accident.
6. **Create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated;** No
7. **Result in a limit for a fission product/contamination barrier being exceeded or altered;**  
or: No
8. **Result in a departure from a method of evaluation used in establishing the design bases or in safety analyses.** No, the change in site size does not result in a departure from a method of evaluation.

**(5) A discussion that provides the reasons for concluding that the environmental impacts associated with the licensee's proposed release of the property will be bounded by appropriate previously issued environmental impact statements.** The proposed property to be released is an area that has never been used for licensed activity, the current use of the land is cattle grazing. Area C is separated from the active area of the site by hills that preclude surface transport of liquid effluents. Samples taken in the area do not indicate impact from license activities. Because the power reactors are shut down and there is no evidence of historic impact on the area, any previous environmental impact statements should not be impacted by the proposed release of Area C.

**Section 5: (c to f) are either not applicable or work to be performed by the NRC.**

**Section 6: Items of interest from other parts of the regulation**

**10CFR70.38(g)(4)(v) An updated detailed cost estimate for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and a plan for assuring the availability of adequate funds for completion of decommissioning.**

The changes will not impact the decommissioning cost estimate. Because no radioactive material was on land being divested, there is not a significant amount of funding in the current plan for this area.

#### References:

- 1) Environmental Site Assessment Assessor's Parcel No. 950-8-2-1 Alameda County, California. March 2, 2015. Brown and Caldwell report 146768
- 2) Background Values of Gross Alpha and Gross Beta in Soil for Lawrence Livermore National Laboratory, March 2008. LLNL-TR-402360. Gretchen Gallegos.
- 3) TAC 15-002; Technical Specification Change to Support Potential VNC Site Land Sale; Tom Caine to Document Control Desk, February 16, 2015. Docket No. 50-73 License No. R-33.
- 4) License Renewal Application for Vallecitos Nuclear Center Reference: NRC License SNM-960, Docket 70-754; September 30, 2009 ML092950541
- 5) Annual Report, 2013 Effluent Monitoring and Environmental Surveillance Programs, February 28, 2014; ML14073A739
- 6) Annual Report, 2014 Effluent Monitoring and Environmental Surveillance Programs, February 25, 2015 ML15069A472



Attachment 1

Gamma Spectroscopy Results:

Sample ID	Sample Date	Matrix	EPA Method	Analyses	Results pCi/gram	±	2 sigma Error	MDA
C1-1-1114 (12:45)	12-21-14	Soil						

Analyses completed on:

02/02/15	9310	Gross Alpha	3.99	±	4.95	8.30
02/02/15	9310	Gross Beta	15.74	±	2.87	4.02
01/23/15	DOE 4.5.2.3	K-40	9.95	±	0.23	0.23
01/23/15	DOE 4.5.2.3	Co-60	ND		0.01	0.05
01/23/15	DOE 4.5.2.3	Cs-137	ND		0.01	0.06
01/23/15	DOE 4.5.2.3	Cs-134	ND		0.01	0.03
01/23/15	DOE 4.5.2.3	Tl-208	0.24	±	0.03	0.23
01/23/15	DOE 4.5.2.3	Pb-210	0.17	±	0.01	0.03
01/23/15	DOE 4.5.2.3	Bi-210	0.13	±	0.01	0.01
01/23/15	DOE 4.5.2.3	Po-210	0.12	±	0.01	0.02
01/23/15	DOE 4.5.2.3	Pb-212	0.21	±	0.01	0.01
01/23/15	DOE 4.5.2.3	Bi-214	0.19	±	0.03	0.08
01/23/15	DOE 4.5.2.3	Pb-214	0.17	±	0.01	0.04
01/23/15	DOE 4.5.2.3	Ra-226	0.18	±	0.01	0.04
01/23/15	DOE 4.5.2.3	Po-214	0.17	±	0.01	0.05
01/23/15	DOE 4.5.2.3	Th-228	0.37	±	0.02	0.10
01/23/15	DOE 4.5.2.3	Th-232	0.36	±	0.03	0.06
01/23/15	DOE 4.5.2.3	Th-234	0.88	±	0.02	0.04
01/23/15	DOE 4.5.2.3	Pa-234m	0.86	±	0.09	0.19
01/23/15	DOE 4.5.2.3	Pa-234	0.76	±	0.07	0.12
01/23/15	DOE 4.5.2.3	Po-216	0.25	±	0.03	0.18
01/23/15	DOE 4.5.2.3	Po-218	0.22	±	0.02	0.05

Sample ID	Sample Date	Matrix	EPA Method	Analyses	Results pCi/gram	±	2 sigma Error	MDA
C1-2-1114 (13:00)	11-21-14	Soil						
Analyses completed on:								
	02/23/15		9310	Gross Alpha	11.65	±	5.11	6.99
	02/23/15		9310	Gross Beta	23.52	±	4.39	5.01
	02/23/15	DOE 4.5.2.3		K-40	12.71	±	0.44	0.82
	02/23/15	DOE 4.5.2.3		Co-60	ND		0.01	0.10
	02/23/15	DOE 4.5.2.3		Cs-137	ND		0.01	0.10
	02/23/15	DOE 4.5.2.3		Cs-134	ND		0.01	0.05
	02/23/15	DOE 4.5.2.3		Tl-208	0.93	±	0.08	0.38
	02/23/15	DOE 4.5.2.3		Pb-210	0.29	±	0.02	0.11
	02/23/15	DOE 4.5.2.3		Bi-210	0.01	±	0.01	0.01
	02/23/15	DOE 4.5.2.3		Po-210	0.10	±	0.01	0.01
	02/23/15	DOE 4.5.2.3		Pb-212	0.01	±	0.01	0.01
	02/23/15	DOE 4.5.2.3		Bi-214	0.19	±	0.02	0.06
	02/23/15	DOE 4.5.2.3		Pb-214	0.17	±	0.01	0.10
	02/23/15	DOE 4.5.2.3		Ra-226	0.19	±	0.02	0.07
	02/23/15	DOE 4.5.2.3		Po-214	0.15	±	0.01	0.08
	02/23/15	DOE 4.5.2.3		Th-228	0.34	±	0.02	0.06
	02/23/15	DOE 4.5.2.3		Th-232	0.21	±	0.02	0.13
	02/23/15	DOE 4.5.2.3		Th-234	1.74	±	0.12	0.20
	02/23/15	DOE 4.5.2.3		Pa-234m	1.67	±	0.15	0.35
	02/23/15	DOE 4.5.2.3		Pa-234	0.76	±	0.07	0.12
	02/23/15	DOE 4.5.2.3		Po-216	0.70	±	0.04	0.10
	02/23/15	DOE 4.5.2.3		Po-218	0.17	±	0.01	0.10

Sample ID	Sample Date	Matrix	EPA Method	Analyses	Results pCi/gram	±	2 Sigmaa Error	MDA
C2-2-1114	11-21-14 (09:00)	Soil						
Analyses completed on:								
	01/26/15	DOE	4.5.2.3	K-40	7.67	±	0.19	0.32
	01/26/15	DOE	4.5.2.3	Co-60	ND		0.01	0.07
	01/26/15	DOE	4.5.2.3	Cs-137	ND		0.01	0.09
	01/26/15	DOE	4.5.2.3	Cs-134	ND		0.01	0.04
	01/26/15	DOE	4.5.2.3	Tl-208	0.23	±	0.03	0.31
	01/26/15	DOE	4.5.2.3	Pb-210	0.11	±	0.01	0.04
	01/26/15	DOE	4.5.2.3	Bi-210	0.21	±	0.01	0.01
	01/26/15	DOE	4.5.2.3	Po-210	0.23	±	0.01	0.07
	01/26/15	DOE	4.5.2.3	Pb-212	0.22	±	0.01	0.06
	01/26/15	DOE	4.5.2.3	Bi-214	0.27	±	0.03	0.12
	01/26/15	DOE	4.5.2.3	Pb-214	0.31	±	0.01	0.06
	01/26/15	DOE	4.5.2.3	Ra-226	0.25	±	0.01	0.02
	01/26/15	DOE	4.5.2.3	Po-214	0.14	±	0.01	0.06
	01/26/15	DOE	4.5.2.3	Th-228	0.17	±	0.01	0.14
	01/26/15	DOE	4.5.2.3	Th-232	0.29	±	0.01	0.04
	01/26/15	DOE	4.5.2.3	Th-234	0.56	±	0.02	0.08
	01/26/15	DOE	4.5.2.3	Pa-234m	0.50	+	0.06	0.26
	01/26/15	DOE	4.5.2.3	Pa-234	0.48	+	0.02	0.06
	01/26/15	DOE	4.5.2.3	Po-216	0.26	±	0.03	0.24
	01/26/15	DOE	4.5.2.3	Po-218	0.23	±	0.01	0.07