Enclosure 4

TAC 15-002

Safety Analysis Report Page Markups

# 2.0 SITE CHARACTERISTICS

## 2.1 GEOGRAPHY AND DEMOGRAPHY

### 2.1.1 Site Location and Description

**Site Location**

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The NTR is situated on the ~~1590 acre (6.4-km$^2$)~~ Vallecitos Nuclear Center (VNC) near Pleasanton, California (Figure 2-1). The VNC site is owned by GE and is used for nuclear research and development.

The VNC is located on the north side of the Vallecitos Valley. The valley is approximately 3.2-km long and 1.6-km wide; its major axis is east-northeast and west-southwest. The valley is at an elevation of 120 to 150-m above sea level and is surrounded by barren mountains and rolling hills.

Delete Insert "is"

The Site ~~consists of a quadrilateral,~~ (Figure 2-2) bounded on the west, north, and east by hilly terrain; in some places, the hills are about 220-m above the general Site elevation. Vallecitos Road (State Highway 84) forms the southern boundary of the Site, from which an expanse of gently rolling grassland extends for about 5-km. Beyond 5-km mountain ranges form a southern barrier which completes the encirclement of the Site.

**Site Description**

Replace with "A portion"

~~Approximately one-third~~ of the Site is gently sloping or rolling terrain (Figure 2-3). The remainder consists primarily of the southwestern slope of a ridge serrated by several small draws. The southern part of the Site, adjacent to the Vallecitos Road, is relatively flat and accommodates the NTR, laboratories, and administrative facilities.

Replace with "A portion"

~~Approximately 1500-acres (6.1-km$^2$)~~ of the Site is normally leased for grazing and for cattle-feed crops. The land surrounding the Site is devoted to agriculture and cattle raising.

**Security**

Since its inception, VNC has operated under a controlled-access security plan. A perimeter fence maintains the Site as a restricted area to the general public. The entrance gate approached over VNC property from the Vallecitos Road is guarded at all times to control the entrance and exit of personnel. Additional security and control within the Site and its facilities is extensive. The plan conforms to the NRC requirements delineated in 10 CFR, Section 73.40. Since the northeast ~~portion~~ of the Site is mountainous, the general security of the Site is increased.

Insert "land"

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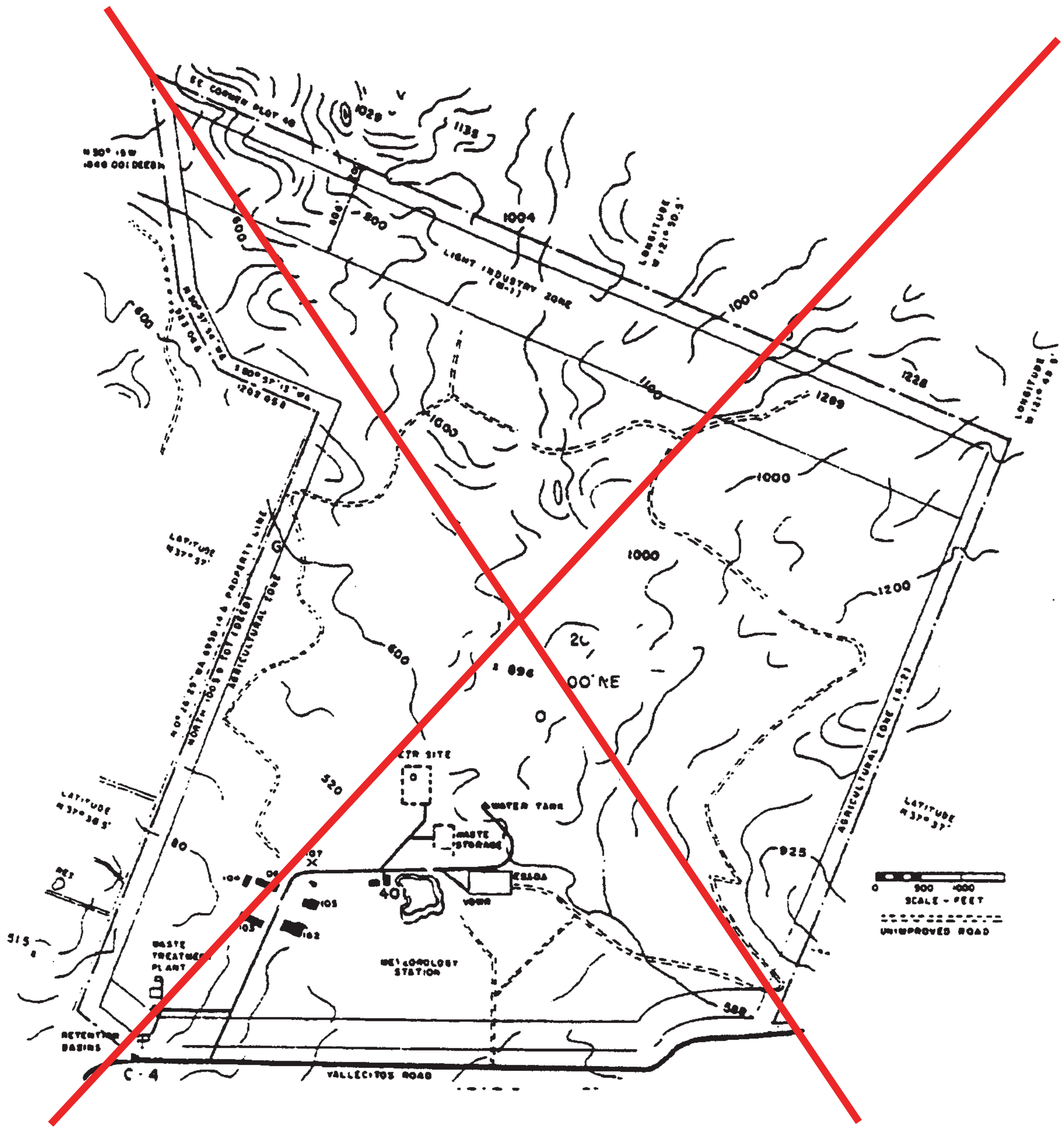
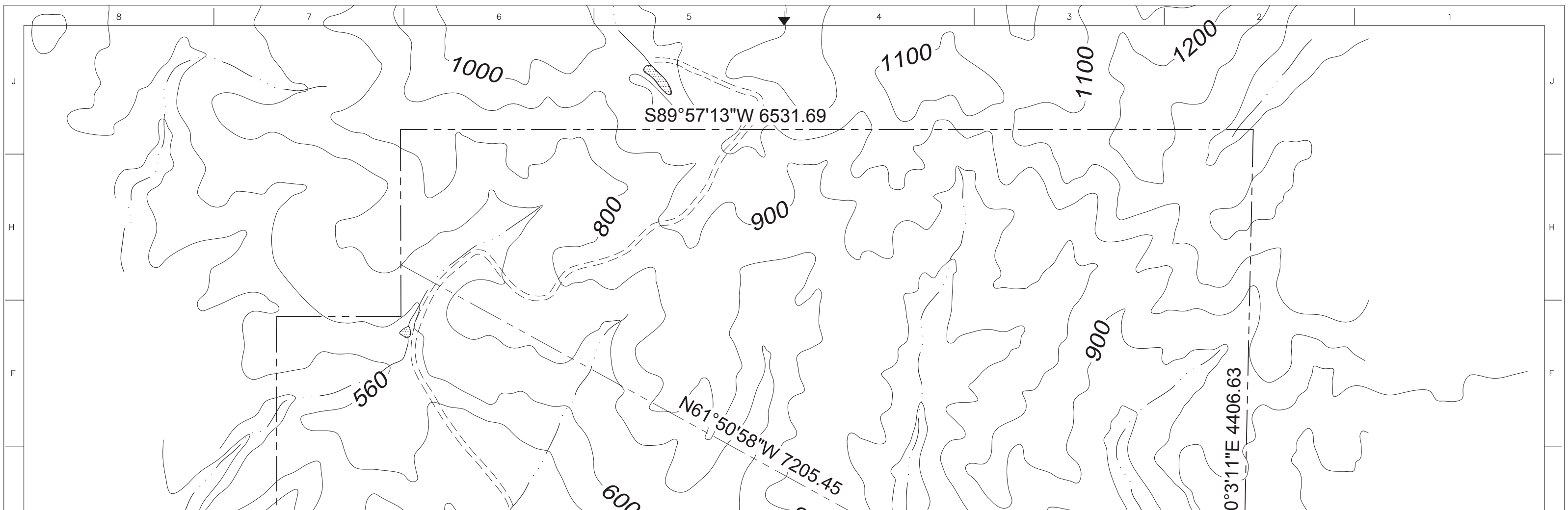



**Figure 2-5. Topography Contour of Vallecitos Nuclear Center**



INSERT 1: Replacement for Figure 2-5

The annual average dilution-dispersion factor for the NTR, and the other stacks at VNC, was calculated from valid hourly records of measured meteorological conditions for a two-year period in 1976 and 1977. The sector average $\chi/Q$ factors were conservatively computer calculated for each of 16 sectors (22.5 degrees each) using:

- Scaled distances from a site layout map to determine the distances from the reactor to the center of the sector at the site boundary.
- A building cross-section of 281 square meters, for wake effects.
- A ground level release elevation.
- No credit taken for plume depletion.

Insert new text as new paragraph using INSERT 2 (next page).

The single maximum calculated annual average $\chi/Q$ value of 3.48E-11 sec/ml was selected from the 16 sector average values. This value, which happens to occur in the east-southeast sector at 622 meters from the stack, is used to determine the NTR stack release limits. The ECL release rate, i.e., the continuous release rate which would produce an annual average boundary concentration equivalent to the ECL, would be calculated by division of the ECL by the $\chi/Q$ value. The Action Level release rates are calculated by reducing the ECL release rates by a factor of 10 for noble gas (a factor of five and another factor of two for "Other Stacks"), and a factor of 20 for the other isotope groups. These release rate limits, in units of microcuries per second, are shown below.

| **Isotope Group** | **Action Limit Release Rates ($\mu$Ci/sec)** |
|---|---|
| Noble Gas | 2.87E+01 |
| Halogen | 2.87E-01 |
| Alpha | 1.44E-05 |
| Beta | 1.44E-03 |

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These conservative release rate limits are converted and presented as the Technical Specification weekly release rate limits of Table 3-3 in NEDO-32765 (Technical Specifications for the General Electric Nuclear Test Reactor). For convenience in monitoring operating conditions, these release limits are also presented in Table 6-1 of this section as concentrations, in units of $\mu$Ci/cc. A normal maximum operating time for the NTR typically would not exceed 30 hours in a week. Therefore, this partial operating time is used to calculate the operating stack effluent concentration limits.

INSERT 2

The annual average $\chi/Q$ value has been reviewed to determine its adequacy for application to a reduced VNC site acreage that results in the reduction of distances from the NTR stack to the six sector distances for the NW sector sweeping clockwise to the ENE sector. The adequacy of the existing $\chi/Q$ was evaluated by comparing the existing $\chi/Q$ value of 3.48E-11 sec/ml to a conservative average annual $\chi/Q$ for the NTR stack calculated following the guidance of Regulatory Guide 1.111 (Reference 32) using:

- A distance of 510 meters which bounds the acreage reduction was used for the NW through ENE sectors. The distances from the original analysis for the remaining sectors (those not impacted by the acreage reduction) were not changed.
- A building cross-section of 281 square meters, for wake effects.
- A mixed mode release model for a release point above the height of adjacent structures (per Reference 32).
    - An above grade NTR stack height of 13.7 meters.
    - An above grade Building 105 height of 11.0 meters.
    - An average stack exit velocity of 7.2 meters/second.
- No credit taken for plume depletion.

The most limiting result from the adequacy review annual average $\chi/Q$ was bounded by the existing values by more than 30%. Therefore, the annual average $\chi/Q$ value of 3.48E-11 sec/ml remains unchanged.

23. L. A. Bromley, Chem. Eng. Prog. *46*, 221, 1950.

24. S. C. Skirvin, *User's Manual for the THTD Computer Program*, General Electric Co., San Jose, California, June 23, 1966.

25. *Development of Technical Specifications for Experiments in Research Reactors*, USNRC Regulatory Guide 2.2, November 1973

26. *Recommendations of the International Commission on Radiological Protection*, ICRP9.

27. J. G. Collier, *Convective Boiling and Condensation*, McGraw-Hill, London, 1972, pg. 253.

28. R. V. Macbeth, *Burnout Analysis, Part III, The Low Velocity Burnout Regime*, Dorset, England, 1963 (AEEW-R-222).

29. P. T. Pon, et al., *A Literature Survey of Critical Heat Flux Correlations for Low Pressure and Low Flow Conditions*, General Electric Co., San Jose, California, May 1980 (NEDE-24859).

30. A. I. Yang, et al., *CORLOOP Multi-Channel Core and Loop Model for the Nuclear Test Reactor*, August 1980 (NEDE-24861).

31. R. Yahalom, *GETR Multi-Channel Core Model for Simulating Internal Natural Circulation*, General Electric Co., San Jose, California, June 1977 (NEDO-12663).

32. Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977.


Add new Reference 32