

Site Summary – Building 4055

Site Identification:

Building 4055
Nuclear Materials Development Facility (NMDF)
Includes Building 4755, Substation
Includes Building 4155, Control Center, Guard Shack

Operational Use/History:

- Constructed in 1967.¹
- From 1968-69, NMDF was used to support the Fast Flux Test Facility through analytical chemistry and research for uranium-plutonium scrap pellet recycling programs. Fission research on microscopic dispersion of tungsten in uranium plutonium fuel was also conducted at that time.¹
- For seven months in 1970, the NMDF fabricated mixed uranium-plutonium oxide pellets for irradiation tests.
- The NMDF was in standby from September 1970 until March 1974. NMDF was activated to participate in the Advanced Fuel Systems Program for liquid metal fast breeder reactors and to demonstrate reduced transuranic (TRU) solid waste with the use of a molten salt combustor.¹
- In 1975, the facility was upgraded to address new environmental, safeguard, licensing and radioactive materials facility operating standards.¹
- D&D efforts began in late 1979 beginning with the decontamination of equipment and treatment of the remaining uranium carbide on site.¹
- The entire building was stripped to the walls and decontaminated, equipment was disposed of as low-level waste, and the liquid waste and exhaust systems were removed.¹
- Currently used for non-radiological research.

Site Description:

- Building 4055 is a tilt up concrete structure 200 feet long (north to south), 60 feet wide and 16 feet high. The walls are 6-inch thick concrete and the ceiling is thin concrete covered with tarred felt and gravel, supported on steel deck panels and girders. The building is divided into an administrative area, change rooms, chemistry and other service laboratories, a glove box room, a vault and facility equipment rooms.²
- Building 4055 was equipped with high-efficiency filters located in the radioactive exhaust filter room. Air was also discharged through a stack. All floor drains, service sinks and lab sinks that were capable of handling radioactive materials were connected to the radioactive liquid waste system by underground piping to two 1000-gallon holdup tanks.¹

Group X

- Serviced by Substation 4755, which is housed internally in the Southwest corner of Building 4055.³
- Serviced by Guard Shack 4155.

Relevant Site Information:

- The primary special nuclear materials handled in the NMDF were plutonium and uranium. Accordingly the contaminants of concern are U, Pu, and their decay and daughter products, primarily Am-241.¹
- A number of incidents may have resulted in releases to the environment:
 - On June 26, 1973, there was a glove box controller failure of the pressurized box, releasing contamination to the area (A0222).
 - On December 21, 1977, a contaminated roll of green tape was discovered in the glove box room. A low level of alpha activity was discovered on the bench underneath the tape and was contained. No other contamination was found (A0224).
 - On May 10, 1978, a lost seal during the replacement of a rubber glove with a plastic bag caused loss of vacuum in a glove box. Contamination was subsequently discovered on the outside window area (A0335).
 - On June 15, 1978, an employee compacted radioactive waste in a compactor reserved for non-radioactive “suspect” waste. Although compacting radioactive waste may have generated high airborne activity, the compactor had a filter that minimized the release of such contamination to the building (A0071).
 - On June 30, 1978, it was discovered that a stack monitor vacuum line had not been monitored for 23 days. Air samples indicated that activity levels were twice the normal level (A0225).
 - On July 21, 1978, it was discovered that a stack monitor in the plutonium facility was out of service for 84 hours due to an electrical failure. Airflow through a filter was maintained and no uncontrolled release of material occurred (A0226).
 - On July 24, 1978, floor contamination was found in the waste handling area. This contamination was assumed to have been caused by leakage from a stored waste container although none of the containers had external contamination (A0073).
 - On June 26, 1979, airborne activity was released during maintenance of glove box. After decontamination, no detectable contamination remained (A0582).
 - On May 10, 1980, the air sample vacuum pump stopped working. There was no indication of a release of contaminants (A0081).
 - May 31, 1981, the air sample vacuum pump failed, resulting in the failure of the facility air monitoring system. Samples indicated no release of contamination (A0085).
- Removed from the Nuclear Regulatory Commission (NRC) Special Nuclear Material (SNM) 21 License and released for unrestricted use October 1987.⁴

Radiological Surveys:

- Rockwell International performed a survey of the NMDF drain lines to determine if any plutonium was left in the soil after removal.⁵
 - The survey concluded that soil from the drain line excavation was below the acceptable levels.
 - Some soil samples showed detectable contamination, maximum measurements were: 0.613 pCi/g of Pu-239 and Pu-240 and 0.0421 pCi/g of Pu-238 (acceptance limit is 25 pCi/g).
 - NRC took confirmatory soil samples supporting the Rockwell samples.
- Rockwell International performed a final radiation survey to determine the effectiveness of the decontamination effort and to demonstrate that the facility met release criteria for unrestricted use. The survey covered Building 4055 and the surrounding area through surface samples.²
 - The survey concluded that no residual contamination remains and that the facility meets the release criteria for unrestricted use.
- Oak Ridge Associated Universities (ORAU) performed a radiological survey in 1987 to confirm the Rocketdyne final radiological survey. The survey covered Building 4055 and the surrounding area through a document review and measurements of direct radiation levels, contamination levels and soil contamination.⁶
 - The survey concluded that the facility satisfies the NRC requirements for release for unrestricted use.
 - The document review found that the final survey was consistent with industry-accepted practices and that the data supported the conclusions.
 - Surface scans revealed no areas of elevated beta-gamma or gamma contamination and one small area of elevated alpha contamination inside the building.
 - Surface contamination measurements for alpha contamination were between the minimum detectable activity (3 dpm/100cm²) and 120 dpm/100cm² (NRC limit is 300 dpm/100cm²). All smears for removable alpha contamination taken after cleanup were below the limit for unrestricted use (NRC limit is 20 dpm/100cm²). Beta contamination measurements were between the MDA (480 dpm/100cm²) and 3,900 dpm/100cm² (NRC limit is 5,000 dpm/100cm²). Removable beta contamination smears taken after cleanup was between the MDA (6 dpm/100cm²) and 23 dpm/100cm² (NRC limit is 1,000 dpm/100cm²).
 - Exposure rates ranged from 12 to 14 μR/hr compared to background levels of 10 to 13 μR/hr (Site criteria is 10 μR/hr above background).
 - Soil samples showed contaminant concentrations of: U-235, <0.36 to <0.41 pCi/g (limit is 35 pCi/g); U-238, 1.7 to 5.1 pCi/g (limit is 35 pCi/g); Am-241, <0.11 to <0.13 pCi/g; Pu-238, <0.01 to 0.01 pCi/g (limit is 25pCi/g); Pu-239/240, <0.01 to 0.06 pCi/g (limit is 25 pCi/g).

Group X

- EPA conducted an oversight verification survey in 2001 for alpha, beta, beta-gamma radiation (total and removable) and gamma radiation.⁷ Surveys were performed to a quality level equal to a final status survey as defined by the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The contaminants of concern (COCs) for 4055 were transuranic compounds on the floors, walls, and ceilings. EPA also collected concrete core samples, which were analyzed for photon-emitting isotopes.
 - Acceptable limits for the survey were consistent with NRC Regulatory Guide 1.86 and the proposed site-wide release criteria in the 1996 Area IV survey.⁸
 - None of the field measurements indicated the presence of radionuclides above acceptable limits.
 - EPA field measurements confirmed the conclusions reached by both Rocketdyne and ORAU.

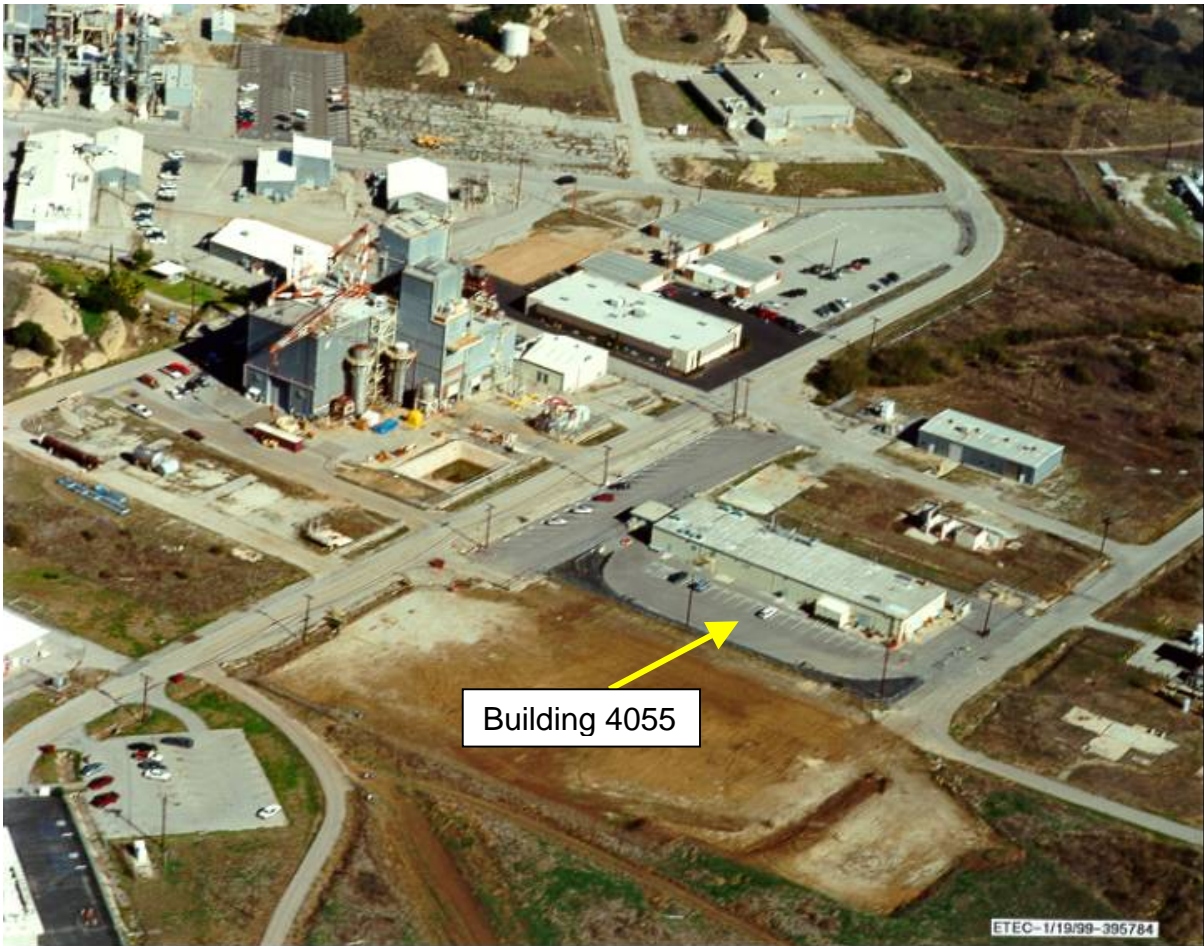
Status:

- NRC released Building 4055 for unrestricted use in March 1987.⁴
- Building 4055 is now used for non-radiological research.

References:

- 1- Rockwell International Report, AI-DOE-13559, "Nuclear Materials Development Facility Decommissioning Final Report," March 31, 1987.
- 2- Rockwell International Report, N704SRR990027, "Final Radiation Survey of the NMDF," December 19, 1986.
- 3- Personnel Interview, Dan Trippeda, September 12, 2003.
- 4- NRC, Letter, "SNM-21, Amendment No. 1," from Leland Rouse (NRC) to M.E. Remley, October 76, 1987.
- 5- Rockwell International Report, N704SRR990024, "Plutonium Concentrations in Soil Around Drain Lines at NMDF," April 3, 1986.
- 6- Oak Ridge Associated Universities Report, no document number, "Confirmatory Radiological Survey Nuclear Materials Development Facility (Building T-055), Rockwell International, Santa Susana, California," July 1987.
- 7- U.S. EPA Report, no document number, "Final Oversight Verification and Confirmation Radiological Survey Report for Buildings T-011, T-019, T-055, and T-100," December 20, 2002.
- 8- Rocketdyne Document, A4CM-ZR-0011, Rev. A, "Area IV Radiological Characterization Survey," August 15, 1996.
- 9- Historical Site Photographs from Boeing Database.
- 10- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4055



4343 (77-92)

4155

4055

4374

4848

4373

4468

4478 (67,82 & 83)



4755

4323












24 ST

Legend

Labeled Features:
(Based on SSFL Documents
as of October 2004)

-  Buildings/Sites:
"Current"
-  Buildings/Sites:
"Demolished"

Unlabeled Features:

-  Leachfield
(Removed)
-  Tree
-  Rock
-  Concrete Curb
-  Gutter
-  Asphalt/Concrete
Berm & Paving
-  Sidewalk
-  Dirt Road
-  Fence
-  Stream/Pond
-  Drain
-  Area IV Boundary

DRAWN BY:

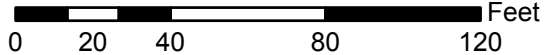


DATE:

May 2005



1 inch equals 50 feet



Site Summary Group X
AREA IV
Santa Susana Field Laboratory, CA