Group AA

Group AA Map

Building 4020

Includes Building 4323, Guard Building
Includes Building 4720, Substation

Building 4468

Site 4520

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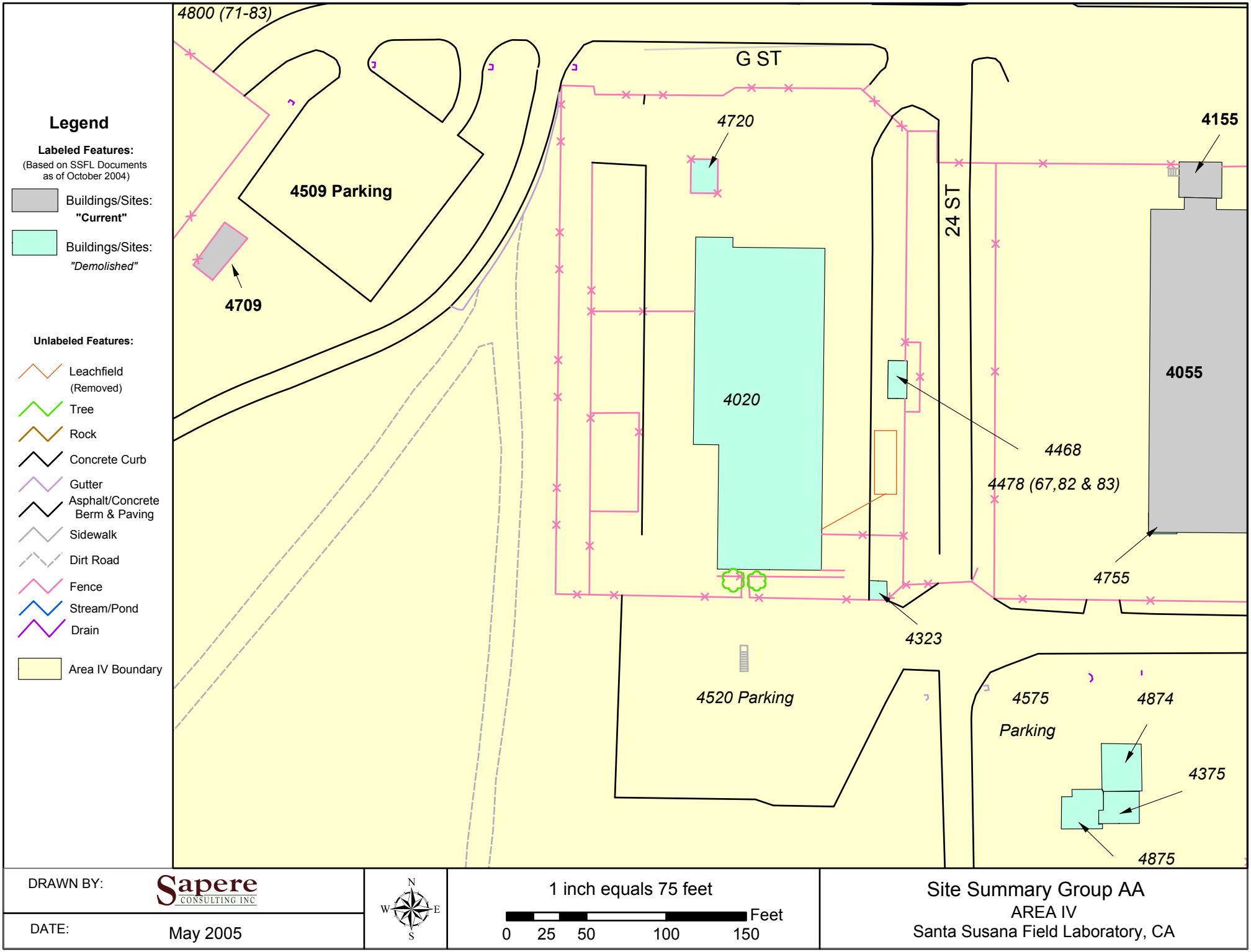
Legend
Labeled Features:
(Based on SSFL Documents as of October 2004)
Buildings/Sites: "Current"
Buildings/Sites: "Demolished"
Unlabeled Features:
Leachfield (Removed)
Tree
Rock
Concrete Curb
Gutter
Asphalt/Concrete Berm & Paving
Sidewalk
Dirt Road
Fence
Stream/Pond
Drain
Area IV Boundary
4800 (71-83)
G ST
4720
4155
4509 Parking
24 ST
4709
4020
4055
4468
4478 (67,82 & 83)
4755
4323
4520 Parking
4575
4874
Parking
4375
4875
DRAWN BY:
Sapere CONSULTING INC
DATE:
May 2005
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1 inch equals 75 feet
0 25 50 100 150
Feet
Site Summary Group AA
AREA IV
Santa Susana Field Laboratory, CA

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Site Summary – Building 4020

Site Identification:

Building 4020
Rockwell International Hot Laboratory
Component Development Hot Cell (CDHC)
Includes Building 4323, Guard Building
Includes Building 4720, Substation

Operational Use/History:

- Constructed in 1959.[1]
- Operations conducted under Nuclear Regulatory Commission (NRC) Special Nuclear Materials License No. SMN-21.[1]
- Constructed for the remote handling of radioactive materials. The Hot Lab was used for the disassembly and examination of irradiated nuclear fuel assemblies from various nuclear reactors (Sodium Reactor Experiment (SRE), Sodium Graphite Reactor (SGR), and Piqua Reactor), the disassembly and examination of Systems for Nuclear Auxiliary Power (SNAP) Reactor cores (SNAP Experimental Reactor (SER), SNAP 2 Demonstration Reactor (S2DR), SNAP 8 Experimental Reactor (S8ER), S8DR, SNAP 10 Flight System-3 (10SF-3)), analysis of irradiated test materials, manufacture and leak testing of sealed radioactive sources (which were checked annually to ensure no leakage occurred) and machining of radioactive Co-60.[1]
- After the termination of the SNAP program, Building 4020 was used for decladding of irradiated plutonium bearing fuels from off-site reactors from 1976 to 1986.[1]
- All equipment and materials related to the decladding project were removed and the cells decontaminated in 1986 in preparation for the next project. However, rather than continuing operations, the Department of Energy (DOE) decided to begin decommissioning and demolition (D&D) of the facility.[1]
- Between 1987 and 1991 all hazardous materials and equipment not related to D&D were removed and decontamination efforts focused on the removal of general contamination from support areas, decontamination rooms and hot cells.[1]
- In 1992, activities in Building 4020 changed from decontamination to dismantlement. Decontamination to support demolition occurred from 1992 through 1995, and the structure was completely removed in 1996.[1]
- Ownership was transferred from Rocketdyne to DOE in 1995 to facilitate final dismantling.[1]
- Demolished and backfilled in 1996.[1]
- DOE approved the removal of Radiological Materials Management Area (RMMA) for the Hot Lab in November 1998.[2]

Site Description:

- Building 4020 is a rectangular, structural steel building covered in sheet metal with 16,000 square feet of floor space. Three subsurface fission gas tanks were located under the north end of the building but never used. Inside the building, four radioactive handling cells were constructed of reinforced concrete with adjacent concrete decontamination rooms above a concrete basement. The building contained an operating gallery, service gallery, maintenance rooms, mock up room, and administrative areas. A stack originated in the basement and extended 55 feet from the top of the building surrounding the concrete cells and decontamination rooms. All drainage systems in the building terminated in the holdup tank (Building 4468) adjacent to the Hot Lab. Two leach pits (i.e., drywells) were located adjacent to the holdup tank building but never put into service.[1] The septic tank and leach pits were removed in 1997.[3]
- Serviced by Guard Building 4323.
- Serviced by Substation 4720.

Relevant Site Information:

- A number of incidents occurred during the normal operation of the facility which may have resulted in the release of contamination to the environment:
  - On December 5, 1959, radioactive liquid spilled during vendor pick up and contaminated the truck. The truck was wiped down and allowed to leave the area after beta-gamma measurements reached an acceptable level of less than 30 dpm/100 cm^2 (A0001).
  - On May 12, 1961, unsafe handling of a cask occurred, though no release of radiation was thought to have occurred (A0011).
  - On May 9, 1962, an irradiated fuel slug burned in Cell 4, releasing radioactive gas to the exhaust stack. It was determined that the release could not have resulted in significant exposure to personnel or surrounding areas (A0317).
  - On May 31, 1962, a portable radioactive liquid tank overflowed on the north pad, and the liquid then flowed to surface drainage resulting in contamination with a total activity of 420 mCi. Decontamination began immediately and continued until no detectable contamination remained (A0016).
  - On September 4, 1962, the repair of a fission gas monitor caused high airborne activity, resulting in the contamination of personnel and the lab (A0018).
  - On December 15, 1962, a worker found contamination on his shoes during a visit to Building 4020. No contamination above acceptable limits was found to have been spread by his shoes (A0020).
  - On May 8, 1963, an employee swung a waxing mop through a contaminated trough and then used the mop to wax the remainder of the floor. A hot spot was identified, although the wax appeared to have semi-fixed the contamination. Measurements taken two days later indicated that the floor was clean (A0433).

- On September 25, 1963, a fire occurred during the dissolving of NaK from fuel decladding in Cell 3. Surveys indicated no significant contamination resulted from the fire (A0027).
- On September 26, 1963, there was a NaK and alcohol fire during the cleaning of a fission gas monitor. There were no signs of elevated airborne activity (A0024).
- On September 26, 1963, an employee conducting cell cleanup received an exposure above guidelines. The contamination was thought to have been the result of contact with a drip pan in the cell (A0025).
- On October 9, 1963, an uncontrolled furnace was left on overnight, burning cell equipment. A stack monitor indicated no increase above normal activity (A0026).
- On March 19, 1964, a radioactive liquid transfer tank was overfilled and contamination spread outside the area. A maximum of 25 gallons of liquid were lost, with a total release of 2.3×10^4 µCi (A0033).
- On March 20, 1964, the door of Cell 4 was opened at the same time a nitrogen purge and UC fuel cutting occurred in Cell 3, resulting in increased airborne activity (A0031).
- On June 8, 1964, an unauthorized and unprotected employee was contaminated by contaminated equipment (A0551).
- On June 16, 1964, a fuel element was repositioned in the cell, which placed the element in line with the manipulator port opening. This resulted in excessive radiation streaming (A0443).
- On August 27, 1964, high airborne activity resulted after the loss of the airborne controller (A0354).
- On November 18, 1964, an exit survey from cells revealed particulate contamination on an employee. No contamination of the area was identified (A0574).
- On December 7, 1964, radioactive material was stored in the yard, causing radiation levels to elevate above guidelines. The maximum detected gamma level was 50 mR/hr. (A0034).
- On May 27, 1965, during the decladding of NaK-bonded uranium carbide fuel, high airborne activity occurred. No personnel or equipment contamination was detected (A0035).
- On July 16, 1965, it was discovered that a fuel wafer had disintegrated on a vacuum filter and caused buildup of 2.2 Ci of mixed fission products. During recovery of the fuel, some material escaped and contaminated the area. No radioactive material was released outside the building (A0037).
- On August 12, 1965, rainwater from a one-way cask was dumped in a clean area, contaminating the ground (A0441).
- On September 21, 1965, personnel were purging a cell with nitrogen when high airborne activity was detected at 1000 cpm. No cause for the increase was discovered, and contamination was not released outside the building (A0038).

- On February 24, 1966, maintenance of a contaminated electronic discharge machine resulted in high airborne activity (A0040).
- On August 16, 1966, an emergency generator failure left emergency-type equipment (e.g., exhaust system) without power and the airborne activity increased in the operating gallery from 2,000 cpm to 5,000 cpm (A0042).
- On January 28, 1967, a worker's overalls and shoes were inadvertently contaminated, and the employee tracked contamination from the Slave Shop to the Service Gallery and Hot Shop. No contamination was tracked outside of a controlled area (A0607).
- On April 6, 1967, a fire occurred in Cell 3 during the cutting of a metallurgical sample. No significant release of radiological material was detected (A0613).
- On May 17, 1967, transfer of a promethium glove box caused high airborne activity. Nasal smears of two workers revealed maximum contamination levels of 1,050 dpm (A0617).
- On June 10, 1967, waste removal from the promethium glove boxes caused high airborne activity. The area was decontaminated prior to resuming work (A0619).
- On October 30, 1967, a radioactive drain system clogged, flooding controlled areas of the building. All areas were successfully decontaminated (A0627).
- On July 22, 1970, a small alcohol fire occurred during the disassembly of a NaK-bonded fuel element. The fire caused no damage and there was no evidence of airborne or surface contamination (A0050).
- On May 19, 1971, there was a fire in Decontamination Room 4 during the disposal of 100 gallons of liquid NaK, which contained 100 µCi of mixed fission products. A hole in a tank fill line caused the release of about 25 gallons of contaminated NaK, which then caught fire. Nearly all contamination was contained in the Hot Cell. Airborne activity and surface radiological contamination concentrations inside the building from the event ranged from 2 percent to 20 percent of permissible concentration for occupational use and the average concentration released through the stack to the outside of the facility was about 5 percent of the permitted concentration for an unrestricted area (A0052).[1]
- On July 29, 1975, an SRE fuel slug partially burned releasing radioactive gas and contamination (A0054).
- On September 26, 1977, in preparation for removal of liquid waste tanks, employees cut pipes and failed to cap them, causing an unexpected drop in air pressure. No increase in airborne activity was detected (A0060).
- On May 3, 1978, a five-minute alcohol fire occurred in Decontamination Room 2. No injury or contamination occurred (A0069).
- On August 21, 1981, personnel were loading bags of contaminated equipment from the Hot Storage Building into a box in the airlock. When two of the bags were damaged, personnel and the Hot Storage Room were contaminated (A0088).

  - On December 18, 1981, one Rad Pac pin was thrown into a low-level waste can by mistake where it became entangled in a Kimwipe (A0094).
  - On December 21, 1981, during a routine survey, a "clean" ladder was found to be contaminated. The source of the contamination was not known, but the ladder was bagged and placed in a controlled area following its discovery (A0092).
  - On March 22, 1982, zirconium fuel pin fines ignited, causing high airborne activity in Cell 1 (A0101).
  - On April 21, 1983, employees incorrectly identified a fuel rod and the amount of Pu it contained, resulting in levels of Pu in excess of the established criticality limit. The criticality limit at the Hot Lab was exceeded overnight, but the rods were secured in transfer casks, preventing the release of contamination (A0262).
  - On August 8, 1983, a leaking transfer tube contaminated an employee and the decontamination room (A0119).
  - On October 11, 1983, a "clean" pump pumped contaminated water. When the pump was disconnected, some contaminated water spilled on the floor and workbench in the shop. Personnel unknowingly spread contamination throughout the building, although no contamination was found outside the building (A0118).
  - On January 30, 1984, a contaminated electrode was worked on a clean grinder. Contamination was discovered on floors and on the clothing of the grinder operator. No other personnel, tools, or locations were found to be contaminated (A0122).
  - On October 15, 1984, during remote decontamination, a small puddle of alcohol ignited. There was no nuclear fuel in the cell at the time, and no increase in stack monitor activity was observed (A0127).
  - On March 20, 1985, a 55-gallon drum containing contaminated rust, dirt and concrete from Cell 1 was opened and contaminated personnel and the surrounding area (A0137).
  - On April 16, 1986, inventory revealed a 1.5 mCi Sr-90 check source was missing. A search failed to recover the missing source (A0156).
  - On October 28, 1986, Fermi Reactor saw fines were ignited during disassembly in Cell 4. All contamination was contained in the cell (A0165).
  - On October 17, 1990, employees dropped a duct section, causing elevated airborne activity (A0210).
  - On September 15, 1993, a dosimeter went off scale during work in a high radiation area. Investigation of the incident revealed that worker error caused the unacceptable exposure. (A0575).
- The Hot Lab facility procedures required decontamination between projects, limiting the buildup of contamination over time.[1]

Radiological Surveys:

- Boeing performed a soil sample survey in 1998 to ensure that Building 4020 site and the leach pits were free of radiological contamination.[4]
  - The survey found no radioactive activity above background levels.
  - Measurements of activity ranged from 1,897 to 2,194 cpm compared with an average background measurement of 2,013 ± 50 cpm.
  - Most soil samples were less than the minimum detectable activity (MDA) of 0.02 pCi/g for Cs-137, with the highest measurement being 0.21 pCi/g (Cs-137 $DCGL_w$ is 9.2 pCi/g).
- Rocketdyne performed a final status survey in September 1999, consistent with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), of the Hot Lab Facility and the surrounding area (including Buildings 4468 and 4020). The survey included a direct qualitative scan (100%) for surface gamma exposure, ambient gamma exposure rates at 1 meter above the ground and soil sampling.[5]
  - The survey concluded that the site was acceptable for unrestricted use and could be released without radiological restrictions.
  - Average surface exposure rates adjusted for background were 2.3 µR/hr for Class 1, 3.2 µR/hr for Class 2, and 2.3 µR/hr for Class 3 (NRC limit is 5.0 µR/hr above background).
  - Average ambient exposure rates ranged from 0.7 to 1.4 µR/hr (NRC limit 5.0 µR/hr above background).
  - Soil samples for Cs-137 showed an average level of 0.22 pCi/g and a maximum of 4.8 pCi/g (Cs-137 $DCGL_w$ is 9.2 pCi/g above background).
- Oak Ridge Institute for Science and Education (ORISE) performed a verification survey in October 1999 and the report was released in 2000. The survey of Building 4020 and the surrounding area (including Buildings 4468 and 4720) included a direct surface scan, exposure rate measurements and soil samples.[6]
  - The survey concluded that the site satisfies the DOE guidelines for release without radiological restrictions.
  - The surface scan did not identify any locations of direct radiation in excess of ambient background levels.
  - The exposure rates, including background, ranged from 10 to 18 µR/hr compared to a background level of 14 µR/hr, which is below the NRC limit of 5 µR/hr above background and the DOE limit of 20 µR/hr above background.
  - Soil samples results were:
    - Am-241, Co-57, Co-58, Co-60, Cr-51, Eu-152, Fe-59, Mn-54, Sb-124, U-235, Sr-90, Pu-238, Pu-239 and Zn-65 were below MDC (minimum detectable concentrations):
    - Cs-137 ranged from < 0.1 to 0.4 pCi/g (guideline is 9.2 pCi/g).
    - Ra-226 < 0.4 to 1.2 pCi/g (guideline is 5 pCi/g for top 15 cm and 15 pCi/g for the next 15 cm).

  - Th-232 < 0.9 to 1.8 pCi/g, (guideline is 5 pCi/g for top 15 cm and 15 pCi/g for the next 15 cm).
  - U-238 < 2.3 pCi/g (guideline is 35 pCi/g).
- DHS performed verification sampling in October 1999.

Status:

- Building 4020 was completely demolished and the site was backfilled in 1996.[1]
- On January 31, 2005 DOE provided a letter to Boeing declaring that Boeing and ORISE surveys had confirmed that DOE and DHS approved soil cleanup limits had been met, and that the 4020 site was suitable for release for unrestricted use.[7]

References:

1- Boeing Report, EID-06141, "Hot Laboratory Decontamination and Dismantlement Final Report," November 27, 2001.
2- DOE-OAK, Letter, "Removal of RMMA Designation for B020," from M. Lopez (DOE-OAK) to M. Lee, November 13, 1998.
3- Personnel Interview, Dan Trippeda, September 29, 2003.
4- Boeing, Letter, "Soil Sampling Results for Buildings 468 & 020 at SSFL," from J. Shao and J. Barnes (Boeing) to P. Rutherford, August 3, 1998.
5- Boeing Report, RS-00010, "Area 4020, MARSSIM Final Status Survey Report," October 31, 2000.
6- ORISE Document, ORISE 2000-1524, "Verification Survey for the Land Area Formerly Supporting the Hot Laboratory (4020), Santa Susana Field Laboratory, The Boeing Company, Ventura County, California," December 2000.
7- DOE Letter, "Release of Building 4020," from M. Lopez (DOE) to M. Lee (Boeing), January 31, 2005.
8- Historical Site Photographs from Boeing Database.
9- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4020

Site Summary – Building 4468

Site Identification:

Building 4468
Holdup Tank

Operational Use/History:

- Constructed in 1959.[1]
- Operations conducted under NRC Special Nuclear Materials License No. SMN-21.[1]
- Constructed to support the operations of Building 4020 by receiving and storing radioactive effluent generated by the operation of the Hot Lab.[1]
- The 3,000-gallon liquid waste tank was removed in 1994 after the drainage system was removed from the Hot Lab building.[1]
- DOE approved the removal of RMMA for the Hot Lab facility in November of 1998, which included the holdup tank and leach pits.[2]
- Demolished in 1997, with the surrounding soil excavated an additional 4 feet.[1]

Site Description:

- Building 4468 was a 10 x 22 feet concrete and cinderblock building with a steel roof. It was adjacent to the Hot Lab building and slightly below grade. The building housed a 3,000-gallon liquid waste holdup tank connected to the Hot Lab and a truck fill station located in-between the Hot Lab and the holdup tank building.[1]

Relevant Site Information:

- There are no Incident Reports associated with Building 4468.[3]

Radiological Surveys:

- During the 1996 Area IV Radiological Characterization Survey, soil samples were taken at one location in the vicinity of Building 4468. None of the measurements were distinguishable from background and all the measurements were below the acceptable concentration levels established by Boeing and presented in document N001SRR140131.[4]
- Boeing performed a soil sample survey in 1998 to ensure that Building 4020 and the leach pits were free of radiological contamination.[5]
    - The survey found no radioactive activity above background levels.
    - Measurements of activity ranged from 1,897 to 2,194 cpm compared with an average background measurement of 2,013 ± 50 cpm.

  - Most soil samples were less than the minimum detectable activity (MDA) for Cs-137, the maximum measurement was 0.21 pCi/g (Cs-137 $DCGL_w$ is 9.2 pCi/g above background).

- Rocketdyne performed a final status survey in September 1999, consistent with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), of the Hot Lab Facility and the surrounding area (including Buildings 4468 and 4020). The survey included a direct qualitative scan (100%) for surface gamma exposure, ambient gamma exposure rates at 1 meter above the ground and soil sampling.[6]
  - The survey concluded that the site was acceptable for unrestricted use and could be released without radiological restrictions.
  - Average surface exposure rates adjusted for background were 2.3 µR/hr for Class 1, 3.2 µR/hr for Class 2, and 2.3 µR/hr for Class 3 (NRC limit is 5.0 µR/hr above background).
  - Average ambient exposure rates ranged from 0.7 to 1.4 µR/hr (NRC limit 5.0 µR/hr above background).
  - Soil samples for Cs-137 showed an average level of 0.17 pCi/gm and a maximum of 0.91 pCi/gf (Cs-137 $DCGL_w$ is 9.2 pCi/g above background).
- Oak Ridge Institute for Science and Education (ORISE) performed a verification survey in October 1999 and the report was released in 2000. The survey of the Hot Lab Facility and the surrounding area (including Buildings 4468 and 4020) included a direct surface scan, exposure rate measurements and soil samples.[7]
  - The survey concluded that the site satisfies the DOE guidelines for release without radiological restrictions.
  - The surface scan did not identify any locations of direct radiation in excess of ambient background levels.
  - The exposure rates, including background, ranged from 10 – 18 µR/hr compared to a background level of 14 µR/hr, which is below the NRC limit of 5 µR/hr above background and the DOE limit of 20 µR/hr above background.
  - Soil samples results were:
    - Am-241, Co-57, Co-58, Co-60, Cr-51, Eu-152, Fe-59, Mn-54, Sb-124, U-235, Sr-90, Pu-238, Pu-239 and Zn-65 were below MDC (minimum detectable concentrations):
    - Cs-137 ranged from < 0.1 to 0.4 pCi/g (guideline is 9.2 pCi/g).
    - Ra-226 < 0.4 to 1.2 pCi/g (guideline is 5 pCi/g for top 15 cm and 15 pCi/g for the next 15 cm).
    - Th-232 < 0.9 to 1.8 pCi/g, (guideline is 5 pCi/g for top 15 cm and 15 pCi/g for the next 15 cm).
    - U-238 < 2.3 pCi/g (guideline is 35 pCi/g).

Status:

- Building 4468 was demolished in 1997. The surrounding soil was excavated an additional 4 feet.[1]
- On January 31, 2005 DOE provided a letter to Boeing declaring that Boeing and ORISE surveys had confirmed that DOE and DHS approved soil cleanup limits had been met, and that the 4020 site was suitable for release for unrestricted use.[8]

References:

1- Boeing Report, EID-06141, "Hot Laboratory Decontamination and Dismantlement Final Report," November 27, 2001.
2- DOE-OAK, Letter, "Removal of RMMA Designation for B020," from M. Lopez (DOE-OAK) to M. Lee, November 13, 1998.
3- Review of Radiation Safety Records Management System, 2003.
4- Rocketdyne Report, A4CM-ZR-0011, "Area IV Radiological Characterization Survey Final Report," August 15, 1996.
5- Boeing Document, Letter from J. Shao and J. Barnes (Boeing) to P. Rutherford, "Soil Sampling Results for Buildings 468 & 020 at SSFL," August 3, 1998.
6- Boeing Report, RS-00010, "Area 4020, MARSSIM Final Status Survey Report," October 31, 2000.
7- ORISE Document, ORISE 2000-1524, "Verification Survey for the Land Area Formerly Supporting the Hot Laboratory (4020), Santa Susana Field Laboratory, The Boeing Company, Ventura County, California," December 2000.
8- DOE Letter, "Release of Building 4020," from M. Lopez (DOE) to M. Lee (Boeing), January 31, 2005.
9- Historical Site Photographs from Boeing Database.
10- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4468

Site Summary – Site 4520

Site Identification:

Site 4520
Parking Lot

Operational Use/History:

- Constructed 1959.[1,2]
- Site 4520 served as the parking lot for the Hot Lab facility.
- Demolished in 1996 as part of the Hot Lab D&D effort.

Site Description:

- The parking lot is located directly to the south of Building 4020 outside the fence.[1,2]

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Site 4520.[3]

Radiological Surveys:

- In September 1999, Site 4520 was included in the MARSSIM Class 2 survey as part of the Building 4020 final status survey. Refer to Building 4020 Site Summary for a discussion of this survey.[4,5]

Status:

- Site 4520 was removed in 1996 as part of the Hot Lab facility D&D effort and is now a vegetated field.

References:

1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
2- Historical Site Photographs from Boeing Database.
3- Review of Radiation Safety Records Management System, 2003.
4- Boeing Report, RS-00010, "Area 4020, MARSSIM Final Status Survey Report," October 31, 2000.
5- ORISE Document, ORISE 2000-1524, "Verification Survey for the Land Area Formerly Supporting the Hot Laboratory (4020), Santa Susana Field Laboratory, The Boeing Company, Ventura County, California," December 2000.

Photograph – Site 4520