Site Summary – Building 4023

Site Identification:

Building 4023
Liquid Metals Component Test Building
Corrosion Test Loop
Includes Building 4742, Substation

Operational Use/History:

- The first section of Building 4023, constructed in 1962 (known as 023), housed a small sodium loop to conduct studies of radioactive contamination transport. The second section, constructed in 1976 (known as 23A), served as a storage and setup room as well as an analytical chemistry laboratory.[1]
- In 1982, an Alnor Dew-Point Meter containing a 6.25 μCi Ra-226 source was brought to the facility to be disassembled, but the disassembly was never authorized or attempted and the instrument was removed intact in 1986.[2]
- A 10 μCi Mn-54 sealed source, which was checked annually to ensure that no leaks had occurred, was stored in the building from 1983 to 1986.[2]
- Sodium loop tests stopped in 1982 and the loop was dismantled and removed in 1986. At this point the connections to the tank were sealed and sinks were removed.[1]
- In 1990 the high-efficiency particulate air (HEPA) filtration system and fume hoods were removed.[2]
- The remainder of the radioactive liquid waste system (pipes, drains, tank) was removed in 1993.[2]

Site Description:

- Building 4023 was a single story structure with galvanized steel walls and roof and a concrete slab floor. The sodium test loop was located in the western, or "old," portion of the building. The "new" building section held an analytical chemistry laboratory and a storage set-up room.[3]
- The facility was approximately 20 feet below the general grade of the adjacent 12th Street.[1]
- The waste holdup tank was located in an exterior sub-grade open-top concrete vault (7.5 feet x 10 feet x 6 feet) at the east end of Building 4023.[2]
- Serviced by Substation 4742.

Relevant Site Information:

- The majority of the contamination of Building 4023 was associated with drain lines and associated vent pipes, the holdup tank, the open top holdup tank pit, and a laboratory fume hood.[4]

- The contaminants of concern associated with the activities at Building 4023 include: Co-60, Mn-54, Ni-63, Fe-55, Ta-182 and tritium. Limited amounts of Cs-137 and Sr-90 were also found.[5]
- Use Authorization 105 was issued in 1976. It allowed the use of a small section of activated stainless steel Experimental Boilers Reactor fuel cladding in a small sodium test loop to gather data on transport characteristics of radiological contamination in sodium loops.[1]
- There have been two incidents associated with Building 4023 that could have resulted in a release to the environment:[2]
    - On December 18, 1980, water reacted with non-neutralized sodium and surged out of the loop. The water leak resulted in contamination of the ceiling, walls and floor with maximum contamination levels of 1,000 dpm/100 cm^2 of Mn-54 (A0084).
    - On April 28, 1981, there was a minor sodium leak and fire, with Cs-137, Mn-54 and Co-60 as the principal radioactive isotopes contained in the loop at the time. The fire was extinguished with calcium carbonate. Smears of the loop and the floor showed no radioactive contamination (A0257).
- All drain lines in Building 4023 were connected to the waste holdup tank system. The lines were both above and below ground.[2]

Radiological Surveys:

- In 1993, Rockwell/Rocketdyne conducted a final radiological survey to ensure compliance with acceptable contamination limits for activation products and mixed fission products and for ambient exposure rate.[6]
    - The scope of the survey included only the interior rooms of the building.
    - Contamination limit criteria are as follows:
        - For alpha and beta contamination:
            - Average contamination of ≤ 5,000 dpm/100 cm^2.
            - Maximum of contamination ≤ 15,000 dpm/100 cm^2.
            - Removable contamination of ≤ 1,000 dpm/100 cm^2.
        - For gamma contamination:
            - ≤ 5 μR/hr above background at 1 meter interior and exterior.
    - Initial surface scans indicated an area within Building 4023 with elevated levels of Cs-137 requiring additional decontamination.
        - These locations were decontaminated and post-remedial action scans found surface activity to be below release limits.
    - Observed detection limit ranges are as follows:
        - Removable alpha: 2 dpm/100 cm^2 to 9 dpm/100 cm^2.
        - Total beta: 252 dpm/100 cm^2 to 373 dpm/100 cm^2.
        - Removable beta: 6 dpm/100 cm^2 to 23 dpm/cm^2.
        - Net ambient gamma exposure rate: 0.49 μR/hr to 0.66 μR/hr.

- In 1994, ORISE conducted a verification survey using surface scans to confirm that remedial actions have been effective in meeting established guidelines. No soil samples were taken, because the entire area around Building 4023 was paved.[3]
    - Scans inside the Building 4023 Control Room identified elevated direct radiation in two areas that required additional investigation.
        - Rocketdyne personnel decontaminated the two areas and Environmental Survey and Site Assessment Program (ESSAP) personnel performed additional scans after the decontamination. Scans showed the beta surface activity was comparable to background levels.
    - Final survey results for total surface activity levels inside Building 4023 were less than 66 to 400 dpm/100 cm^2 for alpha and less that 1,400 to 6,700 dpm/100 cm^2 for beta.
    - Final survey results for activity levels on exterior surfaces, including the holdup waste tank vault, were less than 66 dpm/100 cm^2 to 120 dpm/100 cm^2 for alpha and less than 1,500 dpm/100 cm^2 to 1,600 dpm/cm^2 for beta.
- On August 28, 1997, the Radiological Health Branch (RHB) and the California Department of Health Services (DHS) conducted a confirmatory survey of Building 4023. A complete qualitative gamma scan of the facility and surrounding area was performed. Selected measurements of total and removable beta surface activity and local gamma exposure rates were also conducted.[7]
    - The survey results and laboratory analysis results confirmed the results of the final radiological survey in 1993 and the Oak Ridge Institute for Science and Education (ORISE) verification survey in 1994.[8]

Status:

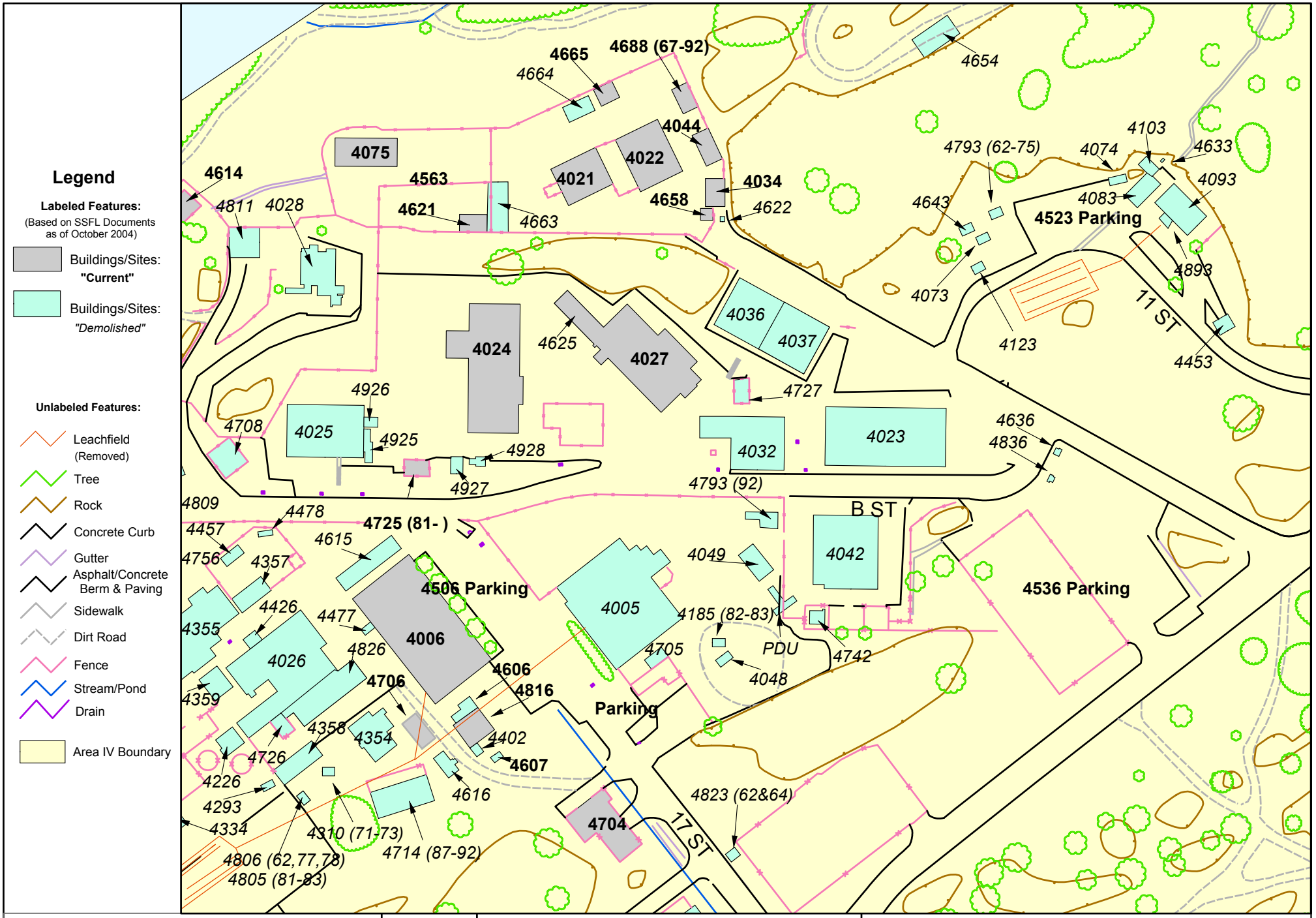
- DOE formally released Building 4023 on April 21, 1997.[9]
- DHS concurred with release of Building 4023 on February 19, 1998.[8]
- Building 4023 was demolished in October 1999.

References:

1- DOE Document, Docket No. DOE/CD-ETEC-023, "Certification Docket for the Release of Building 023 at ETEC," February 1997.
2- Rocketdyne Report, 023-AR-0002 Rev. A., "Building 023 D&D Operations Final Report," March 7, 1996.
3- ORISE Report, 94/K-14, "Verification Survey of Buildings 005, 023, and 064, Santa Susana Field Laboratory, Rockwell International, Ventura County, California," October 1994.
4- Rocketdyne, Internal Letter, "Assessment Plan for Building 023 D&D, from P. Waite to R. Meyer", January 12, 1993.
5- Rocketdyne, Internal Letter, "Potential Contaminants at T023," from R. J. Tuttle to P. Rutherford, January 20, 1993.
6- Rocketdyne Report, 023-ZR-0001, "Final Radiological Survey Report of Building 023," March 1, 1994.

7- Rocketdyne, E-mail, "State DHS/RHB Inspection of T023," from R. Tuttle to P. Rutherford, et al, August 29, 1997.
8- DHS/RHB, Letter, "Boeing's Request for Concurrence in Release for Use Without Radiological Restriction, Rocketdyne Santa Susana Field Laboratory Building T023," from Gerard Wong (DHS/RHB) to Phil Rutherford, February 19, 1998.
9- DOE/OAK, Letter, "Release of Facilities for Unrestricted Non-Radiological Use," from Roger Liddle (DOE/OAK) to Mark Gabler, April 21, 1997.
10- Historical Site Photographs from Boeing Database.
11- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4023


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
4665
4664
4688 (67-92)
4654
4044
4075
4022
4021
4614
4563
4034
4658
4621
4622
4663
4811
4028
4793 (62-75)
4103
4074
4633
4093
4083
4523 Parking
4643
4073
4123
4893
11 ST
4453
4036
4037
4024
4625
4027
4727
4926
4708
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4836
4793 (92)
4809
4478
4725 (81-)
B ST
4457
4615
4042
4756
4357
4049
4506 Parking
4536 Parking
4005
4355
4426
4477
4185 (82-83)
4006
4826
4705
PDU
4742
4026
4606
4706
4816
4048
4359
Parking
4358
4354
4402
4726
4607
4226
4616
4823 (62&64)
4293
4704
17 ST
4334
4310 (71-73)
4714 (87-92)
4806 (62,77,78)
4805 (81-83)
DRAWN BY:
Sapere CONSULTING INC
DATE:
May 2005
N
W
E
S
1 inch equals 150 feet
Feet
0 50 100 200 300
Site Summary Group J
AREA IV
Santa Susana Field Laboratory, CA