Supplemental Detailed Comments
Regarding the Department of Toxic Substances Control
Draft Program Environmental Impact Report
on Cleanup
of the Santa Susana Field Laboratory
by
the Committee to Bridge the Gap
and
the Natural Resource Defense Council
14 December 2017

A. BACKGROUND

The history of the site provided in the draft Program Environmental Impact Report (PEIR) is inaccurate and minimizes the problems. We provide here a more complete picture.

The Santa Susana Field Laboratory (SSFL) was established in the late 1940s for rocket testing and in the early 1950s commenced nuclear reactor work. In this initial incarnation, the site was supposed to be a remote field lab for work too dangerous to conduct near populated areas, and the original siting criteria stated that "care must be taken to select an area where prospects for population growth in the near future are not anticipated."[1] However, over the decades the population nearby mushroomed, so that there are now more than 150,000 people living within 5 miles of the site and more than half a million people are within 10 miles.[2]

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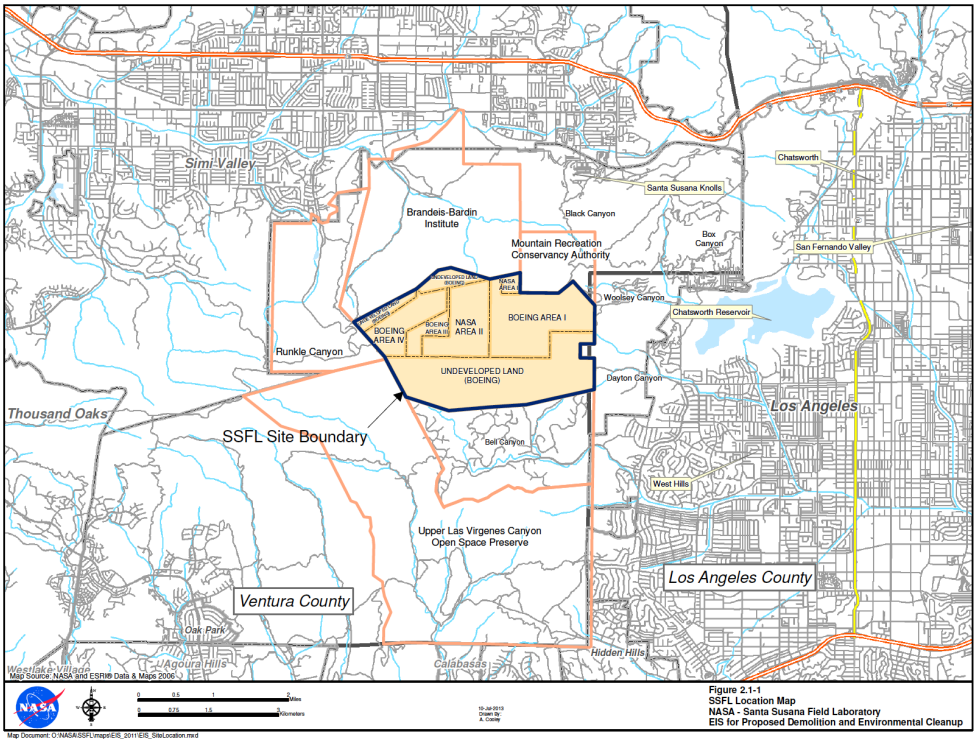
[1] NAA-SR-30, *General Reactor Site Survey of the Los Angeles Area*, U.S. Atomic Energy Commission, June 1, 1949, as cited in *Report of the Santa Susana Field Laboratory Advisory Panel,* October 2006 (hereafter SSFL Panel Report), p. 8. http://www.ssflpanel.org/files/SSFLPanelReport.pdf The SSFL Advisory Panel was established at the initiative of local legislators in the early 1990s to oversee independent health studies of SSFL and the surrounding areas. Under its auspices, federally-funded worker studies by the UCLA School of Public Health were conducted in the 1990s, and in the next decade a series of studies about potential offsite effects funded by the State Legislature were prepared. This summary of the siting and accident history is drawn in part from the Panel's 2006 report; the reader is referred to the full report for more detail and supporting citations, which is incorporated herein by reference.

[2] SSFL Panel Report, pp. 8-9.



1. A History of Safety Considerations Subordinated to Other Concerns; Accidents, Spills and Releases

a. Nuclear Activities

SSFL housed ten reactors, plutonium and uranium fuel fabrication facilities, numerous nuclear "critical facilities," and a "hot lab" wherein highly irradiated nuclear fuel from around the nation was cut apart. Safety considerations were "subordinated to other concerns from the outset."[3] Despite being ranked 5th out of 6 candidate sites for the safety of meteorological conditions (in part because of nighttime migration of potentially contaminated air into the San Fernando Valley), the site was chosen as a nuclear testing site nonetheless, in large measure because of convenient drive times from nearby universities. To compensate for the poor site conditions, and because the reactors would have no containment structures, a reactor power limit was set to limit radioactive inventory. But a decade thereafter, the AEC chose to build the Sodium Reactor Experiment (SRE) with power twenty times the limit, despite people living much closer than the original rule recommended.[4]

Poor environmental and safety practices resulted in at least four of the reactors suffering significant accidents, including a partial nuclear meltdown.

[3] *id.,* p. 8.
[4] *id.*, pp. 8-9.

First, in March of 1959, the AE6 reactor released fission gases as a result of malfunction.. Then blockage of coolant precipitated a power excursion and partial meltdown of the SRE in July 1959. The SNAP8ER accident damaged 80% of its fuel in 1964. A similar accident in the SNAP8DR resulted in damage to a third of its fuel in 1969.[5] None of these reactors had a containment structure like modern reactors to prevent radiological releases into the environment.

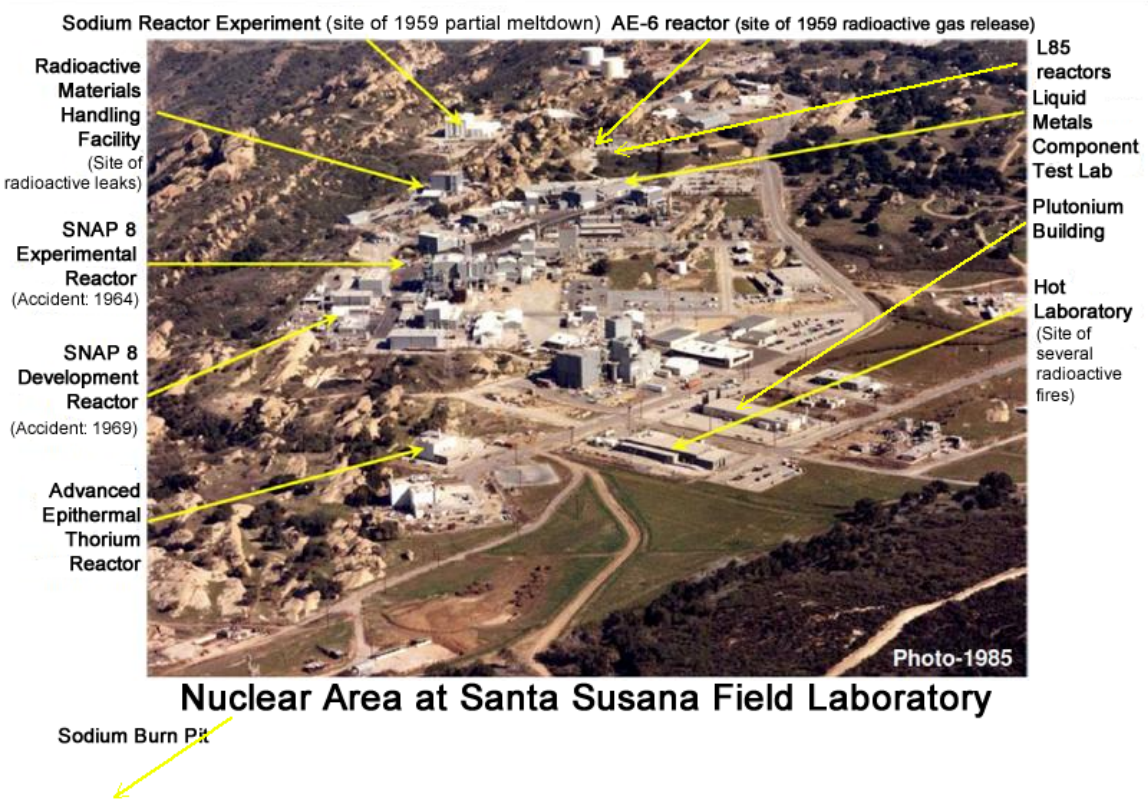


photo source: DOE; labels: SSFL Work Group[6]

The events of June, 1959 at the SRE are emblematic of the problems caused by a troubled safety culture at SSFL.[7] On that date, a fuel rod at the SRE, coated with sodium, exploded when it was washed with water in a "wash cell." The explosion lifted the shield plug out of the wash cell, and created "extremely high contamination levels

[5] SSFL Panel Report, p. 10.
[6] https://energy.gov/em/energy-technology-engineering-center; http://www.ssflworkgroup.org/about-ssfl/
[7] See, e.g., the review of the SRE accident performed for DOE by Dr. Thomas Cochran of NRDC, *Sodium Reactor Experiment Partial Fuel Meltdown, 29 August 2009.* http://www.etec.energy.gov/Library/Main/Cochran%20SRE%20Presentation.pdf

within the entire building."[8] A couple of weeks later, on July 13, the SRE experienced a power excursion—the reactor power suddenly began to increase exponentially, out of control, and the reactor barely was able to be shut down, or "scrammed." Yet, inexplicably, the operators of the reactor, unable to figure out what had caused the incident, started it up again two hours later, and continued to operate it for another week and a half, in the face of rising radioactivity readings (off-scale) and numerous other signs of reactor in trouble. When it was finally shut down, it was determined that 13 of 43 fuel elements had experienced melting.

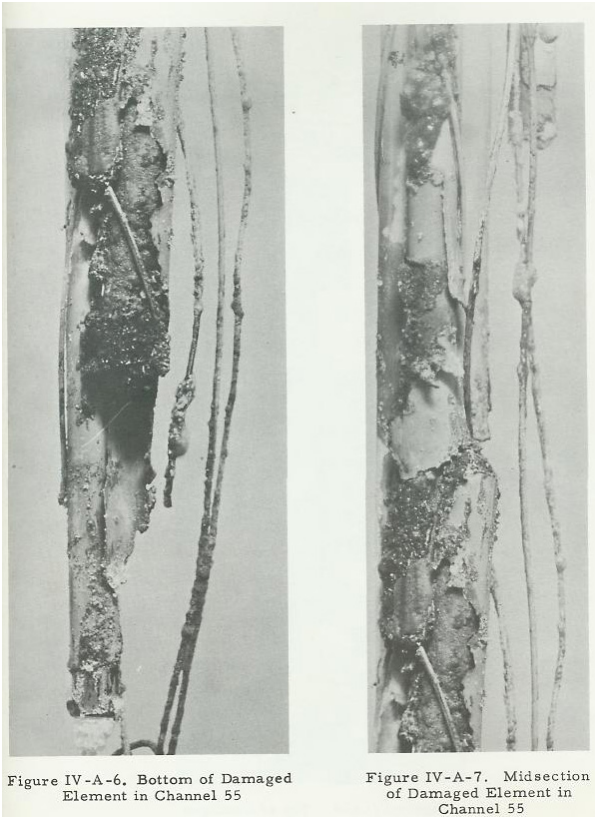
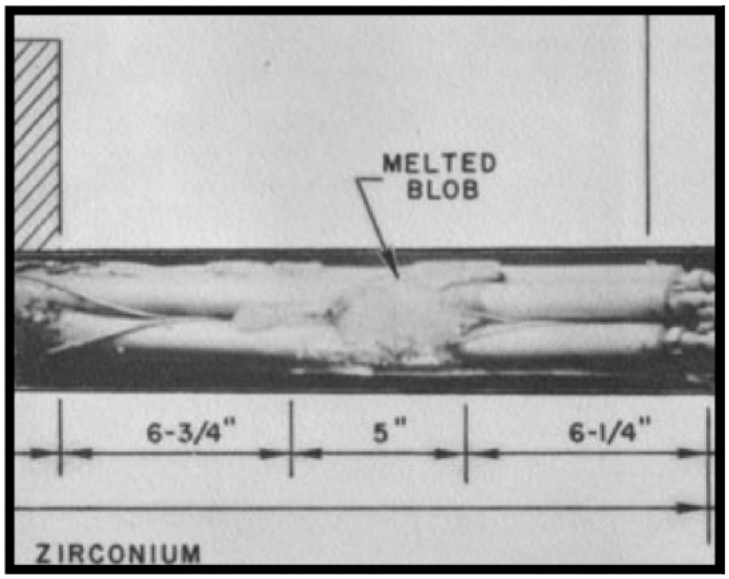


Figure IV-A-6. Bottom of Damaged Element in Channel 55

Figure IV-A-7. Midsection of Damaged Element in Channel 55

Photo of Damaged Fuel Element; source: AEC/Atomics International

[8] See Committee to Bridge the Gap, *Past Accidents and Areas of Possible Present Concern Regarding Atomics International*," January 18, 1980, and the citations therein. (Atomics International was the name of the AEC contractor running the nuclear portion of SSFL at the time.)



SRE Fuel "Melted Blob" (label in original); source: AEC/Atomics International

The accidents at the SRE, SNAP8ER and SNAP8DR all involved running the reactors for extensive periods of time while they were failing, despite clear indications of problems. As an AEC analysis[9] of the SRE partial meltdown concluded:

> [S]o many difficulties were encountered that, at least in retrospect, it is quite clear that the reactor should have been shut down and the problems solved properly. Continuing to run in the face of a known Tetralin leak, repeated scrams, equipment failures, rising radioactivity releases, and unexplained transient effects is difficult to justify. Such emphasis on continued operation can and often does have serious effects on safety and can create an atmosphere leading to serious accidents. It is dangerous, as well as being false economy, to run a reactor that clearly is not functioning as it was designed to function.

Nonetheless, the same pattern of continuing to operate reactors for long periods despite evidence of failing cores subsequently resulted in significant fuel damage in two other reactors at the site.

The problem of cutting safety corners was compounded by a culture of secrecy and a lack of candor. The AEC said nothing publicly about the SRE partial meltdown for nearly five weeks. Finally, it issued a news release, embargoed for Saturday morning papers, saying that "a parted fuel element had been observed," that there were no

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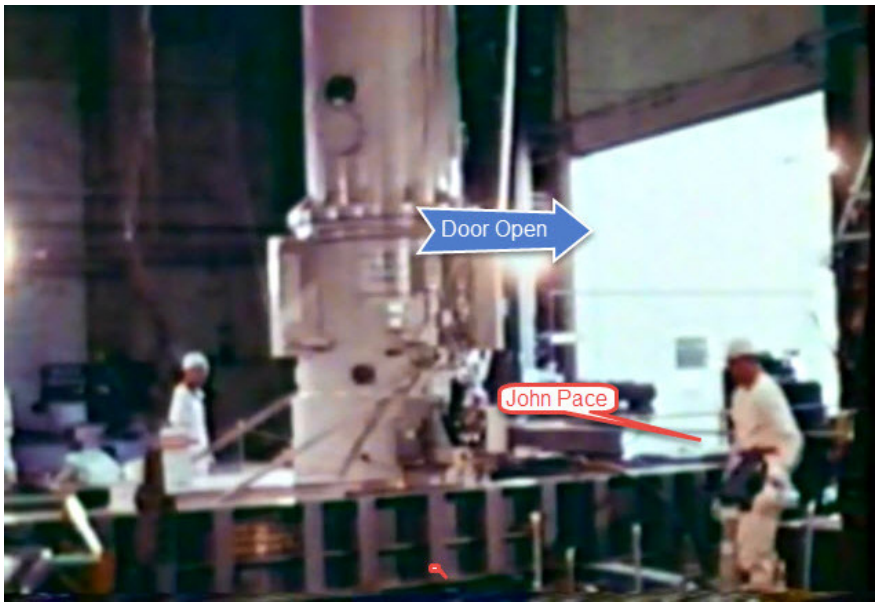
[9] T. J. Thompson and J. G. Beckerley, *The Technology of Nuclear Reactor Safety,* prepared under the auspices of the US Atomic Energy Commission, 1964, p. 644

indications of unsafe operating conditions and no radioactive release. However, in fact, the fuel had experienced not just parting, but melting. A third of the core underwent partial melting, not just a single fuel element. It was a clear indication of unsafe operating conditions,, and radioactivity had been intentionally vented into the atmosphere for weeks.

Despite subsequent claims that only noble gases were released, independent experts have concluded that other radionuclides such as iodine-131 could have been vented into the atmosphere. One estimate is that over 260 times the I-131 released at the Three Mile Island accident could have been emitted by the SRE.[10] The reactor had no containment structure; because of the coolant blockage, the coolant vaporized, and volatile radionuclides like iodine, cesium and strontium could have been emitted into the core cover gas, which was deliberately vented from the reactor and into the environment. Furthermore, a report by an eyewitness, John Pace, indicates that the reactor room became so radioactive that the large equipment door had to be kept open to vent radioactivity from the room to the outdoors.[11]



By no means was the SRE partial meltdown the only problem at SSFL that led to releases. Much of the work at SSFL involved radioactively contaminated liquid sodium coolants for reactors, which burn if exposed to air and explode in the presence of water.

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[10] Declaration of Arjun Makhijani, Ph.D., President of the Institute for Energy and Environmental Research, in *Lawrence O'Connor et al. v. Boeing North American, et al.,* U.S. District Court for the Central District of California, February 12, 2004, p. 24.

[11] http://data.nbcstations.com/national/KNBC/la-nuclear-secret/ The above photograph is from an AEC film about the accident, taken during the recovery operation. The labels have been added. Pace says the door had to be opened for extended periods during the accident itself because of high radiation readings.

There were radioactive fires at the hot lab and numerous other radioactive and chemical releases and spills. In addition, for decades, despite requirements to the contrary, radioactive and toxic chemical wastes were burned in open "burnpits." Sodium-coated reactor components were placed in shallow pools of water to chemically react. The resulting clouds of airborne contamination fell out over wide areas, including beyond the SSFL boundaries. These activities resulted in contaminating soil and groundwater. They also contaminated surface water that ran into the neighboring Brandeis Bardin Institute.

b. Rocket Testing

In addition to nuclear development work, tens of thousands of rocket tests were conducted at SSFL, many with very toxic fuels such as monomethyl hydrazine. The rocket tests produced massive airborne plumes of contaminants extending substantial distances.

Perchlorate, a very hazardous solid rocket fuel component, also resulted in substantial contamination of soil, groundwater and surface water. Because it is so mobile, there is evidence it rapidly traveled offsite contaminating land and groundwater; numerous wells in Simi Valley are polluted with it.[12]

In addition, over 21,500 tests alone involved flushing the rocket engines after firing with trichlorethylene (TCE), a very hazardous volatile organic compound.[13] Approximately one million gallons of TCE were employed for this purpose at SSFL, and about half a million gallons are estimated to have been allowed to percolate into the soil and groundwater. The acceptable concentration (the EPA Maximum Concentration Limit, or MCL) of TCE in drinking water is 5 parts per billion; concentrations orders of magnitude higher than that have been found in SSFL groundwater plumes. A substantial

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[12] See Ali Tabidian, *Land-use conversion and its potential impact on stream/aquifer hydraulics and perchlorate distribution in Simi Valley, California,* prepared for the SSFL Advisory Panel, October 2006

[13] NASA, *Santa Susana Field Laboratory: The Use of Trichloroethylene at NASA's SSFL Sites*, 2008.

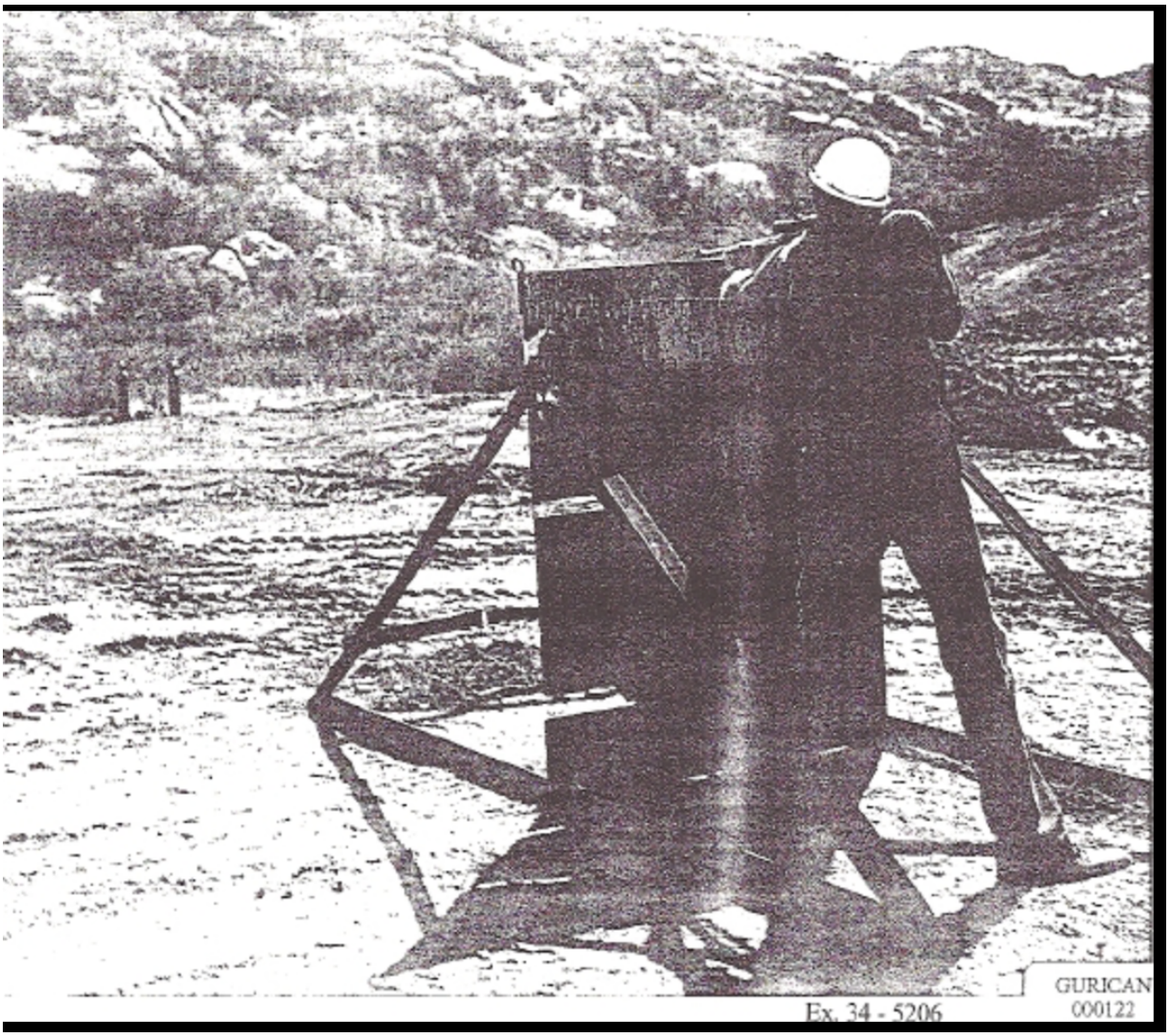
fraction of the groundwater at SSFL is contaminated with TCE and other pollutants. The TCE groundwater plume extends offsite.

There were also various accidents, such as explosions at the Alpha and Coca rocket test stands.[14] In 1994, two workers were killed when hazardous wastes that were being illegally burned in open pits exploded. The U.S. Justice Department commenced legal proceedings against Rocketdyne, resulting in an admission of guilt and plea agreement.

Just as in Area IV, the nuclear area, there was also an open-air burnpit where for years toxic wastes were illegally burned in the open air. To save the expense of transporting the waste offsite for proper disposal, scores of barrels of toxic waste were brought to the pit each month, and ignited by workers firing rifles at them to blow them up, releasing large plumes of contamination.

Ex. 34 - 5

[14] NASA, Historic Resources Survey and Assessment of the NASA Facility at Santa Susana Field Laboratory p. 3-42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A federally-funded study by the UCLA School of Public Health found markedly increased rates of death from key cancers for workers associated with their radiation and chemical exposures.[15] The most highly exposed workers had triple the deaths from those cancers as did less exposed SSFL workers.

A subsequent federally funded study by a team of researchers led by UCLA's Professor Yoram Cohen found evidence of contaminants having migrated outside the site

[15] Morgenstern, Froines, Ritz and Young, *Epidemiologic Study to Determine Possible Adverse Effects to Rocketdyne/Atomics International Workers from Exposure to Ionizing Radiation*, June 1997, at http://www.ssflpanel.org/files/UCLA_rad.pdf. See also *Santa Susana Field Laboratory Epidemiological Study: Report of the Oversight Committee,* September 1997, at http://www.ssflpanel.org/files/panel_worker_radiation.pdf, and the UCLA study of and panel report about chemical exposures, included in exhibits to these comments.

boundaries and exposing the public at levels in excess of EPA levels of concern.[16] A study by Dr. Hal Morgenstern of the University of Michigan, also federally funded, found a greater than 60% increase in incidence of various cancers in people living near the site associated with their proximity to it.[17]

SSFL is located atop the Santa Susana mountains overlooking significant populations in the City of Los Angeles and elsewhere. The site is contaminated with a wide range of radioactive materials, such as plutonium-239, cesium-137, and strontium-90, and over a hundred hazardous chemicals, such as dioxins, PCBs, heavy metals, and volatile organic compounds. Contaminants at the site can migrate offsite and expose those communities. Thus, the cleanup of the source of pollution above these communities is critical to their health. The concern thus is not limited in any fashion to potential exposures to people at the site in the future, but to the people who live in the area surrounding SSFL. As we shall show, the failure to recognize this is a fundamental failure of the PEIR.

2. Responsible Parties' History of Resisting Cleanup Obligations

Along with the history of weak environmental and safety controls at SSFL, the AEC – and its successor the DOE – have long resisted doing anything more than a minimal cleanup of the contamination for which it was responsible, at this or its other polluted facilities across the country.[18]

After incidents like the Rocky Flats fires in the 1970s, the Three Mile Island meltdown in Pennsylvania in the late 1970s, and the 1986 Chernobyl accident in the former Soviet Union raised concerns with the widespread environmental and safety problems throughout the DOE nuclear complex nationwide, tentative attempts at reform were undertaken. Reviews were undertaken of environmental problems at DOE sites; one performed by DOE contractor (and thereafter, NRDC engineer) James Werner found widespread chemical and radioactive contamination at SSFL.[19] Admiral James Watkins

[16] Yoram Cohen, et al., *Potential for Offsite Exposures Associated with the Santa Susana Field Laboratory,* February 2006, at http://www.ssflworkgroup.org/potential-for-offsite-exposures-associated-with-ssfl/

[17] Hal Morgenstern, et al., *Cancer Incidence in the Community Surrounding the Rocketdyne Facility in Southern California*, March 2007, at http://www.ssflworkgroup.org/files/UofM-Rocketdyne-Epidemiologic-Study-Feb-2007-release.pdf . See also, Professor Hal Morgenstern letter to Senator Joe Simitian, then-Chair, California Senate Committee on Environmental Quality, April 5, 2007, summarizing his findings, at http://www.ssflworkgroup.org/files/LettertoSen.Simitian_041507.pdf

[18] See, e.g., National Governors Association, *Cleaning Up America's Nuclear Weapons Complex:* 2015 Update for Governors.

[19] Environmental Survey, Preliminary Report, DOE Activities at Santa Susana Field Laboratory, February 1989; DOE/eh/OEV-33-P.

was brought in as Secretary of Energy to attempt to change the troubled "safety culture" at DOE. In 1991 an investigative "Tiger Team" team found significant problems in the safety and environmental program at SSFL.[20] In 1995, in an effort to bring DOE into the modern era of environmental regulation, it entered into a Joint Policy with the U.S. EPA committing that all DOE nuclear sites in the country, irrespective of whether they were on the National Priority List, would be cleaned up consistent with EPA's CERCLA (Superfund) guidance.[21] However, significant elements within DOE continued to resist these efforts at reform.

A clear example of this resistance can be found in the cleanup standards for the site. To wit, despite these critical findings and despite the Joint Policy entered into with EPA to carry out environmental remediation pursuant to EPA's CERCLA guidance, in the late 1990s, DOE and its contractor Boeing put forward cleanup standards for SSFL that were orders of magnitude more lax than the EPA CERCLA guidance and which would have left virtually all of the contamination not cleaned up.[22] In January 2002, DOE issued a Draft Environmental Assessment, and in 2003 a final Environmental Assessment and Finding of No Significant Impact approving those standards and its plan to leave substantially more than 90% of the radioactive contamination unremediated.[23]

Concerned about the plan to not clean up the great majority of the contamination and the failure to examine the environmental impacts of the harms associated with such weak cleanup choices, the City of Los Angeles, the Natural Resources Defense Council (NRDC), and the Committee to Bridge the Gap (CBG) filed a lawsuit in U.S. District Court, challenging the legality of DOE's actions under the National Environmental Policy Act (NEPA), 42 U.S.C. §4321, et seq. In 2007, in an Order highly critical of DOE, Judge Samuel Conti, granted summary judgment for the plaintiffs and against DOE.[24]

In 2007, Judge Conti ruled against DOE. He noted, "Area IV is known to be radiologically contaminated and, in fact, was the location of at least one well-known nuclear meltdown....It is located only miles away from one of the largest population centers in the world....Among the primary purposes of NEPA, and the EIS process more specifically, is assuring the public is informed and aware of the potential environmental impacts of government actions....It is difficult to imagine a situation where the need for

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[20] http://www.etec.energy.gov/Library/Main/DOE-EH-0175_ES&H_Tiger_Team_Assessment_of_ETEC.pdf

[21] DOE & EPA, Policy on Decommissioning Department of Energy Facilities Under CERCLA, May 22, 1995, hereafter DOE-EPA 1995 Joint Policy.

[22] Approved Sitewide Release Criteria for Remediation of Radiological Facilities at the SSFL, December 12, 1998.

[23] The EA was restricted to issues related to cleanup of radioactivity, recognizing that the cleanup of the chemicals was subject to the Resource Conservation and Recovery Act (RCRA) and those cleanup decisions were in the hands of the California Department of Toxic Substances Control.

[24] 2007 WL 1302498 (N.D. Cal).

such an assurance could be greater." He therefore permanently enjoined DOE from "transferring ownership or possession, or otherwise relinquishing control over, any portion of Area IV until it completed an EIS and issued a Record of Decision pursuant to NEPA." The Court retained jurisdiction over the matter until it is satisfied that the DOE has met its legal obligations related to the remediation.

Shortly thereafter, DOE issued a Notice of Intent to prepare an EIS. However, DOE dragged its feet for a decade and only now has issued the DEIS for comment.

3. The 2007 and 2010 Cleanup Agreements

a. The 2007 Consent Order

In 2007, the California Department of Toxic Substances Control (DTSC), which regulates toxic chemicals in California pursuant to federal delegation under the Resource Conservation and Recovery Act (RCRA), entered into a Consent Order with DOE and the other SSFL Responsible Parties (Boeing and NASA) in which the Responsible Parties were obligated to complete cleanup of soil and installation of the permanent groundwater remedy by mid-2017.[25] Contrary to the claim in the PEIR, that Consent Order does not mandate a cleanup to standards less than the 2010 AOC requirements, but instead requires cleanup to normal DTSC procedures. Those procedures, as DTSC reiterated in 2010, rely on current County zoning and General Plan land use designations, which in the case of SSFL, allows a wide range of agricultural and residential (with garden) uses and would result in the most protective cleanup standards being employed, comparable, DTSC has written, to a cleanup to background.[26]

b. The 2010 Administrative Order on Consent (AOC)

In 2010, in the face of mounting frustration by DTSC, the California Environmental Protection Agency (CalEPA), and state and federal legislators with what appeared to be continued foot-dragging by DOE mid-level personnel, Dr. Steven Chu, the Nobel-Prize winning physicist who was then the Secretary of Energy, and Dr. Ines Triay, the DOE Assistant Secretary for Environmental Management, proposed to the state that they enter into an agreement whereby the site would be cleaned up to local background; i.e., remove all the detectible contamination and return it to the condition it was in before DOE contaminated it. Over that year, there were numerous negotiating sessions with DOE and the state, with participation from some of the parties to the successful 2007 NEPA lawsuit, to hammer out the written agreement, first an Agreement in Principle (AIP) and then the full Administrative Order on Consent (AOC), which incorporated the AIP. A nearly identical AOC was reached with NASA. After two rounds of opportunity

[25] Consent Order, p. 20.
[26] DTSC, Response to Comments, Agreements in Principle, State of California and the Department of Energy, of California and the National Aeronautics and Space Administration, (hereafter DTSC Response to Comments on Agreements in Principle), October 26, 2010, Volume I, pp. 11-12, 14-7, 21.

for public comment, in which more than 3000 comments were received, of which all but a handful were strongly in favor, DTSC, DOE and NASA executed the AOCs in December, 2010.

There are several key components of the AOCs. (1) They are legally binding; the parties cannot unilaterally choose not to comply with any part of them. (2) Cleanup of soil shall be to local background. (3) For the purposes of the AOCs, soil is defined to include structures, debris, and other anthropogenic materials. (4) There is to be no averaging; any contamination above background is to be cleaned up. (5) The deadline for full soil cleanup and implementation of the groundwater remedy was 2017. (6) All waste with radioactivity above background must be disposed of in licensed or authorized low-level radioactive waste disposal facilities. And (7) critically, no "leave in place alternatives will be considered.

The AOCs contain some very tightly delimited exceptions to the requirement to clean up all contamination to background.[27] Because DTSC in the DEIR misrepresents them as it implies they allow it to leave in place very large amounts of contaminated soil, reprinting the exceptions from the DOE AOC here may be helpful:

> **SUMMARY: The end state of the site (the whole of Area IV and the Northern Buffer Zone) after cleanup will be background** (i.e., at the completion of the cleanup, no contaminants will remain in the soil above local background levels), subject to any special considerations specified below.
>
> • Clean up radioactive contaminants to local background concentrations.
>
> Possible exceptions *(where unavoidable by other means):*
>
> • The framework acknowledges that, where appropriate, DOE will engage in an Endangered Species Act (ESA) Section 7(a)(2) consultation with the U.S. Fish and Wildlife Service (FWS) over any species or critical habitat that may be affected by a federal action proposed to be undertaken herein on a portion of the site. Impacts to species or habitat protected under the Endangered Species Act may be considered as possible exceptions from the cleanup standard specified herein *only to extent that the federal Fish and Wildlife Service, in response to a request by DOE for consultation, issues a Biological Opinion with a determination that implementation of the cleanup action would violate Section 7(a)(2) or Section 9 of the ESA, and no reasonable and prudent measures or reasonable and prudent alternatives exist that would allow for the use of the specified cleanup standard in that portion of the site.*

[27] DOE AOC, Appendix B, pp. 1-2; NASA AOC, Appendix B, p. 1