

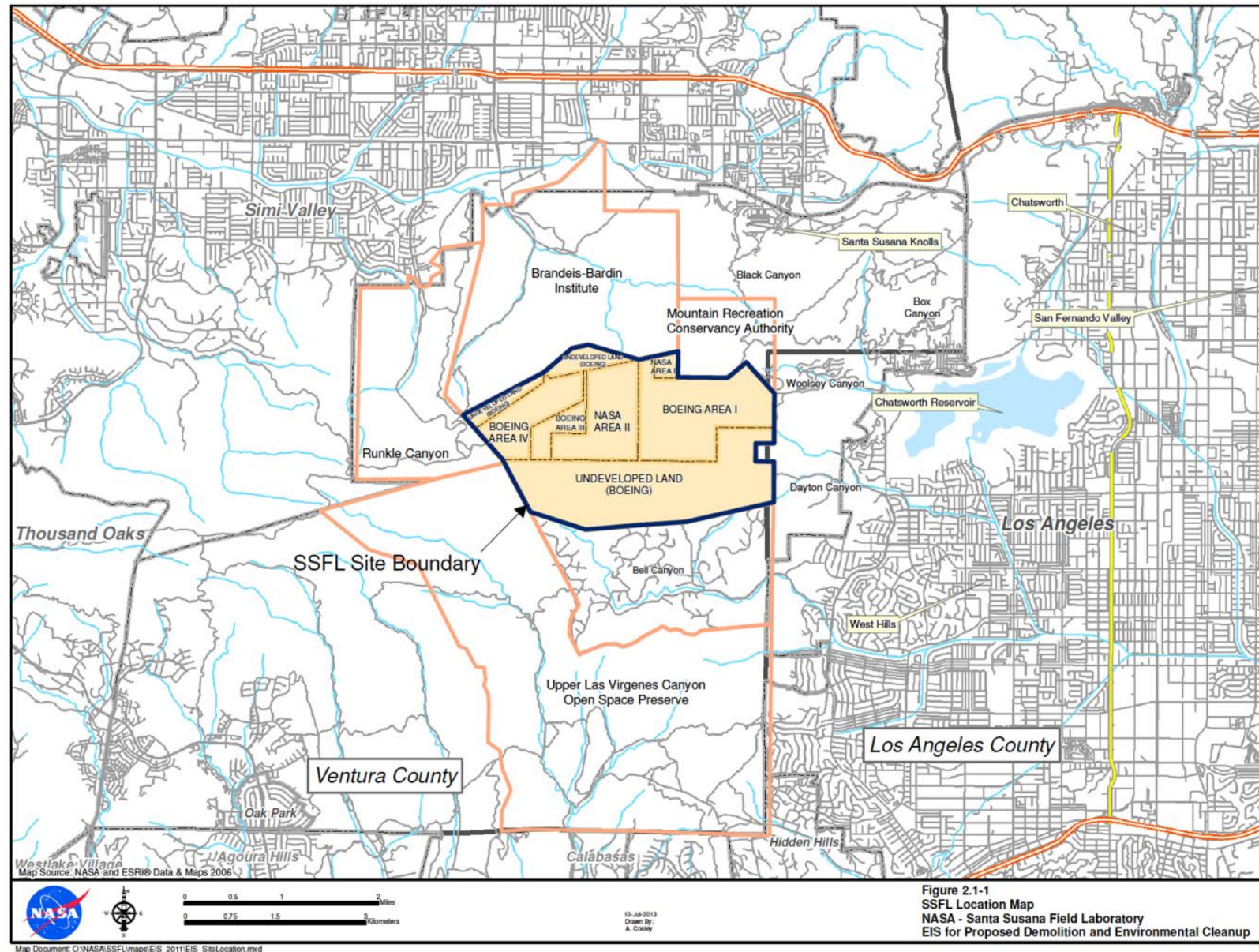
SANTA SUSANA FIELD LAB

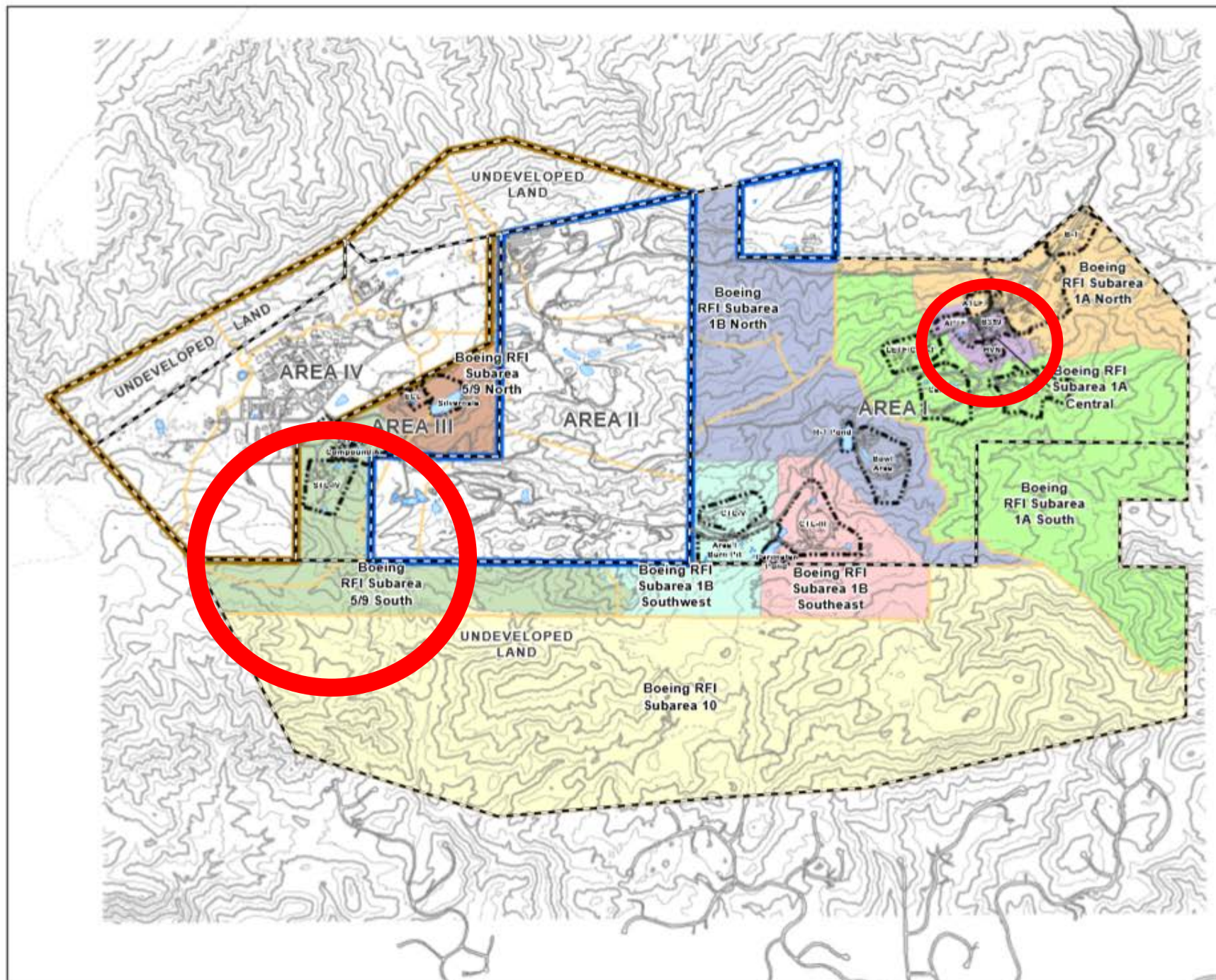
Analysis of Boeing Risk Assessments

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College Ten
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Santa Susana Field Lab

- Former nuclear reactor and rocket testing facility about thirty miles from downtown LA
- 10 nuclear reactors, plutonium fuel facility, hot lab for reprocessing irradiated nuclear fuel, 1000s of rocket tests
- Two open-air burn pits burned radioactive and chemically toxic wastes
- Site contaminated with radioactivity and toxic chemicals





- LEGEND**
- DOE AOC Boundary
 - NASA AOC Boundary
 - RFI Group Boundary
 - Administrative Boundary
 - Ponds
 - Boeing RFI Site
 - Paved Road
 - Dirt Road
 - Unpaved trail

Note: Investigations of former operational areas administered by NASA and DOE are being performed under agreed-upon AOCs with those parties. Therefore, RFI sites for NASA and DOE-administered areas are not presented in this figure.

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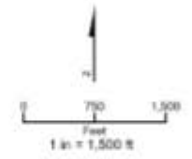


FIGURE 1-1
Boeing RFI Subareas
 RCRA Facility Investigation
 Data Summary and Findings Report
 Environmental Effects Laboratory RFI Site
 Boeing RFI Subarea 5/9 South
 Santa Susana Field Laboratory, Ventura County, California



Background

- In 2010, DTSC, DOE, and NASA signed agreements to clean up all the contamination on the DOE and NASA portions
 - Also in 2010, DTSC committed that the remaining Boeing portions would undergo a comparable cleanup
 - DTSC has recently reaffirmed that Boeing must clean up its site so that it would be safe for all of the land uses permitted by Ventura County, including homes with backyard gardens
-



- The reports focus on specific contaminated sites within these subareas
 - Boeing identifies sources and levels of contamination, its estimate of cancer and toxic risks from the contamination, and its proposals for “No Further Action”
-

*Last summer,
Boeing
submitted to
DTSC 12 risk
assessments
for these 2
subareas...*





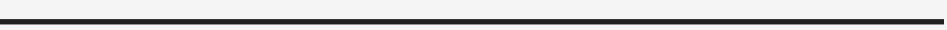
No Further Action (NFA) =
AREAS BOEING
PROPOSES TO
NOT CLEAN UP





*In these
reports,
Boeing...*

- Estimated the risk from the contamination presently at the site
- Proposed areas to be designated for a Corrected Measure Study, i.e. to be evaluated for some possible clean up, and areas to be designated NFA
- Estimated remaining risk after their proposed partial clean up






- Most were between 2,000 pages to >3,000 pages
 - Boeing's executive summaries often misrepresent the data buried thousands of pages into the reports
 - We performed a detailed review of the reports, back to front
-


*What did
we do?*





*Boeing's own
pre-clean up
risk values*

*(Pre-clean up: what is
the risk from the
contamination at the
site now if people lived
there?)*

- Systems Test Lab: 9.6×10^{-1}
 - **96 out of 100 people would get cancer**
 - Environmental Effects Lab: 3×10^{-1}
 - **3 out of 10 people would get a cancer**
 - Happy Valley North: 2×10^{-1}
 - **1 out of 5 people would get a cancer**
 - Compound A: 1×10^{-1}
 - **1 out of 10 people would get a cancer**
- 



BOEING PROPOSES TO LEAVE MOST OF THE CONTAMINATION NOT CLEANED UP



*About 98% of the soil would not be remediated, if DTSC
were to approve Boeing's requests.*



Post-clean up risk values

*(Post clean-up:
what Boeing
estimates the
risk will be after
clean up)*

- Happy Valley North: 2×10^{-1}
 - **Every 5th person would still get cancer**
- Advanced Propulsion Test Lab: 1×10^{-2}
 - **1 out of 100 people would get a cancer**
- Environmental Effects Lab and Systems Test Lab: 2×10^{-3}
 - **1 out of 500 people would get a cancer**



*DTSC'S CLEANUP GOAL IS ONE IN
A MILLION REMAINING RISK*

Thus, Boeing is proposing such a weak cleanup that remaining contamination would be as much as *500,000 times higher* than DTSC's required cleanup goal.



Boeing Underestimates True Risk

As large as Boeing's risk figures are, they appear to underestimate the true risk because of factors left out

Example: the risk from the full family of PCBs (PCB-TEQ) was calculated but not included in the total risk



Table E1-4

Risk and Hazard Estimates for Exposure to Site Soil
 Data Summary and Findings Report, Boeing RFI Subarea 1A Central, B359 RFI Site

Chemical	Cas #	Resident Direct Contact EPC ^a Soil (mg/kg)	Garden/ Recreator EPC ^b Soil (mg/kg)	RBSL			Soil Media Cancer Risk/HQ		
				Suburban Resident		Recreator	Suburban Resident		Recreator
				Soil (mg/kg)	Garden (mg/kg)	Soil (mg/kg)	Soil	Garden	Soil
Herbicides									
MCPP	93652	1.7E+00	1.7E+00	-	-	-	-	-	-
PCDD/PCDFs									
2,3,7,8-TCDD TEQ	1746016-TEQ	4.5E-06	3.3E-06	4.8E-06	7.5E-09	1.8E-05	9.3E-07	4.4E-04	1.8E-07
PCBs									
Aroclor 1242	53469219	3.2E-02	-	2.3E-01	4.9E-04	5.6E-01	1.4E-07	-	-
Aroclor 1254	11097691	1.7E+00	3.2E-01	2.3E-01	4.9E-04	5.6E-01	7.2E-06	6.5E-04	5.6E-07
Aroclor 1260	11096825	6.2E-01	6.9E-02	2.3E-01	4.9E-04	5.6E-01	2.7E-06	1.4E-04	1.2E-07
PCB TEQ	1746016-PCB TEQ	1.3E-03	2.5E-04	3.6E-06	7.5E-09	8.7E-06	3.7E-04	3.3E-02	2.8E-05
Total Cancer Risk^c							1E-06	2E-03	2E-06

3.3E-02

2E-03

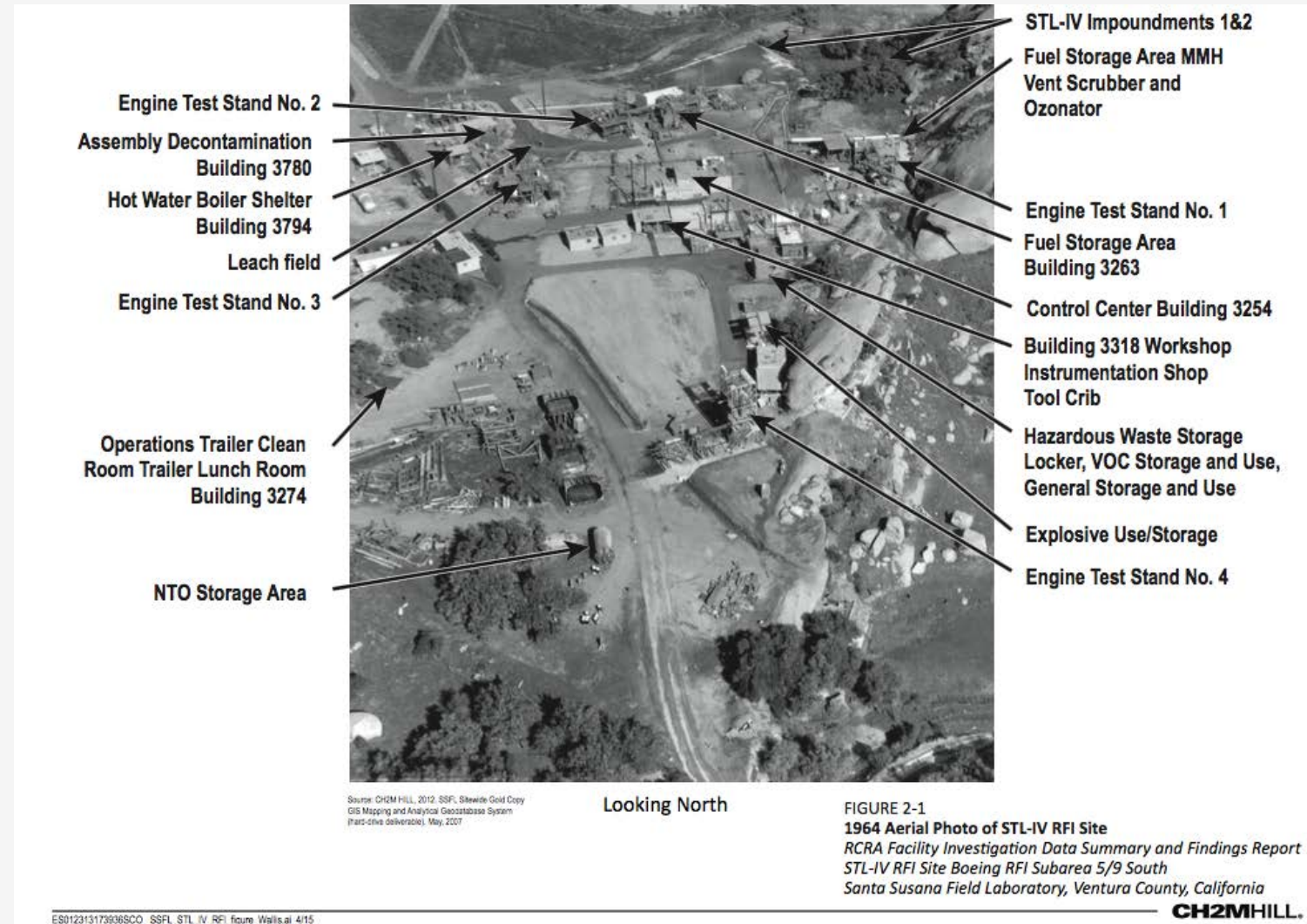


- Left out chemicals from the post-cleanup totals and do not disclose that they left it out
 - **Monomethylhydrazine (MMH) missing from Systems Test Lab IV's post clean-up values**
 - Main contributor to pre-cleanup cancer risk (91% of the cancer risk)
 - Used for rocket propellant
 - **Arsenic missing from Environmental Effects Lab's post clean-up values**
 - Main contributor to pre-cleanup cancer risk (97% of cancer risk)
 - Levels far greater than naturally occurring levels
-



Systems Test Lab IV

- Pre-clean up: 96 out of 100 people would get cancer (9.6×10^{-1})
- Post-clean up: 1 out of 500 people would get cancer (2×10^{-3})
 - 2000 times higher than DTSC cleanup goal
- Used for rocket and missile engine testing from mid-1950s to 2000s
- After performing the tests, the engines were flushed and cleaned with trichloroethene (TCE)



Environmental Effects Lab



Source: CH2M HILL, 2012. SSFL Sitewide Gold Copy GIS Mapping and Analytical Geodatabase System (hard-drive deliverable), May, 2007

Note: 1) Portions of the EEL RFI Site located within Administrative Area IV are being characterized by US DOE.
2) The border between Administrative Areas III and IV is approximate.

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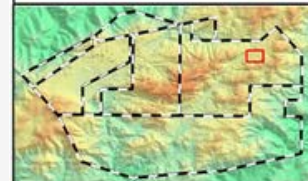
FIGURE 2-1
2007 Aerial Photo of EEL RFI Site
RCRA Facility Investigation, Data Summary and Findings Report,
Environmental Effects Laboratory RFI Site, Boeing RFI Subarea 5/9 South,
Santa Susana Field Laboratory, Ventura County, California

CH2MHILL

- Pre-clean up: 3 out of 10 people would get cancer (3×10^{-1})
- Post-clean up: 1 out of 500 people would get cancer (2×10^{-3})
 - 2000 times higher than DTSC cleanup goal
- Used for testing materials in high-pressure conditions

Happy Valley North

- Pre-cleanup: Every fifth person would get a cancer (2×10^{-1})
- Post-cleanup: Every fifth person would get a cancer (2×10^{-1})
 - 200,000 times higher than DTSC cleanup goal
- Experiments involving energetics compounds and detonators were conducted
- Tested rocket and gun propellants



1960 Oblique Aerial Photo of HVN RFI Site
SANTA SUSANA FIELD LABORATORY
Path: C:\Work\ref\Group\144\CSFR_MSD\1A_Central\HVN\HVN_Ep1_1.mxd Date: 6/26/2014
← North MWH Figure 2-1



BOARD OF SUPERVISORS COUNTY OF LOS ANGELES

821 KENNETH HAHN HALL OF ADMINISTRATION / LOS ANGELES, CALIFORNIA 90012
Tel: 213-974-3333 Fax: 213-625-7360 Sheila@bos.lacounty.gov

SHEILA KUEHL
SUPERVISOR, THIRD DISTRICT

The documents disclose never before known extraordinarily high risks from the pollution, but, nonetheless, request that Boeing be relieved of the obligation to clean up most of it. Boeing's requests, if granted, would breach commitments DTSC made for a full cleanup and would result in the great majority of the contamination for which Boeing is responsible not being remediated. We urge you to reject Boeing's requests and reaffirm DTSC's commitment to a full cleanup.

Sincerely,


SHEILA KUEHL
Supervisor, Third District

MITCHELL ENGLANDER
Council President Pro-Tempore
Councilmember, Twelfth District

SENATOR FRAN PAVLEY
California State Senate
27th District



Boeing's Response

- “It is worth noting that the suburban residential standard does not generally presume use of backyard gardens. **Boeing has never committed to a cleanup that assumes the use of “backyard gardens” because there will never be such gardens”**
-
- 



Boeing contradicts itself

- “We will restrict Boeing’s property so it will never be used for residential, commercial, industrial or agricultural purposes, but **the land will be cleaned up so it is safe enough that houses could be built there if it wasn’t restricted**” – Boeing’s written statement to NBC, Fall 2015
 - “Boeing has referred to this commitment as a cleanup to a ‘suburban residential’ standard that is applied generally throughout the state, by which we mean **a cleanup safe enough that houses could be built there...**” -David Dassler email, Sept. 2nd, 2015
 - “Boeing will clean up its property so **it would be safe enough for people to live there...**” – Boeing, “Protecting Santa Susana”
-



Boeing also claims...

- “Consideration of backyard gardens **deviates from DTSC’s standard suburban residential risk assessment practice**”
 - “... [DTSC does] not normally presume consumption of produce from a home garden in estimating risk for suburban residential future land use...”
-





However, DTSC's risk assessment methodology requires consideration of backyard gardens.

- “If residences are constructed at the SSFL in the future, it is possible that produce may be grown in impacted soil in backyard gardens. Compounds in soil may then be incorporated into edible plant tissues via root uptake. **Residents could be exposed to compounds in soil via consumption of produce grown in backyard gardens.**” –DTSC
Standardized Risk Assessment Methodology (SRAM), p. 90
-



Indeed, DTSC says:

- In California, local governments determine how land is used and zoned. DTSC uses the zoning information to aid in developing cleanup decisions. Ventura County ultimately determines how the SSFL property is zoned. On July 20, 2015, Ventura County issued a letter to DTSC identifying more than a dozen potential land uses for the site.
 - **One of the possible land uses identified by Ventura County is “suburban residential with a garden.” This land use requires a very stringent cleanup level because people living in a house on the land and eating fruits and vegetables from a garden have a greater potential for exposure to chemicals in the soil.**
 - DTSC, SSFL Community Update Cleanup, 10-15-15
-



Lastly, Boeing's response cited a PowerPoint slide from DTSC to supposedly support its claim.

- However, **the very next DTSC slide** from that presentation states that the **garden is included** in residential cleanups and risk assessment



Potential Home-grown Produce Intake

- Boeing has included home-grown produce as separate intake estimate as called for
 - SRAM-2 Calls for Home-grown produce as 100% source of vegetable intake
- DTSC Currently evaluating this pathway
 - Include for Site-specific reasons
 - Contaminated groundwater used for garden watering
 - US EPA (2011) Exposure Factors Handbook, Region-specific values



Conclusions

- DTSC and Boeing have both promised that SSFL would be cleaned up so that it would be safe to live on the property
 - This is critical, irrespective of whatever use SSFL is eventually put to, because many people live close to the site
 - Contamination from the site has already migrated off-site repeatedly, carried by storm water, moving in groundwater, and blown by the wind
 - If SSFL is not fully cleaned up as promised, there can be continued migration to neighboring areas
-



- Boeing itself has estimated extraordinary cancer risks associated with site contamination.
 - Nonetheless, Boeing has proposed No Further Action (no cleanup) for about 98% of the soil.
 - Boeing's own estimates show very high risk even after the minimal proposed clean up.
 - **If DTSC approves Boeing's proposal, the great majority of their site would never be cleaned up and large amounts of contamination would remain available for migration to neighboring areas.**
-

