Position of The Boeing Company on SB 990 (Kuehl)

SB 990 prohibits the sale, transfer or lease of any part of Santa Susana Field Laboratory (SSFL) for any use, unless the Director of the Department of Toxic Substances Control (DTSC) certifies that the land has undergone complete remediation, pursuant of the most protective cleanup standards (this implies a 10^{-6} risk level) that have been promulgated by the U.S. Environmental Protection Agency (EPA) for sites that contain chemical and radioactive contamination and that are based on the most restrictive potential land use for these sites (this implies agricultural land use).

The Boeing Company opposes SB 990 for the following reasons.

Regulatory Impracticality

The DTSC has no regulatory jurisdiction over radioactive materials in the State of California. As such it has no personnel with the requisite training or expertise to implement the radiological mandates of SB 990.

Technical Impracticality

Technical feasibility is discussed in detail in EPA 402-R-96-011-A[1], "Radiation Site Cleanup Regulations – Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil."

EPA 402-R-96-011-A compares the soil concentrations to both laboratory detection capabilities, field survey detection capabilities and typical range of background and concludes,

> *"An important consideration in the development of soil cleanup levels is the feasibility of implementing the cleanup criteria in actual practice in the field. If the cleanup levels are set below the lower limits of detection for laboratory and field measurement techniques, or if the background radiation or radioactivity levels are highly variable and comparable to the cleanup levels. It will be very difficult to implement and enforce the regulations based on those cleanup criteria."* Section 7.2, page 7-14.

In February 2002, EPA published preliminary remediation goals (PRGs) for agricultural soil based on a 10^{-6} risk level[2]. Using these PRGs, a comparison of detectability and distinguishability from background has been made using the same technical feasibility criteria employed in EPA 402-R-96-011-A. The following conclusions are made for an agricultural land use scenario.

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[1] EPA 402-R-96-011-A, "Radiation Site Cleanup Regulations – Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil", September 1994, (http://www.epa.gov/rpdweb00/docs/cleanup/402-r-96-011a.htm), Chapter 7.2 "Technical Feasibility Issues Associated with Implementation", pages 7-14 through 7-41, Tables 7-4 through 7-10 and Table O-6.

[2] OSWER 9355.01-83A. "Distribution of OSWER Radionuclide Preliminary Remediation Goals (PRGs) Superfund Electronic Calculator." February 7, 2002. http://epa-prgs.ornl.gov/radionuclides)

- At the 10^{-6} PRG risk level for agricultural land use, no radionuclides can be detected by field instrument surveys.
- At the 10^{-6} PRG risk level for agricultural land use, the following radionuclides cannot be detected by laboratory analysis - Co-60, Cs-137, Fe-55, K-40, Ni-63, Pu-238, Pu-239, Pu-240, Pu-242, Ra-226, Sr-90, Th-228, Th-232, U-234, U-235 and U-238.
- At the 10^{-6} PRG risk level for agricultural land use, the following radionuclides cannot be distinguished from background variability by laboratory analysis - Am-241, Co-60, Cs-137, Fe-55, H-3, K-40, Ni-59, Ni-63, Pu-239, Pu-240, Pu-242, Ra-226, Sr-90, Th-228, Th-232, U-234, U-235 and U-238.

As an example of the unrealistic goals of SB 990, the bill would require an EPA cleanup standard for naturally occurring potassium-40 of 0.0445 pCi/g. This is a much lower level than the potassium-40 in our own bodies, the food we eat and in soil and rock.

Item	Potassium-40 (pCi/g)
Human body	~1
Food	1 to 10
Soil/Rock	10 to 25
Salt Substitute	~400

In conclusion, it is technically impossible to implement and verify a 10^{-6} risk level for an agricultural land use scenario. In effect one would be implementing a “cleanup to background” policy rather than implementing a science-based cleanup standard that is fully protective of human health and the environment.

Cost Benefit

CERCLA regulations require analysis of the “costs” and the “effectiveness” of proposed remedial actions. These have been conducted using cost-benefit analysis following Nuclear Regulatory Commission (NRC) guidance[3].

Analysis of the costs and benefits of cleanup to 10^{-4} and 10^{-6} risk levels for both residential and agricultural land use has been made for the 290 acres of Area IV of SSFL. Current remedial goals (~10^{-4} residential), and risk levels achieved ($\leq 10^{-5}$), result in no additional theoretical radiation induced cancers for hypothetical future users of the land. Additional costs for implementing the mandates of SB 990 would be significant without achieving any added level of safety to future users of the land.

[3] NRC NUREG-1727, "NMSS Decommissioning Standard Review Plan", Appendix D, ALARA Analysis, September 2000.

Risk Perspectives

The concepts of 10^{-4} and 10^{-6} risks are difficult to grasp in terms of everyday risks. 10^{-4} appears to be 100 times more dangerous than 10^{-6} so should it be cause for concern? The following data put these numbers and differences into perspective. The table below should help to lessen the perception that a 10^{-4} risk is too dangerous while a 10^{-6} risk is safe.

Sources of Risk	10^{-6} Risk	10^{-4} Risk
Radiation cancer risk from drinking orange juice (contains radioactive potassium-40)	0.4 teaspoon per day	1 cup per day
Radiation cancer risk from elevation change (increasing exposure to cosmic radiation)	Climbing a 6 foot step ladder	Elevation change in traveling from Santa Monica to the foothills of Beverly Hills (600 foot elevation)
Fatal accident risk from driving	Driving an extra 1 mile per year for 30 years	Driving an extra 100 miles per year for 30 years

The table below shows the lifetime cancer risk of background/lifestyle sources of radiation assuming the linear no threshold model of radiation risk is valid at these exposure levels.

Radiation Risk from Background/Lifestyle Sources of Radiation	Exposure (mrem/y)	Cancer Risk (75 year lifetime)*
Smoking 1 pack of cigarettes per day (polonium-210)	8,000	684,000 per 1,000,000
Indoor radon	200	17,100 per 1,000,000
Working in granite buildings	100	8,550 per 1,000,000
Soil and rock (Colorado plateau)	90	7,695 per 1,000,000
Cosmic rays (Denver at 5000 ft elevation)	55	4,703 per 1,000,000
Human body (from food we eat)	40	3,420 per 1,000,000
Soil and rock	40	3,420 per 1,000,000
Cosmic rays (at sea level)	30	2,565 per 1,000,000
Living in a brick house	7	599 per 1,000,000
One round trip from LA to NY per year	6	513 per 1,000,000
Sleeping next to one's partner	2	171 per 1,000,000

* Based on BEIR VII radiation risk of 0.00114 per 1,000 mrem

Past Experience and Future Plans

Post-remedial risk analyses at SSFL's prior radiological cleanup sites demonstrate that residential risk levels achieved are below the lower 10% of the CERCLA 10^{-6} to 10^{-4} risk range. (i.e. < 10^{-5}) and in many cases less than 10^{-6}.

The remaining two radiological facilities owned by the DOE at SSFL will be decommissioned pending completion of an EIS. SSFL is not currently on the National Priorities List (NPL) however EPA is performing a third hazard ranking assessment to determine whether SSFL should be listed on the NPL. The EPA and DOE agreed in a joint policy statement[4] that DOE decommissioning activities will be conducted consistent with CERCLA, effectively integrating EPA oversight responsibility, DOE lead agency responsibility, and state and stakeholder participation.

[4] USDOE and USEPA, "Policy on Decommissioning Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)." May 22, 1995.