APPENDIX I. DOE RESPONSE TO COMMENTS ON DRAFT ETEC EA

The U.S. Department of Energy (DOE) received 63 comment letters, electronic mail messages, and verbal communications from individuals; groups; and federal, state, and local governmental entities during the 90-day comment period on the Draft environmental assessment (EA). In addition, 16 people provided comments in the Draft EA public comment sessions held on January 24, 2002. DOE has considered these comments individually and collectively and has made many changes to the Draft EA as a result of the comments. These changes are reflected in the Final EA. DOE's specific responses to the issues raised in the public comments are provided below.

1. **Using the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process.** Commenters recommended that the CERCLA process be used to evaluate and select a cleanup alternative in order to conduct a risk-based cleanup evaluation.

   DOE Response:

   EPA-DOE Memorandum of Agreement
   The proposed cleanup activities for radionuclides are being performed under the DOE's AEA authority.[1] However, the NEPA process has been followed to evaluate the environmental impacts of response options and selection of a cleanup plan has been consistent with CERCLA in accordance with DOE's longstanding policy. The cleanup of non-radionuclides is being performed under the RCRA process which is also consistent with CERCLA and is expected to result in similar degrees of cleanup.

   In general, both the NEPA and CERCLA processes are consistent in that each requires: 1) the need for an action be demonstrated; 2) alternatives, including the no action alternative, be evaluated and compared against one another; 3) an administrative record be compiled of the information relied on in identifying a preferred alternative; 4) the public offered an opportunity to comment on the preferred alternative, and 5) the rationale and basis for the selected alternative outlined in a final decision document.

   On May 22, 1995, DOE and EPA signed a Memorandum of Agreement, which provided that DOE would conduct its decontamination and decommissioning activities consistent with CERCLA; specifically as non-time critical removal actions. Although two of the CERCLA evaluation criteria, effectiveness and implementability of alternatives were assessed in the EA, the third CERCLA criterion, cost, was not. DOE elected not to look at cost in the EA as the primary purpose of that analysis was to evaluate environmental impacts. DOE did consider costs however, in developing it's preferred response and concluded that the additional cost of $195 million for alternative 2 was not proportional to the risk reduction achieved.

   In many respects, DOE has not only been consistent with CERCLA, but has exceeded the specified requirements, particularly for public involvement DOE and other representatives of the Santa Susana Field Laboratory (SSFL) Workgroup regularly conduct public meetings (nominally on a quarterly basis) to provide an update of cleanup activities at the site and to afford the public an opportunity to comment on those and other activities. In addition, DOE and other representatives of the Workgroup hold monthly teleconferences for activity updates.

[1] DOE's authority to conduct decontamination and decommissioning activities is an implied authority flowing from Section 161 of the Atomic Energy Act (42 USC § 2201).

At the conclusion of the decontamination and decommissioning of each facility, DOE prepares a docket to document the successful completion of the effort and a notice of availability is published in the Federal Register.

Lastly, EPA is a standing member of the SSFL Workgroup and has had an active voice in the decontamination and decommissioning activities at ETEC for more than 10 years, despite EPA's determination in 1993 that the site did not pose sufficient risk to merit being listed on the National Priorities List of CERCLA sites.

2. **1 x 10^{-6} Risk Standard.** Commenters asked DOE to select the 1 x 10^{-6} risk standard (Alternative 2) for the cleanup of the ETEC site to protect public health and property values. DOE's preferred alternative of using a 15-millirem annual dose standard for ETEC, which relates to a 3 x 10^{-4} risk (Alternative 1) was said to be too high and not within a range permitted under CERCLA. Commenters stated that DOE was required by law and DOE policy to clean up to a 1 x 10^{-6} risk level unless technical reasons prevented cleanup to this level. They also stated that adding the risks associated with hazardous chemical contamination and radionuclides other than cesium would increase the risk standard above DOE's preferred 3 x 10^{-4} risk standard. Some commenters stated that there is "no cancer risk that is acceptable."

   DOE Response: DOE recognizes commenters' concerns regarding the 15 mrem cleanup standard, however, the actual cleanup will be conducted in accordance with the principle of ALARA. (see appendix G). Based on post-remedial verification inspections of previous cleanup activities at the ETEC site, the ultimate cleanup level reached will be in the 10^{-5} to 10^{-6} risk range. Furthermore, EPA has previously established 15 millirem per year (mrem/yr) dose limit as being protective. In the Office of Solid Waste and Emergency Response (OSWER) Directive 9200.4-18 (EPA 1997) EPA states: "This {15 millirem per year (mrem/yr)} level equates to approximately 3 x 10^{-4} increased lifetime risk and is consistent with levels generally considered protective in other governmental actions, particularly regulations and guidance developed by EPA in other radiation control programs. EPA goes on to explain that "Protectiveness for carcinogens under CERCLA is generally determined with reference to a cancer risk range of 10^{-4} to 10^{-6} deemed acceptable by EPA. Consistent with this range, EPA has considered cancer risk from radiation in a number of different contexts, and has consistently concluded that levels of 15 mrem/yr or less are protective and achievable.

   Cumulative Risk
   With respect to the contribution of other radionuclides and hazardous chemical contamination to residual risk levels, the ALARA process would ensure that no individual radionuclide would be present at sufficient concentrations to contribute a site risk level of 3 x 10^{-4}. Indeed, cesium-137, the primary radionuclide of concern, has been shown to contribute a theoretical risk of 2 x 10^{-6} at current levels. Potential theoretical contributions of other, less observed radionuclides would not result in additional theoretical risk approaching 1 x 10^{-4}. Similarly, levels of residual chemical contamination in soil are expected to be a very small fraction of the upper end of the CERCLA risk range. Therefore, summing the theoretical chemical and radiological risks would not exceed 1 x 10^{-4}.

   Theoretical Cancer Risks of the Linear-No-Threshold Model
   Finally, with respect to whether any additional cancer risk is acceptable, it is important to note that, although exposure to high levels of ionizing radiation can and does result in detrimental health effects including cancer, there is no scientific evidence to support the presence of any increase in cancer risk at levels below 10,000 millirem in addition to background radiation.

Additional information about the linear-no-threshold model is contained in Appendix C of this EA.

3. **Leaving Contaminated Soil Onsite.** Commenters stated that DOE's preferred alternative would leave "98% of contaminated soil in place" and would allow "300 times" and "10,000 times" more radioactivity in the soil than EPA standards would allow. Commenters also stated that the 15-millirem standard was the equivalent of 200 additional chest x-rays over a lifetime. These commenters asked that DOE clean up all contaminated soil at the site.

   Commenters noted the relatively large soil concentration values for nickel-59, nickel-63, and iron-55, and the resulting high risk factors in Table I-1.

   DOE Response: Leaving "98% of contaminated soil in place" refers to the difference between excavating 5,500 cubic meters (194,230 cubic feet) of soil under Alternative 1 and excavating 404,850 cubic meters (14.3 million cubic feet) under Alternative 2.

   DOE is not allowing 10,000 times more radioactivity in the soil than EPA standards allow. This statement presumes the EPA requirement is to remediate soil to a 1×10^{-6} risk level. This is not the case. The EPA CERCLA standard is a range from 1×10^{-4} to 1×10^{-6}. As discussed in the previous response, Alternative I will result in residual radioactivity that is well below the EPA threshold of a 10^{-4} risk level. In fact, the residual contamination at ETEC would be lower than 15 millirem per year through the application of the ALARA principle under which DOE would act to attain doses as far below applicable limits as is reasonably achievable (*see* Appendix G). The current average risk at the site is only about 2×10^{-6} In the past, DOE has achieved residual dose risk on the order of 1×10^{-6} by the application of the ALARA principle and the 15 millirem residual contamination standard.

   While a 15 mrem standard dose equates to an equivalent dose of 200 chest x-rays over a 100 year life span, the balance of Area IV is already below a 1 mrem effective dose. Using the actual effective dose, it would take over 1500 years to accumulate the equivalent does of 200 chest x-rays. In addition, the 15 mrem standard is only 5 percent of the average natural background radiation level of approximately 300 mrem per year and is less than the variability of natural background in the United States.

   EPA Region 9 Table

   In 1999, EPA Region 9 compiled a table to compare DOE- and DHS-approved Rocketdyne soil concentration cleanup standards at the 15 millirem per year level with soil concentrations at the 10^{-6} risk level. This table was referred to in public comments on the Draft EA, is included at the end of this section (Table I-1), and is explained below.

   Column 3 in Table I-1, titled "EPA 10^{-6} Level (pCi/g)," references EPA document 402/R-96/011A, *Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil* (EPA 1994). Radioisotope soil concentrations are provided for the 10^{-6} risk level and are compared to the approved Rocketdyne radioisotope soil concentrations in Column 2. There is an implication that EPA document 402/R-96/011A presented these 10^{-6} risk level soil concentrations and recommended a 10^{-6} risk cleanup level. This is incorrect.

   In fact, EPA document 402/R-96/011A does not recommend cleanup standards and does not present radioisotope soil concentrations at 10^{-6} risk levels. EPA document 402/R-96/011A was originally written as a technical basis for the draft EPA Regulation 40 CFR Part 196, Radiation Site Cleanup Regulation, which does recommend cleanup levels but at the 3×10^{-4} or 15 millirem

per year level. Subsequently, EPA OSWER Directive 9200.4-18, *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination* (EPA 1997), has reiterated EPA's support for cleanup levels of 3×10^{-4} risk or 15 millirem per year.

In fact, EPA document 402/R-96/011A provides radioisotope soil concentrations at the 10^{-4}, 3×10^{-4}, and 15 millirem per year levels for various exposure scenarios, including rural residential. The EPA table (Table I-1) ratios radioisotope soil concentrations in EPA document 402/R-96/011A for the 10^{-4} risk level down to the 10^{-6} risk level by dividing all the data by 100.

EPA document 402/R-96/011A compares the radioisotope soil concentrations to both laboratory detection capabilities, field survey detection capabilities, and typical range of background. That document makes the following statements about the feasibility of using cleanup standards at the 10^{-4}, 3×10^{-4}, and 15 millirem per year levels:

> "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.
>
> "At the target risk level of 10^{-4}, no radionuclides can be detected using field measurements for the rural residential exposure scenario." Section 7.2.1.4, page 7-37.
>
> "It is important to emphasize that in some situations, it is the spatial variability in the levels of naturally occurring or anthropogenic background radioactivity rather than the minimum detectable concentration, that limits the technical feasibility of using field or laboratory techniques to assess contaminant concentrations at a site." Section 7.2.1.4, page 7-39.
>
> "At a target risk level of 10^{-4}, all radionuclides may by detectable above their respective background concentrations for the rural residential exposure scenario, except C-14, Cs-137, K-40, Pa-231, Pb-210, Ra-226, Ra-228, Sr-90, Th-228, Th-230, Th-232, U-234, and U-238." Section 7.2.2.3. page 7-42.

In summary, the EPA document 402/R-96/011A (EPA 1994), which was used to develop Table I-1, in fact fully supports the current DOE- and DHS-approved Rocketdyne cleanup standards and provides data to demonstrate that cleanup to even 10^{-4} levels may not always be feasible because of detectability and background variability issues.

Because of concerns relating to how Table I-1 could be used and interpreted, EPA later prepared a second table (Table I-2) showing the full range of soil concentrations from 10^{-6} to 15 millirem per year and both suburban residential and rural residential data. This version better represents the actual data in EPA document 402/R-96/011A. Table I-2 shows that the upper end of the EPA risk range for suburban scenarios (Column 3) agrees fairly closely with the DOE 15-millirem-per-year level for ETEC (Column 2). Remaining differences are due to different input assumptions, principally estimated fruit and vegetable intakes. Therefore, EPA analyses and limits are not significantly different from DOE analyses and limits.

Table I-1. A Comparison of DOE-Approved Cleanup Levels for ETEC, 10^{-6} Residential Levels, and "Background" Levels

Radionuclide	DOE Cleanup Level for ETEC[a] (pCi/g) (est. risk level[b])	EPA 10^{-6} Level[c] (pCi/g)	Background[d] (95% of distribution, not mean) (pCi/g)
Am-241	5.44 ($6x10^{-6}$)	0.90	
Co-60	1.94 ($5x10^{-4}$)	0.004	
Cs-134	3.33 ($3x10^{-4}$)	0.01	
Cs-137	9.20 ($9x10^{-4}$)	0.01	0.21
Eu-152	4.51 ($5x10^{-4}$)	0.01	
Eu-154	4.11 ($4x10^{-4}$)	0.01	
Fe-55	629,000 ($9x10^{-3}$)	67.62	
H-3	31,900 ($3x10^{-6}$)[e]	11,000[e]	0.525
K-40	27.6 ($1x10^{-3}$)	0.02	
Mn-54	6.11 ($6x10^{-4}$)	0.01	
Na-22	2.31 ($6x10^{-4}$)	0.004	
Ni-59	151,000 ($2x10^{-2}$)	8.97	
Ni-63	55,300 ($2x10^{-2}$)	2.86	
Pu-238	37.2 ($4x10^{-5}$)	1.01	0.07
Pu-239	33.9 ($3x10^{-5}$)	1.04	
Pu-240	33.9 ($3x10^{-5}$)	1.04	
Pu-241	230 ($7x10^{-6}$)	30.76	
Pu-242	35.5 ($3x10^{-5}$)	1.09	
Ra-226	5 and 15 ($5x10^{-5}$ and $2x10^{-4}$)	0.1 (includes risk from decay to radon)	
Sr-90	36 ($4x10^{-4}$)	0.01	0.12
Th-228	5 and 15 ($5x10^{-4}$ and $2x10^{-3}$)	0.01	1.7 (TMA) 0.9 (Teledyne)[f]
Th-232	5 and 15 ($2x10^{-3}$and $6x10^{-3}$)	0.003	1.58 (TMA) 1.1 (Teledyne)[f]
U-234	30 ($6x10^{-4}$)	0.05	2.2 (TMA) 0.79 (Teledyne)[f]
U-235	30 ($8x10^{-4}$)	0.04	0.1 (TMA) 0.04 (Teledyne)[f]
U-238	35 ($9x10^{-4}$)	0.04	1.8 (TMA) 0.84 (Teledyne)[f]

Notes on Table I-1:
a. From the *Proposed Sitewide Release Criteria for Remediation of Facilities at the SSFL*, August 22, 1996. DOE approved the release criteria on September 17, 1996. DHS approved the release criteria on August 6, 1996.
b. Estimated by comparison with Rural residential (10^{-4} level) contained in *Radiation Site Cleanup Regulations: Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil* (EPA 1994).
c. Estimated by comparison with Rural residential (10^{-4} level) contained in *Radiation Site Cleanup Regulations: Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil* (EPA 1994).
d. 95% (confidence interval) of the distribution, from the *Area IV Radiological Characterization Survey* (Rocketdyne 1996).
e. Based on Risk Comparison for Radionuclides in Soil, derived from RiskCalc software using RAGS HHEM Part B with its Default Scenario Values. According to footnote c, the 10^{-4} rural residential concentration is 34 pCi/g. However, this level seems low considering that EPA's MCL for tritium is 20 pCi/g (20,000 pCi/l).
f. The averages from both laboratories should be combined. Any samples collected outside the Chatsworth Formation should not be considered background for these radionuclides.

Table I-2. A Comparison of DOE-Approved Cleanup Levels for ETEC, EPA's Risk Range for Generic Suburban and Residential Scenarios, and "Background" Levels

Radionuclide	DOE 15 mrem Level for ETEC[a] (pCi/g)	EPA Risk Range[b] (Suburban) (pCi/g)	EPA Risk Range[b] (Rural Residential) (pCi/g)	Background[c] (95% of distribution, not mean) (pCi/g)
Am-241	5.44	2.26 - 74	0.90 - 26	
Co-60	1.94	0.004 - 1.3	0.004 - 1.2	
Cs-134	3.33	0.01 - 3	0.01 - 2	
Cs-137	9.20	0.02 - 6	0.01 - 5	0.21
Eu-152	4.51	0.01 - 3	0.01 - 3	
Eu-154	4.11	0.01 - 3	0.01 - 3	
Fe-55	629,000	1,401 - 601,443	67.62 - 31,793	
H-3	31,900	11,000[d]	N/A	0.525
K-40	27.6	0.05 - 20	0.02 - 9	
Mn-54	6.11	0.01 - 5	0.01 - 5	
Na-22	2.31	0.005 - 2	0.004 - 2	
Ni-59	151,000	69 - 53,744	8.97 - 7,049	
Ni-63	55,300	22 - 20,105	2.86 - 2,616	
Pu-238	37.2	3.25 - 100	1.01 - 31	0.07
Pu-239	33.9	3.38 - 88	1.04 - 27	
Pu-240	33.9	3.38 - 88	1.04 - 27	
Pu-241	230	77 - 2,524	30.76 - 870	
Pu-242	35.5	3.52 - 93	1.09 - 29	
Ra-226	5 and 15	0.001 - 0.1 (w/o radon) 0.005 - 1.0 (w/radon)	0.001 - 0.1 (includes risk from decay to radon) 0.004 - 1.0 (w/ radon)	
Sr-90	36	0.001 - 13	0.01 - 3	0.12
Th-228	5 and 15	0.01 - 2	0.01 - 2	1.7 (TMA) 0.9 (Teledyne)[e]
Th-232	5 and 15	0.004 - 1	0.003 - 1	1.58 (TMA) 1.1 (Teledyne)[e]
U-234	30	0.06 - 7	0.05 - 7	2.2 (TMA) 0.79 (Teledyne)[e]
U-235	30	0.04 - 7	0.04 - 6	0.1 (TMA) 0.04 (Teledyne)[e]
U-238	35	0.06 - 8	0.04 - 7	1.8 (TMA) 0.84 (Teledyne)[e]

Notes on Table I-2:

a. From the *Proposed Sitewide Release Criteria for Remediation of Facilities at the SSFL*, August 22, 1996. DOE approved the release criteria on September 17, 1996. DHS approved the release criteria on August 6, 1996.

b. In this table, the range has been set from a 1×10^{-6} excess cancer risk to 15 milirem per year level. The 1×10^{-6} level has been estimated by comparison with 10^{-4} level (for both suburban and rural residential scenarios) contained in *Radiation Site Cleanup Regulations: Technical Support Document for the Development of Radionuclide Cleanup Levels for Soil* (EPA 1994). As stated in the OSWER Directive 9200.4-18 (EPA 1997), "EPA generally sets site specific remediation levels for carcinogens at a level that represents an excess upper bound lifetime cancer risk to an individual of between 10^{-4} to 10^{-6}." It also states, "[g]uidance that provides for cleanups outside the risk range (in general, cleanup levels exceeding 15 milirems per which equates to 3×10^{-4} increased lifetime risk) is similarly not protective under CERCLA and should not be used to establish cleanup levels."

c. 95% (confidence interval) of the distribution, from the *Area IV Radiological Characterization Survey* (Rocketdyne 1996).

Notes on Table I-2 (cont):
d. Based on Risk Comparison for Radionuclides in Soil, derived from RiskCalc software using RAGS HHEM Part B with its Default Scenario Values. According to the document referenced in footnote b, the 10^{-4} rural residential concentration is 34 pCi/g. However, this level seems low considering that EPA's MCL for tritium is 20 pCi/g (20,000 pCi/l).
e. The averages from both laboratories should be combined. Any samples collected outside the Chatsworth Formation should not be considered background for these radionuclides.

Nickel-59, Nickel-63, and Iron-55

Nickel-59, nickel-63, or iron-55 have not been observed in any soil at Area IV. No europium-152 or europium-154 was detected in any Area IV survey soil samples. Only three Area IV survey soil samples showed any detectable cobalt-60, at 0.04, 0.04, and 0.13 picocuries per gram. These levels are well below the cleanup standard of 1.9 picocuries per gram. Thus, it is apparent that there is no good transport mechanism for activation products, including nickel-59, nickel-63, and iron-55, from internal equipment and structural materials into environmental soil and or groundwater. Activation products, including nickel-59, nickel-63, and iron-55, are not therefore likely to be contaminants of concern.

In conclusion, the relatively high concentration limits and high theoretical risk values for nickel-59, nickel-63, and iron-55 are not meaningful or relevant because these isotopes have never been observed in Area IV soil.

4. **Rocketdyne/Boeing Soil Sampling.** Commenters questioned the use of the 1995 soil survey data compiled by Rocketdyne/Boeing as the basis for the analysis in the EA. They stated that EPA had recommended that the survey be withdrawn and that DOE had agreed to do so.

   DOE Response: Area IV soil sample data were used primarily to obtain a conservative estimate of the required soil to be excavated to achieve various levels of residual contamination. DOE did not agree to withdraw the data and believes it to be valid for the purpose for which it was used. In response to comments concerning the methodology used to obtain the soil data and whether the assumptions made on the basis of the data are overly conservative or not conservative enough, DOE has prepared a separate appendix regarding the soil survey data used as the basis of analysis in the EA (*see* Appendix E) which shows that the 1995 Area IV survey data set is representative of all soil in Area IV.

5. **EPA Survey.** Commenters stated that DOE promised to allow EPA to conduct a comprehensive survey of the site but that such a survey was no longer being proposed. Further, commenters stated that DOE was "refusing to check for the contamination to see where it still is and clean it up."

   DOE Response: A final status survey of Area IV will be done according to MARSSIM protocol before the site is released back to the property owner. The MARSSIM survey will verify that the site has been cleaned up to appropriate standards.

6. **Health Studies.** Commenters stated that there was anecdotal evidence of a large number of cancers in the area around SSFL. Commenters also sought information regarding the results of a worker exposure study conducted by the University of California at Los Angeles and an epidemiological study being conducted by the Agency for Toxic Substances and Disease Registry.

DOE Response: There have been three DHS studies of cancer rates in the communities surrounding SSFL in recent years. The first was published in 1990, the second was published in 1992, and the third published in 1997.

1990 Cancer Study
The first study (DHS 1990) investigated the rates of many forms of cancer in Los Angeles County census tracts to the east of SSFL and compared them with the Los Angeles County average cancer rates. No cancer rates in the proximity of SSFL were identified as statistically different from Los Angeles County averages. Bladder cancer in one census tract was identified as being 50 percent higher than the Los Angeles County average rate. However, the 1,300 Los Angeles County census tracts had a wide distribution of bladder cancer rates, such that approximately 20 percent or 250 census tracts in Los Angeles actually had higher bladder cancer rates than the census tract close by SSFL. Therefore, a 50 percent difference is not statistically significant. The 1990 study concluded, "these findings are consistent with random variation in cancer incidence rates" (*id*. at Page 1).

1992 Cancer Study
The 1992 report (DHS 1992) expanded the 1990 cancer study to include Ventura county census tracts, including those of Simi Valley, immediately to the north of SSFL and closest to the Area IV, where nuclear research was conducted. Bladder cancer rates, which were the highlight of the first study, were still observed to be elevated in Los Angeles County census tracts close to SSFL but only in men, not in women. Also, bladder cancer rates in the Simi Valley tracts close to SSFL were actually less than the rest of Ventura County. The 1992 report concluded that:

> "people living near the SSFL are not at increased risk for developing cancers associated with radiation exposure" (*id*. at Page ii).
>
> "We would expect that if community exposure to ionizing radiation were causing an elevation in cancers in this geographic area we would see the greatest increase among those cancers known to be most strongly associated with radiation exposure. Not only is such a pattern not evident, but the very radiosensitive cancer group appears to be somewhat underrepresented in people living near the SSFL" (*id*. at Page 8).

1997 Cancer Study
In 1997, a report (DHS 1997) by Health Care Services of Santa Barbara County compared cancer rates within 8 kilometers (5 miles) of SSFL with average data from San Luis Obispo, Santa Barbara, and Ventura Counties. They determined that:

> "residents of the study area seem to have cancer incidence risk which is similar to that of the other residents of the Tri-Counties Region…" (*id*. at Page 2).

The report further noted a significant decrease in leukemia in women (leukemia was a focus of attention in the later Rocketdyne Worker Health Study) and a slight decrease in bladder cancer in the study area (the focus of attention in the 1990 study). This study also noted a 17 percent increase in lung cancer over the Tri-County Region average. However, the study area lung cancer rate was within the observed range of individual census tract lung cancer rates, as with bladder cancer in the 1990 study. The report's author did not regard a 17 percent increase in rates as statistically significant.

1999 Department of Toxic Substances Control Review of DHS Cancer Studies

Subsequent to these reports, the Department of Toxic Substances Control was directed to perform a review of the three DHS cancer studies (DTSC 1999). The inquiry was conducted under the direction of Special Assistant Harold Thomas and Chief Investigator Mary Locke. As part of the inquiry, a technical review of all DHS SSFL cancer registry studies was conducted by Dr. Myrto Petreas of the Department of Toxic Substances Control's Hazardous Materials Laboratory under the Direction of Dr. Bob Stevens, Deputy Director of the Department of Toxic Substances Control's Science, Pollution and Prevention and Technology Program. This review was titled "Health Studies at Santa Susana Field Laboratory - Expert Panel Review." Expert panel members, with no affiliation to the DHS, were selected to review all previous SSFL cancer registry studies. These panel members were Dr. James Beaumont, Associate Professor at the Department of Epidemiology and Preventive Medicine at the UC Davis School of Medicine, and Dr. Faith Davis, Professor and Director, Division of Epidemiology and Biostatistics, School of Public Health at the University of Illinois, Chicago.

Findings of the Expert Panel Review are provided below:

> "Three studies of cancer incidence in the vicinity of SSFL were reviewed. Whereas there were some differences in the geographic areas, time periods, case definitions and level of significance used in these three studies, the combined evidence from all three does not indicate an increased rate of cancer incidence in the regions examined. The extremely modest cancer incidence increases associated with known radiosensitive tumors could be easily explained by uncontrolled confounding or imprecision of the data. The results do not support the presence of any major environmental hazard."

1997 Rocketdyne Radiation Worker Health Study

In the early 1990s, DOE provided funding to the Public Health Foundation of the California DHS for the performance of an epidemiology study of Rocketdyne workers. The contract was eventually awarded to a team from University of California, Los Angeles. The first phase of the study to investigate the effects of ionizing radiation on Rocketdyne's radiation workers was conducted by Dr. Beate Ritz and commenced in January 1994. A report titled *Epidemiology Study to Determine the Possible Adverse Effects of Rocketdyne/Atomics International Workers from Exposure to Ionizing Radiation* was released in September 1997 (UCLA 1997). The following conclusions may be drawn from the study's data and results.

- Rocketdyne radiation workers have a 32 percent lower death rate from "all causes" and a 21 percent lower death rate from "all cancers" than the U.S. population.

- Rocketdyne radiation workers have a 38 percent lower death rate from "all causes" and an 11 percent lower death rate from "all cancers" than a similar worker control group who was not exposed to occupational radiation.

- Out of 4,563 Rocketdyne radiation workers exposed to external radiation, more than 99 percent (or 4,529) did not exhibit any increased cancer rates.

- The University of California at Los Angeles concluded that there was an increased rate of leukemia/lymphoma in those workers with external exposure above 200 milliSievert (20 rem). This was due to 1 leukemia death and 1 non-radiosensitive "Hodgkins Disease" death from 34 workers with exposure above 200 milliSievert (20 rem). The small sample size means that a large uncertainty is associated with this result. However,

leukemia has been observed to be correlated to higher levels of radiation in other studies at other nuclear facilities in the United States.

- The University of California at Los Angeles concluded that there was an increased rate of lung cancer in those workers with external exposure above 200 milliSievert (20 rem). This was due to 2 lung cancer deaths from 34 workers with exposure above 200 milliSievert (20 rem). The small sample size means that a large uncertainty is associated with this result. This result was also in direct contradiction to results for internal (inhaled) radiation exposure which showed decreasing lung cancer rates with increasing internal (lung) radiation exposures.

- Rocketdyne and many national experts in radiation effects and radiation epidemiology have questioned all of the University of California at Los Angeles' conclusions based on internal radiation exposure data. The University's conclusions are not consistent with what has been seen in a majority of other worker studies that examined higher exposures and larger study groups.

- Rocketdyne radiation workers have received lower exposures than any other groups of radiation workers studied in the United States, United Kingdom, and Canada.

- No Rocketdyne radiation worker has ever exceeded the allowable annual regulatory limits for external radiation exposure.

- Since 1984, Rocketdyne has voluntarily limited annual exposures to less than 40 percent of regulatory limits.

- The study demonstrates that Rocketdyne's efforts to minimize risks to its employees in the area of radiation protection have been successful.

- The study demonstrates that there are no widespread health effects related to radiation exposure at Rocketdyne and that its radiation workers are generally healthier than other worker groups

Agency for Toxic Substances and Disease Registry/Eastem Research Group/University of California at Los Angeles Community Cancer Study

In December 1999, the Agency for Toxic Substances and Disease Registry issued a draft "Preliminary Site Evaluation for the Santa Susana Field Laboratory Site" (ATSDR 1999). This report addressed the concerns of the community and was a preliminary assessment of the potential for adverse human health effects from past, present, and future activities at the site. The Agency also reviewed five epidemiological studies from the SSFL (two were health studies of workers and three were evaluations of community cancer registry data). Based on a preliminary evaluation of the potential exposure pathways and associated health studies and on then-available data, the Agency concluded that:

- "[I]t is unlikely that people living in communities near the site have been exposed to substances from the site at levels that would have resulted in adverse health effects."

- "In this preliminary evaluation of available data and information, ATSDR has not identified an apparent public health hazard to the surrounding communities because people have not been, and are currently not being exposed to chemicals and radionuclides from the site at

levels that are likely to result in adverse health effects."

- "Based on available data and information, there is no indication that off-site residential areas, including the Brandeis-Bardin Institute, the Santa Monica Mountains Conservancy, and Bell Canyon, have been adversely impacted by chemicals or radionuclides from SSFL."

Notwithstanding these conclusions, the Agency recommended several follow-up studies, including:

- "A more in-depth evaluation of exposure pathways that addresses past, present, and future exposure to chemicals and radionuclides from the SSFL should be conducted to improve the assessment of potential offsite exposures and public health implications associated with this site."

- Are-analysis of cancer registry data including additional years of newly available cancer data and updated demographic information should be conducted to see if the apparent increase in the incidence rates of bladder and lung cancers persist.

As a result of the last recommendation, the Agency contracted with the Eastern Research Group, which in turn has contracted (sole source) with the University of California at Los Angeles to perform another investigation of the cancer rates around SSFL. DOE is not aware of any progress made on this project.

7. **Radioactive Waste Disposal.** Commenters stated that DOE was proposing to dispose of radioactive waste in local municipal landfills rather than licensed radioactive waste disposal facilities.

DOE Response: As stated in Section 4.10, radioactive waste stored on the site and generated as a result of ongoing activities and decontamination is transported to and disposed of at DOE-managed or Nuclear Regulatory Commission -licensed radioactive waste disposal sites. DOE has not shipped radioactive waste to any municipal landfills or hazardous waste landfills and is not proposing to do so.

Building debris from demolished buildings that have been decontaminated and released for unrestricted use by federal and state agencies can be sent to municipal landfills without any further regulatory controls. Such material does not pose a health risk to the public or the environment.

Similarly, soil that has been released by federal and state agencies for unrestricted use may be disposed of at municipal landfills. This soil does not pose a health risk to the public or the environment.

Questions have been raised regarding the alleged disposal of radioactive waste from ETEC to various sanitary landfills. DOE only sends radioactive waste to facilities licensed to accept this type of waste. DOE complies with all federal, state, and local regulations regarding the disposal of waste. The comments regarding the legality of DOE actions stem from differences regarding the definition of radioactive waste. Inherent in this discussion is a difference over what dose is considered safe. The approved site release limit for soil at ETEC is a dose of 15 millirem per year using a suburban residential land use scenario. This limit is less than the state and DOE dose limit of 25 millirem per year. Consequently, any material below this dose limit is not considered radioactive waste by either the state or federal government. It is important to remember that the

release limit for soil (15 millirem per year dose) is the dose above background radiation levels. Average background radiation is 300 millirem per year. Consequently, the ETEC release limit is only a small increment above background. Additionally, this dose is equivalent to a risk level that is within the CERCLA risk range (a fact that was publicly acknowledged by EPA in its testimony before the Los Angeles City Council in April 2002).

DOE has shipped waste to three sanitary landfills (Bradley, Sunshine, and Calabassas). All waste shipped to these facilities meets state requirements for disposal at these sites. None of the waste going to these landfills is classified as either radioactive or hazardous waste.

The waste sent to the Bradley landfill is building debris. It is noteworthy to point out that the release limit for building debris is less than that for soil (different regulations are involved). The release limit for debris is equivalent to a dose of less than one millirem per year above background levels. DOE must assure that the debris meets state and federal regulations regarding the unrestricted release of former radioactively contaminated facilities. ETEC was a multi-purpose facility. Currently, DOE has only three facilities at the site subject to radiological controls. DOE must assure that the debris meets state and federal regulations regarding the unrestricted release of former radioactively contaminated facilities. Radiological materials were not used in the balance of the facilities at ETEC. Consequently, they are not subject to radiological controls. Most of the waste shipped from ETEC does not require a survey for radioactivity because it does not come from a radiologically controlled facility. Hazardous materials are removed from all facilities prior to demolition. Hazardous waste is sent to a RCRA-permitted disposal site.

Through Executive Order D-62-02 (September 30, 2002), the Governor of California imposed a moratorium on the disposal of decommissioned materials into Class III landfills and unclassified waste management units, as described in Title 27, sections 20260 and 20230, of the California Code of Regulations. The moratorium affects material from former radiological facilities. It will remain in effect until the state completes its assessment of the public health and environmental safety risks associated with the disposal of decommissioned materials and the regulations setting dose standards for decommissioning.

8. **Monitoring.** Commenters sought information on water and air monitoring that had been done to ascertain radioactive releases that had occurred from the site. Commenters stated that radioactive carcinogens, including tritium, would continue to be released from the site due to wind and rain if the site were not cleaned up. Previous studies found contamination from ETEC had migrated off site.

DOE Response: DOE annually reports on the results of environmental monitoring done at each of its sites, including ETEC. The most recent ETEC report, *Site Environmental Report for Calendar Year 2000* (DOE 2001), contains information on radioactive effluent monitoring and sampling of ambient air, groundwater, surface water and domestic water supply, soil, vegetation, and ambient radiation. It also describes the results of non-radiological monitoring of surface water, air, and groundwater. The annual site environmental reports are public documents and available from DOE and library repositories (California State University at Northridge, Platt Street Library, and Simi Valley Library).

The 2000 Site Environmental Report indicates that the collective dose to the public in the 50-mile (80-kilometer) radius from SSFL is 2.2×10^{-4} person-rem. This may be compared to the 3×10^{6} person-rem dose as a result of exposure to natural background radiation (300 millirem per

person per year). The discussion of the No Action Alternative in the EA addresses potential impacts of not cleaning up the area where the remaining ETEC facilities are located.

As discussed in Section 4.4.1 of the EA, DOE determined that the occurrence of the tritium in groundwater resulted from the formation of tritium in the reactor shielding in Building 4010, which has since been decontaminated, released for unrestricted use, and demolished. Prior to removal of the facility, tritiated water migrated from the concrete into the surrounding soil and subsequently into the groundwater. No tritium has been observed that exceeds EPA drinking water supplier standards.

9. Future Use of the Site. Commenters stated that DOE only analyzed 500 people living in 100 homes on 2,800 acres of land. They concluded that a larger number of people would eventually live on the site and that an analysis of a larger population would result in "significant numbers of cancers." Other commenters recommended that DOE consider prohibiting future residential use of the site.

DOE Response: ETEC facilities are or were located within an approximate 0.4-square-kilometer (90-acre) area within Area IV of the SSFL. The habitable portion of Area IV is approximately 0.8-square-kilometer (200 acres). Because implementation of Alternative 2 would require excavation of some parts of Area IV, DOE analyzed the impacts to future residents on Area IV—the approximate 0.8-square-kilometer within which the ETEC facilities are or were located.

Given the land use and population density of the community located nearest to the SSFL, DOE assumed that single-family houses would be built on 8,000-square-meter (2-acre) plots of land on the 0.8-square-kilometer (200-acre) Area IV. The 100 homes were assumed to house 5 people each, for a total of 500 people living on the site at any one time. A 15-millirem annual dose through all exposure pathways to each individual living on the site for 40 years would result in an individual risk of incurring a latent cancer fatality risk of 3×10^{-4}. Thus, a site population of 500 people would receive a total of 300 person-rem over 40 years, which could result in up to a 0.15 theoretical additional latent cancer fatality within the population during that time period. By comparison, this population would be expected to incur approximately three theoretical latent cancer fatalities as a result of exposure to background radiation over 40 years.

Viewed differently, one additional latent cancer fatality could be expected in the population living on Area IV (following cleanup under Alternative 1) over a 270-year period. By comparison, approximately 20 latent cancer fatalities would be expected in a site population of 500 as a result of exposure to background radiation over 270 years. Implementation of the ALARA process (see Appendix G) would reduce exposures even further, making these theoretical cancer estimates ultraconservative.

Under Alternative 2, a 0.05-millirem annual dose through all exposure pathways to each individual living on the site for 40 years would result in an individual risk of incurring a latent cancer fatality of 1×10^{-6}. A site population of 500 people would receive a total of 1 person-rem over 40 years, which could result in up to 0.0005 theoretical latent cancer fatality within the population during that time period. Following cleanup under Alternative 2, one latent cancer fatality could be expected in the population living on Area IV over an 80,000-year period.

Commenters have assumed that higher population density homes (between 3.5-person, one-fifth-acre tract homes and 3.5-person, 30-units per acre) would be built on all 2,240 habitable acres of the SSFL, giving a residential population of between 39,200 and 235,200 people. Such assumptions are unrealistic given the surrounding land use of 8,000-square-meter (2-acre) plots.

Commenters have also assumed that all of the SSFL would have residual contamination resulting in a 15-millirem annual dose to all residents of the area constituting the SSFL. This is incorrect, inasmuch as there has been no use of radioactive materials in the 10 square kilometers (2,500 acres) that constitute Areas I, II, and III of the SSFL. There is no evidence of any radiological contamination in any of these other areas.

DOE does not own any part of the SSFL, including the land where ETEC facilities are or were located, and has no authority to restrict future uses of the site. Although it is possible that the land could remain open space in the future, DOE's obligation is to clean up the site to residential standards.

10. No Action Alternative. Commenters noted that implementation of the No Action Alternative would benefit current residents because truck transportation of soil would not occur and, for this reason, the No Action Alternative was safer. Implementation of Alternative 1 or 2 would benefit future generations who lived on the site.

DOE Response: The commenter is correct in that the implementation of Alternative 1 or 2 would benefit future residents of the site, while imposing some impacts (for example, noise and vibrations as a result of truck traffic) to current residents near the site. DOE must balance the present and future benefits and impacts of all alternatives in determining which course of action to take.

11. Other Alternatives. Commenters suggested that DOE examine other cleanup alternatives. Finding an appropriate balance between the risks associated with truck transportation and the risks associated with residual radioactive contamination was suggested. Another alternative suggested using the CERCLA process for the selection of a remedy, active onsite management to reduce potential transportation impacts, the cleanup of the site to industrial levels, prohibiting residential use, leaving the area as a wildlife corridor or hiking area, and different transportation options.

DOE Response: DOE believes Alternative 1 is the appropriate balance between the risks associated with truck transportation and the risks associated with residual radioactive contamination. The following table is a comparison between the risks associated with Alternative 1 and Alternative 2. Cleanup levels between these two alternatives would result in different balances between the risks associated with truck transportation and the risks associated with residual radioactive contamination.

Theoretical Residual Risk	Annual Exposure (millirem)	Latent Cancer Fatalities in Exposed Population (40 Year Exposure)	Traffic Fatalities Resulting from Soil Removal
3×10^{-4}	15	0.15	0.025
1×10^{-4}	5.0	0.05	0.035
1×10^{-5}	0.5	0.005	0.49
1×10^{-6}	0.05	0.0005	1.4

Cleanup to recreational/parkland levels would allow approximately five times more cesium-137 in the soil than residential levels would allow. As a result, no further soil excavation would be required in Area IV, even at the Radioactive Materials Handling Facility. DOE did not analyze this alternative cleanup level because the Department did not believe it was a reasonable alternative given the anticipated future use of the property.

The following table presents the levels of various radionuclides that could remain in the soil under different future use scenarios, assuming an annual exposure rate of no more than 15 millirem to an individual, using the 2001 version of RESRAD.

Single Radionuclide Soil Guidelines (picocuries/gram)

Isotope	Resident Farmer[a]	Industrial Worker[a]	Recreationist[a]	SSFL-Approved Soil Guidelines (Residential)[b]
Am-241	0.8	307	78	5.4
Co-60	1.7	5.9	55	1.9
Cs-134	2.9	11	35	3.3
Cs-137	6.1	27	47	9.2
Eu-152	3.9	13	384	4.5
Eu-154	3.6	12	353	4.1
Fe-55	33,110	3,295,000	39,120	629,000
H-3	601	129,500	4,150	31,900
K-40	8.6	87	31	28
Mn-54	7.3	25	709	6.1
Na-22	2.1	7.5	57	2.3
Ni-59	6,165	8,199,000	58,130	151,000
Ni-63	2,252	3,012,000	21,230	55,300
Pu-238	37	412	1,184	37
Pu-239	34	372	1,067	34
Pu-240	34	372	1,067	34
Pu-241	25	12,210	2,371	230
Pu-242	35	391	1,124	36
Ra-226	1.0	7.9	25	5 and 15[c]
Sr-90	2.5	2661	9.4	36
Th-228	3.0	10.3	292	5 and 15[c]
Th-232	1.0	5.4	38	5 and 15[c]
U-234	15	2,633	1,815	30[c]
U-235	3.4	112	136	30[c]
U-238	16	531	2,051	35[c]

a. Source: RESRAD 6.1 (ANL 2001) default parameters.
b. Source: Rocketdyne 1999 (using RESRAD 1996).
c. Based on applicable or relevant and appropriate requirements (ARARs).

The contaminated soil would be considered to be low-level radioactive waste (LLW). There is no "onsite management or treatment" of the waste that could occur in order to reduce potential transportation impacts. The impacts associated with transportation of LLW relate solely to the number of truck shipments required and not the level of radioactivity in the soil that would be transported.

With respect to other transportation alternatives, the only other potential transportation option would be rail. However, ETEC sits at the top of a range of hills with no current rail access. Constructing rail access to the site would be environmentally harmful and expensive. Moving contaminated soil from ETEC to the nearest railhead would still involve transportation of soil by truck.

12. **NEPA Compliance.** Commenters stated that DOE was improperly segmenting its analysis by only examining ETEC facilities and not analyzing hazardous chemical contamination. Commenters requested that the EA address the applicability of other laws and requirements to the proposed action. Commenters also stated that DOE had exempted itself from environmental law by issuing categorical exclusions for earlier cleanup activities. A commenter also questioned the extent to which DOE took public comments into account.

DOE Response: Although ETEC is located at the SSFL, DOE is responsible only for the facilities on Area IV that make up the ETEC. Most of those facilities have already been decontaminated, decommissioned, and demolished or abandoned for use by Boeing. However, DOE did evaluate the potential for cumulative impacts in the EA.

Applicable regulations require an agency to analyze connected, cumulative, and similar actions together in the same National Environmental Policy Act (NEPA) document (see 40 CFR 1508.8.25(a)). "Connected" actions are those that automatically trigger other actions, cannot proceed unless other actions are taken, or are interdependent parts of a larger action. The cleanup of hazardous chemical contamination is being undertaken as part of a RCRA process and is not related to the radiological decontamination and decommissioning of the remaining radiological facilities at ETEC. DOE is required to cleanup radiological contamination to a level protective of human health and the environment; this obligation is not affected by the clean up actions undertaken for hazardous chemical contamination. For this reason, the cleanup of radiological contamination and the cleanup of hazardous chemical contamination are not "connected actions" as that term is used in NEPA regulations.

In Section 2.2, the EA does address the applicability of other laws and regulations applicable to a cleanup of ETEC facilities.

Previous decontamination and decommissioning activities were undertaken pursuant to categorical exclusions in accordance with DOE and Council on Environmental Quality NEPA implementing regulations (see 10 CFR Part 1021, Subpart D and 40 CFR 1508.4). Application of a categorical exclusion is not only allowed by law but is encouraged to reduce paperwork and delay (see 40 CFR 1500.4(p) and 1500.5(k)). A categorical exclusion is an exemption from NEPA documentation requirements, not from NEPA itself. The prior decontamination and decommissioning activities were overseen by the California DHS, which concurred that the radiological facilities could be released for unrestricted use in accordance with state regulatory standards (the same standards are applicable to the proposed cleanup of the remaining ETEC radiological facilities). Although DOE agreed to conduct an EA due to stakeholder concern of segmentation, DOE saw no value in re-evaluating the decontamination and decommissioning decisions previously made that were approved by CA DHS and the facilities have been demolished or turned over to Boeing for reuse (see Table I-3).

DOE reviewed and considered all of the public scoping comments it received. DOE added, the $1x10^{-6}$ cleanup standard, Alternative 2, as an alternative at the request of stakeholders during the public scoping process. DOE has also reviewed and considered the comments it received on the Draft EA and has made changes to the document in response to those comments. These changes include a clarification of the areas to be cleaned up under Alternatives 1 and 2 and additional information regarding soil survey data, ALARA, radionuclides of concern, and air quality.

Table I-3. Status of All Radiological Facilities at ETEC

Facility Number	Facility Title	Rocketdyne Operations	Verification Surveys	Owner	Released By	Release Date	Building Demolition Date
OCY	Old Conservation Yard	D&D and survey complete	ORISE, DHS	Rocketdyne	DHS	1995	Land Only
RMHF	Radioactive Materials Handling Facility	Operational	-	DOE	-	ECD 2006	ECD 2006
003	Engineering Test Building	D&D and survey complete	ANL	Rocketdyne	DOE	1985	1999
005	Uranium Carbide Fuel Facility	D&D and survey complete	ORISE, DHS	Rocketdyne	DHS	1995	1996
009	Organic Moderated Reactor, Sodium Graphite Reactor	D&D and survey complete	DHS	Rocketdyne	DHS	1999	Not Planned
011	Radiation Instrument Calibration Laboratory	Survey complete	DHS	Rocketdyne	DHS	1998	Not Planned
010	SNAP-8 Experimental Reactor	D&D and survey complete	ANL	DOE	DOE	1982	1983
012	SNAP Critical Facility	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1997	ECD 2004
17th St.	17th St. Drainage Area	D&D and survey complete	ORISE, DHS	Rocketdyne	Pending	ECD 2002	Land Only
019	Flight System Critical Assembly	D&D and survey complete	ORISE, DHS	DOE	Pending	ECD 2002	Not Planned
020	Hot Lab Bldg.	D&D and survey complete	DHS	DOE	DHS (concrete)	1997-99	1997-99

Table I-3. Status of All Radiological Facilities at ETEC (cont)

Facility Number	Facility Title	Rocketdyne Operations	Verification Surveys	Owner	Released By	Release Date	Building Demolition Date
020	Hot Lab Land	Survey complete	ORISE, DHS	DOE	Pending	ECD 2002	Land Only
023	Corrosion Test Loop	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1997	1999
024	SNAP Environmental Test Facility	Operational (offices)	-	DOE	-	ECD 2005	ECD 2005
028	Shield Test Iradiation Reactor	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1997	1998
029	Radiation Measurement Facility	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1997	ECD 2003
030	van de Graaf Accelerator	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1997	1999
055	Nuclear Materials Development Facility	D&D and survey complete	ORAU	Rocketdyne	NRC	1987	Not Planned
059	SNAP Ground Prototype Test Building	Phase I D&D and survey complete	ORISE, DHS	DOE	Phase I pending	ECD 2002	ECD 2003
059	059 Land	Phase II D&D and survey complete	ORISE, DHS	DOE	-	ECD 2004	Land Only
064	Fuel Storage Facility	D&D and survey complete	ORISE, DHS	DOE	DOE, DHS	1996	1997
064SY	064 Side Yard and land	D&D and survey complete	ORISE, DHS	DOE	Pending	ECD 2002	Land Only
073	Kinetic Experiment Water Boiler	D&D and survey complete	ANL	ERDA	ERDA	1976	1976

Table I-3. Status of All Radiological Facilities at ETEC (cont)

Facility Number	Facility Title	Rocketdyne Operations	Verification Surveys	Owner	Released By	Release Date	Building Demolition Date
093	L-85 Reactor	D&D and survey complete	ORAU	Rocketdyne	NRC	1987	1995
100	Fast Critical Experiment Laboratory	D&D and survey complete	NRC	Rocketdyne	NRC	1980	Not Planned
143	Sodium Reactor Experiment	D&D and survey complete	ANL	Rocketdyne	DOE	1985	1999
363	R&D Laboratory	D&D and survey complete	ORISE, DHS	Rocketdyne	DHS	1998	2001
373	SNAP Critical Facility	D&D and survey complete	DHS (document review only)	Rocketdyne	DHS	1995	1996-99
654	Interim Storage Facility	D&D and survey complete	ORISE, DHS	DOE	Pending	ECD 2002	Land Only
886	Sodium Disposal Facility	Rad. D&D and survey complete	DHS	Rocketdyne	DHS	1998 (Land)	1991(Bldg)

D&D: decontamination and decommissioning
ECD: estimated completion date

13. EA Analysis. Commenters thought the purpose, scope, and context of the EA should be clarified and that the bases for judgments and conclusions should be provided. Commenters also asked for clarification regarding the definition of risk and lifetime span as used in the EA. Additional information was requested regarding air quality impacts; potential radiological contamination of groundwater; locations and history of radiological releases at ETEC and the standards applied to previous cleanups; potential impacts to protected, sensitive, or threatened plant and wildlife species that are known to occur on the site; and potential impacts to wetland and riparian resources. Information regarding loading of pollutants into the watershed was also requested. One commenter recommended that project costs, including transportation and disposal, be included in the decisionmaking process.

DOE Response: DOE has clarified the purpose, scope, and context of the EA in Chapter 1 and has added a discussion of the bases for judgments and conclusions where appropriate, particularly in Sections 3.2 and 3.3. DOE has also added Appendix E to specifically address the use of the Area IV soil survey data in the EA.

DOE has also clarified the discussion of risk and lifetime span in Chapter 1 and Appendix C. Specifically, the text was modified to explain that the risk discussed is the risk of incurring a fatal cancer and that DOE analyzed a 40-year period of exposure as a result of living on a house constructed within Area IV after cleanup. Information was also added regarding air quality impacts, previous cleanups at the site (*see* Table I-3), and liquid effluents.

With respect to impacts to biological resources, the EA identifies sensitive species that have been observed or that could potentially occur at the SSFL (*see* Appendix D). However, Section 4.6 of the EA also states that none of these would be affected under Alternative 1 because they are not present in the areas where the work would be performed. The EA acknowledges that the additional land disturbance required under Alternative 2 could increase the potential for disturbance of sensitive species and that consultation with the U.S. Fish and Wildlife Service could be necessary should DOE decide to implement Alternative 2. DOE believes the existing information on the difference in environmental impacts between alternatives 1 and 2 are sufficient to reach a defensible conclusion on which of the alternatives constitute the most appropriate response. Therefore, DOE has elected not to create detailed habitat maps or conduct biological resource surveys at this time to compare the potential environmental impacts of Alternatives 1 and 2; such additional analysis could be required, and would be conducted, if DOE decided to implement Alternative 2.

Although jurisdictional wetlands occur at the SSFL, none would be affected by the implementation of any of the alternatives, as indicated in Section 4.4 of the EA. Therefore, additional information regarding potential impacts or mitigation measures to avoid those impacts is not necessary. Similarly, none of the alternatives would result in releases of radioactively contaminated liquid effluent.

DOE intends to consider cost in its decisionmaking process. However, DOE did not include cost data in the EA because it focuses on potential environmental issues, not cost.

14. Mitigation. Commenters offered possible mitigation measures relating to truck transportation and activities to reduce air quality impacts from decontamination activities.

DOE Response: Many of the mitigation measures suggested are "best practices" that DOE routinely implements. DOE will consider and implement all suggested mitigation to the fullest extent possible.

15. Environmental Impact Statement. Commenters stated that DOE should prepare an environmental impact statement for the proposed cleanup of the site. Reasons cited for preparing an environmental impact statement were that the cleanup would cost "a quarter of a billion dollars," there was a meltdown there in 1959, it was an "immense area with lots of chemical and radioactive contamination," and there had never been an environmental impact statement to look at the cleanup of the site.

DOE Response: The purpose of an EA is to determine whether the impacts of a proposed action would be significant. Regardless of the cost or extent of a proposed action, an environmental impact statement is required when the impacts of the proposal may be significant. "Significance" is determined on a case-by-case basis. DOE prepared the *Draft Environmental Assessment for Cleanup and Closure of the Energy Technology Engineering Center* (DOE 2002) in order to determine whether the impacts of the proposed cleanup and cleanup alternatives would be significant. Based on its analysis, DOE determined that the impacts of the preferred alternative would not be significant and therefore that an environmental impact statement is not required.

In preparing the EA, DOE conducted a public scoping process to elicit public input on the scope of the EA analysis. DOE also issued the EA in draft and held a public hearing to obtain comments on the draft document. The comment period on the draft was 4 months long. The public was afforded the same participation and commenting opportunities on the ETEC EA as would be conducted for the preparation of an environmental impact statement.

Although it is not relevant to DOE's current cleanup proposal, DOE offers the following information regarding an accident at the site in 1959. The Sodium Reactor Experiment, also known as Building 4143, operated from April 1957 to February 1964. It supplied approximately 20 megawatts of nuclear powered electricity (less than 1 percent of the size of commercial power plants) to a commercial grid and supplied electricity to the city of Moorpark in the late 1950s.

The Sodium Reactor Experiment accident occurred in July 1959 when there was an accidental partial blockage of sodium coolant in some of the reactor coolant channels. This resulted in the partial melting of 13 of the 43 reactor fuel assemblies and the release of some fission products that contaminated the primary reactor cooling system and some of the inside rooms of the facility. All of the reactor safety systems functioned properly, and the reactor was safely shut down. The primary pressure vessel containing the reactor core and sodium coolant remained intact. Under the oversight of the AEC, contamination within the building was cleaned up; the reactor fuel assemblies were then removed, inspected, and stored at the Radioactive Materials Handling Facility. (They were later declad in the Hot Lab, and the fuel and cladding was shipped off site to an AEC-approved disposal facility). A second fuel loading was inserted, and operations continued until the reactor was shut down in February 1964 due to termination of the project.

A major portion of the radioactivity released from the fuel as a result of the fuel melting was contained in the sodium coolant, but some of the radioactivity was collected in the cover gas in the volume above the sodium coolant inside the reactor vessel. This radioactivity in the cover gas consisted principally of krypton-85 and xenon-135 gas and was the same type of radioactivity that collected in smaller quantities during normal operation of the experimental power plant.

During normal routine operations, the cover gas was transferred to large holdup tanks in the Sodium Reactor Experiment facility for the specific purpose of collecting and retaining radioactive gases. After decay, the gas was normally exhausted to the atmosphere through a filtered ventilation system with large quantities of air for dilution of the radioactivity. The

releases were always well below those permitted by regulations in existence both then and today. This was done with the approval and oversight of the AEC.

Following the accident, the contaminated reactor cover gas was again transferred to the holding tanks and held long enough for the xenon-135 to decay away (9.1-hour half-life). It was then released to the atmosphere through the stack in a controlled manner, in low concentrations that met federal requirements. This was done with the approval and oversight of the AEC. Based on measurements of the cover gas concentration and volume, less than 5 curies of krypton-85 (10.7-year half-life) was released in this way. The dispersion of the krypton-85 in the atmosphere diluted it so much that it would have resulted in a maximum theoretical calculated dose of 0.00006 millirem to someone living in Susana Knolls, the nearest residential area at that time. This is the amount of dose received from natural external radiation in about 15 seconds. The other fission products were retained in the primary coolant and were removed during cleanup operations.

Personnel employed in operating the reactor and those employed during the post-accident recovery, cleanup, and refurbishment were continually monitored for external and internal radiation exposure. No personnel exceeded annual exposure limits for radiation workers.

Established routine monitoring of the environment, including soil/vegetation sampling, surface water sampling and air sampling, before, during, and after the accident, failed to detect any increase in the ambient levels of naturally occurring radioactivity. Subsequent sampling in recent years has failed to detect any environmental contamination from the Sodium Reactor Experiment accident that would result in any exposure or risk to anyone living off the site.

16. **Extension of the Comment Period.** Commenters requested a 60-day extension of time in which to file comments. The Committee to Bridge the Gap was asked to provide documentation referred to in its oral comments. The extension was said to be necessary to assemble the "very extensive set of documentation relevant to the EA."

    DOE Response: DOE extended the comment period on the Draft EA to April 26, 2002. Although DOE sought information referenced by the Committee to Bridge the Gap in during the scoping meetings in October 2000, Mr. Hirsch stated at that time that he would not be able to provide written comments or references. DOE will review and consider any information provided by Mr. Hirsch in response to DOE's renewed request for relevant material. As of August 1, 2002, DOE has not received any additional documentation from Mr. Hirsch.

17. **Other Alternatives.** Commenters suggested that several other alternatives be considered.

    DOE Response:

    Clean Up SSFL

    During the public scoping process, a commentor suggested that DOE should consider cleaning up the entire SSFL site, rather than limiting its activities to ETEC facilities. DOE did not analyze this alternative because DOE's jurisdiction over the SSFL does not extend beyond ETEC and because DOE is not responsible for contamination at the SSFL other than that which occurred as a result of DOE activities. Therefore, evaluation of ongoing cleanup outside of ETEC and Area IV is beyond the scope of this EA. Cleanup of contamination resulting from DOE-sponsored activities that has migrated outside of the ETEC facility area is within the scope and is addressed in this EA. It should be noted, however, that cleanup of the other areas of SSFL is being

performed pursuant to applicable laws and regulations in coordination with appropriate regulatory agencies.

Use CERCLA Approach to Select a Cleanup Remedy

EPA recommended that DOE consider using EPA's CERCLA approach to evaluate the need for and select a cleanup remedy for ETEC. Because ETEC is not a CERCLA site, DOE has elected to use the NEPA process to evaluate the need for and select a cleanup standard for ETEC. DOE does not believe that using a CERCLA approach is reasonable in these circumstances or would result in an analysis or disclosure of any impacts that have not been analyzed or disclosed in this EA. Use of either the CERCLA or the NEPA process to evaluate impacts does not itself result in environmental impacts.

Manage and Treat Radiological Materials Onsite

EPA recommended that DOE consider onsite active management or treatment of radiological materials to reduce potential impacts associated with transporting radiological materials. All nuclear research at ETEC ended in 1988 and DOE is closing the site. DOE is currently managing the radiological waste that has been generated and will be generated as a result of cleanup activities at ETEC, and conducts limited treatment of radioactive waste such as size reduction, stabilization, and evaporation. The impacts of transporting radioactive waste offsite for storage or disposal have been analyzed and found to be very small. For these reasons, DOE believes that additional onsite management and treatment of radiological materials is not a reasonable alternative. DOE did analyze the No Action Alternative.

Consider Other Transportation Options

EPA recommended that DOE consider different transportation options to mitigate some of the impacts of transportation under Alternative 1 or Alternative 2. There is no rail access to ETEC currently. Constructing rail access or an intermodal facility would be very costly and would not reduce the impacts to the neighborhoods most affected by the transportation of radioactive waste offsite. For these reasons, DOE believes that other transportation options are not reasonable.

Evaluate Restrictions on Residential Use

EPA recommended that DOE consider possible restrictions to prevent residential use on all or portions of Area IV where ETEC facilities are or were located. However, DOE does not own the site and has no control over future land use restrictions. Future land use restrictions would reduce exposure below that already analyzed in this EA. For this reason, DOE believes that evaluating restrictions on residential use is not a reasonable alternative.

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