

SUMMARY¹

This Supplemental Environmental Impact Statement (SEIS) was prepared pursuant to a Joint Stipulation and Order approved and entered as an order of the court on October 27, 1997, in partial settlement of the lawsuit Civ. No. 97-936 (SS) (D.D.C.), *Natural Resources Defense Council [NRDC] et al. v. Richardson et al.* The Joint Stipulation and Order is reproduced at the end of this document as Attachment 1. In the Joint Stipulation and Order, the U.S. Department of Energy (DOE) agreed to prepare an SEIS to the Programmatic Environmental Impact Statement for Stockpile Stewardship and Management (SSM PEIS) (DOE/EIS-0236, DOE 1996a) to evaluate the reasonably foreseeable significant adverse environmental impacts of continuing to construct and of operating the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) in Livermore, California, with respect to any potential or confirmed contamination in the area by hazardous, toxic, and/or radioactive materials. On September 25, 1998, DOE announced in the *Federal Register* the agency's intent to prepare this SEIS for the NIF portion (Volume III, Appendix I) of the SSM PEIS. DOE's need for preparation of this SEIS, consistent with the previously established need for NIF (DOE 1996a, Appendix I), is to determine how the results of characterization studies completed pursuant to the Joint Stipulation and Order should affect the manner in which DOE proceeds with the construction and operation of NIF. On August 5, 1999, DOE issued an amended Notice of Intent to prepare this SEIS, which incorporated changes in schedule resulting from new relevant information.

The SSM PEIS addressed alternative plans for DOE's defense program activities related to nuclear weapons stockpile issues at several DOE laboratories, including LLNL. The environmental consequences of construction and operation of NIF were addressed in detail in SSM PEIS Volume III, Appendix I, entitled *National Ignition Facility Project Specific Analysis* (NIF PSA). The Record of Decision (ROD) for the SSM PEIS was published in the *Federal Register* on December 26, 1996 (61 FR 68014). In the ROD, DOE announced its decision to construct and operate NIF at LLNL. The NIF is an experimental facility that would use laser light to initiate a fusion reaction in very small quantities of hydrogen by a process known as inertial confinement fusion. The start of physical construction of NIF was authorized on March 7, 1997, and groundbreaking for the NIF occurred on May 29, 1997. Construction of the NIF is ongoing; the conventional facilities are over 94% complete and are expected to be completed in late 2001.

On September 3, 1997, excavation activities at the NIF site uncovered capacitors containing polychlorinated biphenyl (PCB) oil, as well as some nonhazardous items. Continued excavation was cordoned off from the rest of the site, and construction activities in this area were halted from September 3 through September 12, 1997. Several of the capacitors had leaked, contaminating the surrounding soil. Analysis of composite soil samples collected in the vicinity of the capacitors indicated that soil contained PCBs at concentrations up to 66 parts per million (ppm). This level is greater than the U.S. Environmental Protection Agency (EPA) Region 9

¹ The lines to the right indicate where changes have been made between the Draft SEIS and the Final SEIS.

preliminary remediation goal (PRG) of 1.3 ppm for general PCBs in soils of an industrial site. The PCB-containing capacitors and PCB-contaminated soils were removed from the NIF Construction Area on September 12, 1997. This cleanup was conducted under the oversight of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Project Managers (RPMs) for the Livermore Site. Under the CERCLA process, the RPMs for the Livermore Site (consisting of the EPA, the California Regional Water Quality Control Board-San Francisco Bay Region, and the California Department of Toxic Substances Control) review remedial or response actions resulting from releases of hazardous substances into the environment. The CERCLA RPMs agreed to a soil cleanup level of 1 ppm for soils in the NIF Construction Area. This level was based on the reporting limit used for soil analysis, which represents a cleanup level more stringent than the EPA Region 9 preliminary remediation goal (PRG) of 1.3 ppm for unspecified PCBs in soils of an industrial site. All soils having PCBs above 1 ppm were removed and disposed of as hazardous waste.

On September 22, 1997, the plaintiffs in *NRDC v. Richardson* filed a motion under Rule 60(b) of the Federal Rules of Civil Procedure in which they alleged that DOE knew but did not adequately analyze and disclose the risk of building the NIF in an area that might contain buried hazardous, toxic, or radioactive materials or waste. DOE denied the allegations in the plaintiffs' motion. In the Joint Stipulation and Order of October 27, 1997, which settled all claims in the plaintiffs' Rule 60(b) motion, DOE agreed to conduct an assessment of "...the reasonably foreseeable significant adverse environmental impacts of continuing to construct and of operating NIF at LLNL with respect to any potential or confirmed contamination in the area by hazardous, toxic, and/or radioactive materials" and to present the results in an SEIS.

Over the period October 7-12, 1998, workers uncovered debris while conducting routine drainage maintenance operations in the center of the East Traffic Circle (ETC), the known location of a LLNL landfill remediated in 1984. These maintenance activities were not related to NIF construction and were physically separated from the NIF construction site. However, the ETC Area is one of the seven areas of concern identified in the Joint Stipulation and Order and is addressed in this SEIS. The ETC landfill was known to have contained the PCB Aroclor 1254, and tests determined that soil removed from the ETC Area contained this specific PCB mixture. The RPMs were immediately notified, and subsequent actions, such as soil disposal, geophysical surveys, and soil sampling, were determined and implemented with the regulatory agencies' concurrence. Analysis of composite samples from soils excavated at the ETC Area indicated that the soil contained Aroclor 1254 at 98 and 120 ppm. With CERCLA RPM concurrence, the excavated PCB-contaminated soil was removed, briefly stored, and sent to Enviro-Safe, Inc., an off-site hazardous waste disposal facility in Idaho. (After cleanup, the areas where the soil was stored before disposal were sampled to verify that no residual PCB contamination remained above 1 ppm.) The cleanup level agreed upon by the CERCLA RPMs was less than 18 ppm. Additional soil was removed from the ETC to meet this cleanup level. These agreements and activities were documented in an Action Memorandum prepared by DOE in March 2000 that incorporated comments by regulators and was released to the public.

The Livermore Site lies in an area of historically inactive faulting, while the Calaveras fault to the west has had several earthquakes in the past 150 years. The Livermore area relies on

groundwater and imported surface water to meet its needs. Two intermittent streams traverse and drain the site. These streams and the Drainage Retention Basin are routinely monitored for radiological parameters. Site wastewater is treated in the Livermore Water Reclamation Plant under permit. Groundwater is conceptually divided into six hydrostratigraphic units (HSUs), two of which consist of two subunits. The northeast quadrant where the NIF is located is hydrologically upgradient; groundwater flows to the southwest, or toward the center of the site. The uppermost two HSUs have portions lying in the unsaturated zone. The water table lies at a depth of about 60 ft in this area, while the average groundwater flow beneath the site is about 3 ft/yr (1 m/yr).

Site soils and groundwater across the site have been contaminated with various industrial chemicals and fuels dating back to the 1940s when the site was a naval air station. The primary contaminants are the chlorinated organic compounds trichloroethylene, perchloroethylene, and carbon tetrachloride; trichlorofluoromethane (Freon 11); fuel hydrocarbons; and PCBs. Tritium is the only radiological contaminate of note. By far, the greatest contamination problem at the site is groundwater containing the chlorinated organic compounds. A major groundwater remediation program administered under CERCLA has been underway since 1987. It employs a number of fixed and mobile groundwater treatment systems and a dense network of monitoring wells. Some of these plumes lie in the northeast quadrant containing the stipulated areas. Fuel hydrocarbon contamination from naval operations has been to a large extent remediated. It does not affect the stipulated areas. PCB contamination in soil has been found in two main locations in the northeast quadrant where former landfills existed. Contaminated soils have been removed and treated off-site under separate CERCLA removal actions. No PCBs have been detected in groundwater. Sporadic tritium contamination exists around the site. It is far below drinking water standards in samples taken from the northeast quadrant including the stipulated areas.

The seven areas at LLNL designated for additional investigation under terms of the Joint Stipulation and Order occupy a large portion of the northeastern corner of the Livermore Site. Site characterization activities required by the Joint Stipulation and Order consisted of two phases. Phase I included review of all available information and interviews with workers and retirees who were reasonably known to have knowledge of the potential existence and location of buried materials in the stipulated areas. Phase II included geophysical surveys of locations suspected of containing buried material, soil boring and/or soil vapor studies where potential burial sites were identified, and groundwater sampling at appropriate locations. The progress of characterization was described in eight quarterly reports issued in November 1997; February, May, August, and November 1998; and March, June, and September 1999 (DOE 1997, 1998a-d, 1999b-d).

Phase I examination of records, interviews of employees and retirees, and examination of aerial photographs narrowed the area for geophysical studies for buried materials to the Helipad Area, the Northern Boundary Area, and the NIF Construction Area. In the NIF Construction Area, magnetometer, electromagnetic induction, and ground-penetrating-radar surveys did not identify any additional locations of potential hazardous waste, while the digging of test holes identified the presence of debris (concrete, asphalt, wood, and cuttings). Other boreholes indicated the presence of nails and wire. Electromagnetic induction and magnetometer surveys of

the Helipad Area also did not identify any buried objects of potential concern. A magnetometer survey was performed at the Northern Boundary Area, and no objects of potential concern were found.

Similarly, review of information on the ETC Area, including interviews and historical searches, indicated that there was a low likelihood of the existence of any additional buried sources of contamination. In addition, a magnetometer survey and subsurface investigations were conducted in the area under the oversight of the CERCLA RPMs. These investigations did not locate any additional buried hazardous objects.

Phase II activities included additional sampling and analysis of soils and groundwater in or downgradient of three of the stipulated areas and examination of existing data. The Livermore Site has an extensive subsurface soil and groundwater monitoring program. Since 1986, an integrated sample and data management program has supported the collection, validation, interpretation, and use of the soil and groundwater data. A highly concentrated groundwater monitoring network within the 1-mi² Livermore Site consists of more than 1,000 boreholes and about 450 regularly monitored wells. Potential source areas were investigated during the CERCLA Remedial Investigation for the Livermore Site. Source investigations, including use of new sampling wells, were conducted on known or suspected landfills on the basis of anecdotal information and aerial photographs. Soil and groundwater were sampled for PCBs near the NIF construction site where PCB contamination was suspected. PCBs in soils are relatively immobile, and no analytical data have identified PCBs in groundwater. At the ETC Area, downgradient groundwater monitoring wells were installed to evaluate groundwater for PCBs. None were detected.

This SEIS addresses the potential environmental impacts on human health from inhalation of PCB-contaminated dust and potential contamination of groundwater resulting from the cleanup of the capacitors and contaminated soils from the NIF site and of residual contamination in the ETC Area. Excavation and removal resulted in brief periods of emissions of dust containing PCBs. The resulting risks of cancer and noncancer health effects on the public and workers are estimated to have been orders of magnitude below levels of concern established by the EPA. The cleanup levels of 1 ppm PCBs in soils of the NIF Construction Area and of 18 ppm in soils of the ETC Area, established in coordination with the CERCLA RPMs, are protective of human health and the environment.

Projected levels of groundwater contamination in the NIF Construction Area and the ETC Area now and in the future are estimated to be well below levels considered to present a risk to the public. Ongoing remediation activities will continue to improve groundwater quality regardless of continued construction and operation of the NIF. None of the activities for construction and operation of the NIF would affect groundwater quality in the areas studied.

The SEIS evaluated two no action alternatives. Impacts on the environment of both alternatives — (1) continue to construct and then operate the NIF at LLNL and (2) cease construction of the NIF — would be similar, except as noted below. Ceasing construction of

NIF, whether for an alternative use, for placing the facility in safe storage (deactivation or “mothballing”), or for demolition, would prolong construction impacts or constructionlike impacts. If an alternative use involved radioactive materials, workers and the public might receive radiological exposures within regulatory limits. Since NIF has not been operated, radiological exposures to workers or the public would not occur during demolition. Demolition would also result in temporary dust releases above state standards and would generate approximately 4,400 m³ (about 5,800 yd³) of nonhazardous waste. Truck traffic from transportation of fill and wastes might temporarily disturb a state-protected bird species. Concentrations of PCBs in soil or groundwater originating from buried material would be below any level of regulatory concern for all alternatives.

Public comments on the Draft SEIS identified 12 general issues. A brief statement of each issue and DOE’s response, including any changes in the SEIS, are provided below. The issues and DOE’s responses are more fully described in Section 2 of Volume II of this SEIS.

1. Preference for Ceasing NIF Construction for Environmental Reasons. Some commenters opposed NIF construction because of impacts on and risks to human health and the environment from facility operations. Based on the results of this SEIS, DOE has concluded that the impacts and risks from continued construction and operations of NIF with respect to potential contamination by hazardous, toxic, and/or radiological materials would be low.
2. Preference for Ceasing NIF Construction for Nonenvironmental Reasons. Some commenters opposed NIF construction because of non-environmental considerations, such as cost, non-technical issues, design issues, and national security. DOE will take these issues into consideration in the Record of Decision.
3. SEIS Inadequacy Because DOE Did Not Hold Public Scoping Meetings. Neither the Council of Environmental Quality (CEQ) nor DOE NEPA regulations obligate the preparing agency to hold scoping meetings for an SEIS. However, DOE welcomed comments from other venues and considered all comments. The public was given an opportunity to comment on the scope of the SEIS as announced in the Notice of Intent, which included directions for providing comments.
4. Breadth of Scope and Impacts of NIF Operations. Commenters stated the SEIS should address and reevaluate the impacts of NIF operations for additional areas not included in the SEIS, including normal operational releases to the environment and waste management. The ultimate design and operation of NIF have remained essentially unchanged since the preparation of the SSM PEIS, although the initial level of operations will be lower in some respects. DOE believes that the analysis in that document accurately

reflects the environmental impacts of constructing and operating NIF. Therefore DOE has determined that there were no new information or changed circumstances related to NIF operations, other than those contained in the SEIS, which would require further reevaluation of NIF operations as contained in the SSM PEIS. In response to these comments, Section 1 of the SEIS was expanded to more fully address DOE's determination of scope.

5. Additional Operational Changes That Should Be Addressed in the SEIS. DOE evaluated certain hypothetical operational changes raised by commenters about additional target materials (plutonium, enriched uranium, and lithium hydride), potential damage to optics, more frequent maintenance and cleaning of optics, and lower energy operations or reduced beam lines. DOE determined that any proposal to use plutonium, enriched uranium, or lithium hydride was not ready for consideration in a NEPA document. Maintenance of optics was already included in the NIF envelope of operations as described and evaluated in the SSM PEIS. Recently Congress directed the National Nuclear Security Administration (NNSA) to review options that would change the schedule for implementing the full design number of 192 beams or options that would possibly operate at a reduced number of beams to allow full demonstration of the system before proceeding with full operation (see Section 1.2). These changes would be modifications of the original proposal, resulting in a reduced project scope. DOE has examined the environmental implications of implementing these modifications and has concluded that the impacts would fall within the bounds of those already evaluated for the 192-beam design in the SSM PEIS. The SSM PEIS demonstrated that the impacts of the 192-beam design are minor. Furthermore, DOE has concluded that the impacts do not vary significantly among the various options using fewer beams.
6. The SEIS Is Not a Decision-Making Document Because Construction Continued. DOE, in the public meetings, provided the reason that construction continued during preparation of this SEIS. The SEIS would have been more "forward looking" (evaluated future actions in more detail) if further buried objects or wastes were found during the characterization studies. If significant contamination had been found, DOE would have halted construction (depending on the levels), assessed consequences, developed removal or remediation procedures, included assessments in the SEIS, and incorporated results in the Record of Decision. However, since additional sources of contamination in the NIF construction areas were not found, the SEIS mainly evaluated the investigations and their results.
7. The SEIS Improperly Characterized the No Action Alternative. DOE believes that the characterization of no action in the SEIS is appropriate under the circumstances. Construction is now ongoing. This situation represents the "status quo" and thus was analyzed as one construct of no action in the draft

SEIS. However, DOE realized that some readers could hold the position that no action should mean “no project” rather than maintenance of the status quo. Therefore, the draft SEIS also included a second construct of no action that would involve ceasing construction of NIF. This was the no action alternative from the SSM PEIS. DOE does not believe that this is a reasonable alternative, since the need for NIF has not changed and the studies conducted under the Joint Stipulation and Order found no evidence of additional buried materials. However, the impacts of this second construct of no action were included in the draft SEIS and here in the final SEIS. DOE believes that both of these constructs are properly characterized as no action and that they should not be considered as action alternatives.

In response to public comment, the discussions of the possible scenarios that could result from ceasing construction of NIF and the impacts of those scenarios have been expanded in the final SEIS. The three options for ceasing construction are placing the facility in safe storage (deactivation or “mothballing”), alternative use of the facility, and demolition. DOE decided not to add the alternative of ceasing construction and abandonment of the facility, as suggested in public comment, to the final SEIS. DOE does not consider ceasing construction of NIF to be a reasonable alternative.

8. Purpose and Need for NIF; NIF Mission Has Changed. Some commenters stated their belief that NIF was no longer needed, concluded that the purpose and need for NIF has changed with the end of the Cold War, and questioned the relationship of NIF to weapons testing. DOE examined these issues and concluded that the purpose and need were as described in the SSM PEIS. NIF remains an important element of science-based stockpile stewardship. It will allow experimental study of thermonuclear burn in the laboratory. It will extend the range of investigations of important regimes of high-energy-density science. NIF will provide data needed for sophisticated models that simulate the physics of nuclear weapons.
9. Nuclear Weapons Are Not Needed. Commenters provided many comments on U.S. nuclear policy, nuclear weapons, and proliferation of nuclear weapons. DOE examined these nonenvironmental issues and concluded that the issues will be taken into consideration in the Record of Decision.
10. Costs of NIF. Comments were provided on recent reports of cost overruns in the NIF program. On December 14, 2000, the Secretary of Energy certified and submitted to Congress a revised cost and schedule baseline for construction of NIF that increased the cost to complete the project and extended the schedule. DOE examined this issue and stated that, while changes in the NIF program are possible as a result of cost and schedule

considerations, any such changes will be within the envelope of NIF operations as described in the SSM PEIS.

11. Characterization Studies. Commenters had questions as to how characterization studies were performed and questioned the conclusion of the SEIS that there is a “low likelihood” that additional buried hazardous objects or wastes exist in the stipulated areas. DOE examined the issues raised by comment and concluded that no revision is necessary. The site has been intensively evaluated with geophysical investigations. Numerous soil borings have been made as part of this investigation. More than 1,000 soil borings and more than 450 monitoring wells exist on site. Additional sampling would have little probability of identifying significant areas of buried objects or wastes without some indication of their possible location.

12. PCB Contaminants in the East Traffic Circle (ETC) Area and NIF Footprint. Commenters wondered why the characterization studies did not identify the contamination later discovered in the ETC. DOE determined that the PCBs in the ETC area were in a known waste disposal area that had already been identified. The characterization studies were not designed to identify small points of residual contamination from former cleanup activities. The recent Action Memorandum for the cleanup of the ETC was described and referenced, including the rationale for the 18-ppm cleanup level used at the ETC.