



**Department of Energy**  
Schenectady Naval Reactors Office  
Post Office Box 1069  
Schenectady, New York 12301-1069

REC&SD:SPT06-36

**JUL 19 2006**

Ms. Janet Schlueter, Director  
Office of State and Tribal Programs (03C10)  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Ms. Schlueter:

**Subject: KNOLLS ATOMIC POWER LABORATORY-S1C SITE, WINDSOR, CT;  
TENTATIVE DETERMINATION OF RCRA CORRECTIVE ACTION  
COMPLETION AND UNRESTRICTED LAND TRANSFER UNDER THE  
CONNECTICUT PROPERTY TRANSFER ACT**

Section 22a-6h of the Connecticut General Statutes and the Department of Environmental Protection ("CT DEP") regulations require the CT DEP Commissioner to publish or cause to be published notice of her tentative determination regarding completion of certain final remedial actions, before making a final decision regarding those actions.

Per these requirements, we are providing you a copy of CT DEP's tentative determination notice regarding completion of RCRA Corrective Action at the U.S. DOE Knolls Atomic Power Laboratory-S1C Site, 1900 Day Hill Road, Windsor, Connecticut. RCRA Corrective Action work entailed completing environmental investigation and remediation work at the S1C Site to ensure that the property could be released for unrestricted use under CT DEP Remediation Standard Regulations. The attached Statement of Basis provides further details regarding CT DEP's tentative determination.

The attached public notices will appear in the classified section of the *Hartford Courant* and will be broadcast on WTIC 1080 (AM) on the following dates:

- Hartford Courant publication: July 24, 2006
- WTIC broadcast: July 24, 2006

06 JUL 25 AM 11:03

STP

*SUNSI Review Complete*

*RIDS: SPD5  
STP-006 Complete*

Ms. Janet Schlueter, Director

-2-

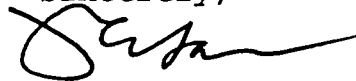
JUL 19 2006

The regulations require the CT DEP Commissioner to hold a public informational meeting on this tentative determination 30 days after publication of the notice: August 24, 2006 at the Windsor Town Hall at 7:00 pm. If, before or during the informational meeting, a public hearing is requested, one will be held during that meeting.

The KAPL-S1C Site is owned by the Department of Energy, Naval Nuclear Propulsion Program. The Site included one nuclear power plant, known as the S1C Prototype, and associated support facilities and buildings. The Site operated for over 30 years, providing training of Naval personnel to operate and maintain nuclear propulsion plants for the Navy's nuclear powered submarines and surface ships. Operations also included research and testing of plant equipment. The Site has been dismantled, graded, and returned to green field conditions.

If you have any questions, please contact J. Hughes Robillard of my staff at (518) 395-6366.

Sincerely,



P. E. Salm  
Manager

Attachments:

As Stated

## NOTICE OF TENTATIVE DETERMINATION

Applicant Name: US DOE Knolls Atomic Power Laboratory  
Facility Location: 1900 Day Hill Road, Windsor, CT 06095  
EPA I.D. Number: CT6890113792

### ATTENTION

The Commissioner of Environmental Protection ("Commissioner") hereby gives notice pursuant to Section 22a-6h of the Connecticut General Statutes ("Conn. Gen. Stat.") and Section 22a-449(c)-110 of the Regulations of Connecticut State Agencies ("RCSA"), incorporating portions of Title 40 of the Code of Federal Regulations ("CFR") Parts 124 and 270, that she has made a tentative Corrective Action Completion Determination that no Resource Conservation and Recovery Act (RCRA) further Corrective Action under the Hazardous and Solid Waste Amendments of 1984 (HSWA) is necessary at the Knolls Atomic Power Laboratory - S1C Site.

The Commissioner's tentative Corrective Action Completion Determination is detailed in a Statement of Basis, which is available at the Connecticut Department of Environmental Protection ("CT DEP") (address listed below). The Statement of Basis also identifies the applicant's RCRA Permit closure, Corrective Action obligations, and compliance with Connecticut Property Transfer Act requirements. The purpose of the RCRA Permit closure, RCRA Corrective Action, and Property Transfer Act requirements are to ensure that any releases of hazardous wastes or hazardous constituents have been investigated and remediated to levels protective of human health and the environment, including the environmental clean-up endpoints that comply with the CT DEP's Remediation Standard Regulations Residential Direct Exposure Criteria; thus allowing the Facility property to be released for unrestricted use. The corrective action measures required at the facility pursuant to Sections 22a-449(c)-104(a)(2)(O) and 110(h), and 22a-133k of RCSA have been completed. The Commissioner will not make a final decision regarding this proposed completion determination until the public comment period has closed and all received comments have been evaluated and addressed.

The Statement of Basis, and other related materials are available for review at the following locations:

**Connecticut Department of Environmental Protection**

79 Elm Street  
Hartford CT 06106-5127  
(860) 424-3023

*The hours of the CT DEP are Monday - Thursday 8:30 a.m. to 4:30 p.m.*

and

**Windsor Public Library**

323 Broad Street  
Windsor, Connecticut  
(860) 285-1910

*The Windsor Town Library hours are:*  
*Monday - Thursday: 10:00 am -9:00 pm*  
*Friday: closed*  
*Saturday: 10:00 am.-1:00 pm*  
*Sunday: closed*

All interested persons are invited to express their views on the tentative determination concerning the environmental investigation and remediation activities. Written comments shall be submitted no later than forty-five (45) days after publication of this notice. Comments shall be directed to: Maurice Hamel, Bureau of Water Protection and Land Reuse, Department of Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127.

The Commissioner will hold a public informational meeting regarding this tentative determination (30) days after publication of this notice, August 24, 2006. A public hearing will be held during the informational meeting, if a request for a hearing is received prior to or during the course of the meeting.

---

Yvonne Bolton, Chief  
Materials Management  
and Compliance  
Assurance Bureau

Newspaper: The Hartford Courant

Date: July 24, 2006

RADIO SPOT

**The following is a Public Notice from  
The Connecticut Department of Environmental Protection:**

The Commissioner of Environmental Protection has made a tentative determination that environmental investigation and remediation work at the US DOE Knolls Atomic Power Laboratory located in Windsor is complete and that no further action is necessary.

Relevant documents may be reviewed at the Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, Connecticut, from 8:30 a.m. to 4:30 p.m., Monday through Thursday, and at the Windsor Public Library.

You are invited to comment on the proposed decision that environmental clean-up requirements are complete. A public informational meeting regarding this action is scheduled for August 24, 2006. Any requests for a hearing shall be submitted within thirty days of this notice or during the public meeting, and at which time the hearing will be held. Prior to making a final decision, the Commissioner will consider all comments received by September 7, 2006.

For more information, call Maurice Hamel at the Department of Environmental Protection at (860) 424-3787.

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

**Introduction**

This Statement of Basis (SB) describes the activities conducted to close the Knolls Atomic Power Laboratory (KAPL) S1C Site under the Environmental Protection Agency (EPA) Region 1 Resource Conservation and Recovery Act (RCRA) Corrective Action Program. In addition to RCRA Corrective Action work, additional environmental investigation and remediation work has been completed in accordance with the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulations (RSRs) in order to achieve unrestricted land transfer under the Connecticut Property Transfer Act.

Based on extensive Site characterization work and completed remediation work, the EPA and CTDEP are proposing that no further action is necessary, and the Site can be released for unrestricted use (RCRA Completion Without Controls).

EPA Region 1 and the CTDEP are jointly issuing this SB as part of their public participation responsibilities under RCRA and applicable CTDEP public participation requirements.

This document summarizes information that can be found in greater detail in the Background Information for the Windsor Site Operations (KAPL, 1995b), the Windsor Site RCRA Facility Assessment (RFA) Sampling Visit (SV) Report (KAPL, 1997), and the S1C Site Confirmatory Chemical Sampling and Analysis (CS&A) Report (KAPL 2004), the CS&A Addendum (KAPL 2006), and the Verification Report (O'Brien & Gere Engineers, Inc. 2006) in addition to other documents contained in the Administrative Record. EPA Region 1 and CTDEP encourage the public to review these documents in order to gain a more comprehensive understanding of the S1C Site, and the RCRA Corrective Action and the CT Property Transfer Program activities completed.

EPA Region 1 and CTDEP will verify acceptability of this proposal following the public comment period, and after the information and comments submitted during that period have been reviewed and considered.

EPA Region 1 or CTDEP may modify the proposed action based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy. The public can review the documents contained in the Administrative Record file, attend the public meeting scheduled for August 24, 2006, and/or submit written comments by the end of the public comment period (September 7, 2006).

**Proposed Action**

No further action under the RCRA Corrective Action Program or the Connecticut Property Transfer Act is proposed for the S1C Site, or the abutting Goodwin Pond and associated drainage ways. There is no need for administrative controls or groundwater monitoring based on the extensive characterization and remediation work completed. The property can be released for unrestricted use.

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

**Background**

**Facility**

The S1C Site is situated on 10.8 acres of land in the Town of Windsor, Hartford County, Connecticut. The street address is 1900 Day Hill Road, Windsor, Connecticut 06095. An access road extends approximately one-half mile from the entrance located along Day Hill Road to the Site. Coordinates are: longitude 72 degrees 42 minutes 50 seconds (72° 42' 50") west, and latitude: 41 degrees 53 minutes 18 seconds (41° 53' 18") north. Figure 1 is a map that shows the location of the Site and surrounding areas within an approximate one-mile radius. The Site is completely surrounded by land owned by Combustion Engineering, Inc. (CE), including Goodwin Pond, which borders the Site on the east and north.

The S1C Site was established by the United States Atomic Energy Commission (now the Department of Energy (DOE)), Naval Nuclear Propulsion Program (NNPP), in 1957. The Site is a Government-owned, contractor-operated facility, originally operated by CE. In the early 1970s, Site operations were assumed by the Knolls Atomic Power Laboratory (KAPL), which has retained oversight through the present.

The Site included one pressurized-water nuclear reactor plant, known as the S1C Prototype, and associated support facilities and buildings. Navy personnel were trained at the S1C Site to operate and maintain Naval nuclear propulsion plants for the Fleet. Research and testing of plant equipment also occurred.

Figure 2 is a Site Plan, which shows the location of all buildings and structures prior to dismantlement. As shown on Figure 2, approximately 90 percent of the Site was developed, consisting of various buildings, structures, and paved roadways and parking lots. Buildings and structures included:

- Buildings 1, 2, 3, 3A, 5, and 6 supported Prototype operations or maintenance;
- Buildings 1A, 4, 7, 9 through 13, 13A, 15, and 17 through 24 housed offices, warehouses, classrooms, and a cafeteria;
- Building 8 housed the Site groundwater wells and pumping equipment;
- Buildings 25 and 26, and an interconnecting underground tunnel, housed safeguard systems for the Prototype;
- Structure 27 was the S1C Prototype Hull, and 31, 33, 34, 35, 36, 39, 40, 42, and 44 were various prototype support structures;
- Structure 28 was the Water Tower;
- Structure 29 was the Process Cooling Water Tower and Basin;
- Structure 30 was the Above-Ground Fuel Oil Storage Facility;
- Structure 32 was the Electrical High Yard;
- Structures 37 and 38 were the respective initial and later Paper Incinerator locations;
- Structure 41 was the Underground Fuel Oil Tank Vault; and
- Structure 90 was a Concrete Slab (storage area).

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

The Prototype was permanently shut down in March 1993. The Site was dismantled between 1995 and 2001. With the exception of the foundations for Buildings 8, 25, 26, and the foundation for the tunnel connecting Buildings 25 and 26, all Site buildings, structures, utilities, and paved areas were removed.

**Regulatory Permits in Use from 1993 - 2006**

As a Federal facility, the S1C site was subject to all applicable Federal and state laws and regulations. Required operational permits were obtained from cognizant agencies during the period of operation. All permits, except for the Town of Windsor wetlands permit, have been terminated in accordance with applicable requirements. At the time of permit terminations there were no outstanding regulatory or enforcement actions.

Type	Permit Number	Issuing Agency	Information	Year Terminated
National Pollution Discharge Elimination System (NPDES)	CT 000 2020	CT-DEP	Site Outfall	1995
RCRA	HWM 164-021	CT-DEP	EPA-ID CT 6890113792 Hazardous Waste Storage Permit	2001
Air Emission	0212-0049-01	CT-DEP	Heating Boiler	1995
Air Emission	0212-0049-02	CT-DEP	Heating Boiler	1995
Air Emission	0212-0058-03	CT-DEP	Emergency Diesel	1994
Air Emission	0212-0059-04	CT-DEP	Emergency Diesel	1994
Storm water	CT GSW000407	CT-DEP	Storm water Discharge	1997
Storm water	CT GSI000637	CT-DEP	Storm water Discharge (Industrial)	1999
Storm water	CT GSN000133	CT-DEP	Storm water Discharge (Construction)	2002
EPA Region 1 Approval to Remove and Dispose of PCB Contaminated Materials, dated 8/5/96	None	EPA Region I	PCB Paint Removal	1999
Inland Wetlands and Watercourses Permit	604	Town of Windsor, Inland Wetlands and Watercourses Commission	Construction activity within a wetlands buffer zone	2003
Inland Wetlands and Watercourses Permit and Amendments A and B	04-699	Town of Windsor, Inland Wetlands and Watercourses Commission	Excavation in wetlands buffer zone	Active

**Hazardous Waste Permit**

In November 1980, the S1C Site submitted a Part A application to EPA Region 1 and the CTDEP for operation of a greater-than-90-day container storage area. The S1C Site submitted the follow-on Part B permit application to the CTDEP and EPA in November 1988. The CTDEP granted a hazardous waste management permit (DEP/HWM-164-021) in November 1990. The permit did not contain RCRA Corrective Action provisions. The permit was modified and renewed in June 1996 to include storage activities associated with mixed (radiological and chemically hazardous) wastes. Throughout the duration of the permit, Corrective Action



**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

authority resided with EPA Region 1. In 2004, the EPA granted the CTDEP RCRA Corrective Action authority; however, at such time, the Site was nearing the final stages of the Corrective Action process and therefore, EPA maintained authority for the Site. RCRA Corrective Action is described in detail below. In April 1999, KAPL submitted a final closure report to the CTDEP, and requested approval to formally close the permitted hazardous waste container storage area. On February 22, 2002, the CTDEP issued a letter acknowledging that the permitted area was properly closed in accordance with the closure plan contained in the permit. The permit has expired and will not be renewed since operations have ended and RCRA Closure and Corrective Action have been completed. A RCRA Post-Closure Permit will not be needed because all hazardous wastes were removed from the storage area and decontamination is complete.

**Site Closure Radiological Surveys**

As part of the S1C Site radiological closure process, a detailed radiological survey plan was developed and executed to identify any radioactivity associated with the Site's activities. This plan was reviewed and agreed with by EPA Region 1 and the CTDEP. The plan established requirements for performing extensive surveys and measurements with sensitive instruments over all areas where radioactive material had been worked on, stored, or transported. Post-dismantlement radiological surveys and measurements were performed in more than 40 discrete areas of the Site. A confirmatory survey of the entire Site was performed after completing the final dismantlement activity and removing all radioactive materials. The results of the independent CTDEP surveys and analyses of solid samples identified no radioactivity associated with S1C Site operations. Based on the survey and sampling results, work involving radioactivity during operations at S1C has had no adverse effect on the quality of the environment; no further action with regard to radioactivity associated with the S1C Site is required. EPA Region 1 and CTDEP agreed with this conclusion. Hence, the S1C Site is acceptable for unrestricted future use with respect to radioactivity.

**RCRA Corrective Action**

In July 1995, the RCRA Corrective Action process was initiated with the EPA on a voluntary basis with the transmittal of the S1C Site Sampling Visit (SV) Work Plan and the Background Information for the Windsor Site Operations, to EPA Region 1 (KAPL 1995a and 1995b). The actions were considered voluntary because EPA did not need to utilize its' permit or enforcement authority in order to mandate fieldwork. Both documents were prepared in accordance with the USEPA RCRA Facility Assessment Guidance (USEPA 1986) and various other USEPA guidance documents. From review of historical files and employee interviews, 15 solid waste management units (SWMUs) and 15 areas of concern (AOCs) were identified. All 30 SWMUs and AOCs were technically evaluated utilizing historical information, employee interviews, review of operational records, and detailed site inspections to assess the potential for integrity losses and the potential for releases of hazardous waste or hazardous constituents to the environment (40 CFR Part 264.101). As a result, four SWMUs and seven AOCs were identified for investigation in the SV Work Plan.

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

Surface and subsurface soil, groundwater, surface water, and sediment samples were collected in two phases of SV fieldwork. Samples were analyzed for a variety of organic compounds, polychlorinated biphenyls (PCBs), metals, and cyanide for release assessment purposes. EPA Region 1 comments on the SV Work Plan were resolved prior to initiating the first of two investigation phases in July 1995. In July 1996, SNR and KAPL met with the EPA Region 1 and the CTDEP at the Site to review initial investigative findings and obtain agreement on the scope of the second phase of work.

In July 1997, a meeting was held with EPA Region 1 and the CTDEP to review second phase fieldwork results and to discuss pending dismantlement program characterization work. From SV results, KAPL concluded that additional characterization work was warranted to further assess potential releases at various SWMUs and AOCs, and that soil remediation at two AOCs (including a newly discovered AOC-16 found during the SV) was warranted. However, with the desire to create a database thorough enough to close the Site, the EPA region 1 requested that all building footprints and all utilities, regardless of waste management or spill history, be subject to release assessment.

In September 1997, SNR transmitted the SV Report to EPA Region 1 (KAPL 1997). The report concluded that additional investigation work during Site dismantlement would be pursued in accordance with three Work Plans to characterize and remediate, as necessary, potential releases at SWMUs, AOCs, various utilities, and Site buildings. Two work plans primarily addressed assessing potential releases to soil, and the third plan primarily entailed characterization of Site groundwater, and neighboring Goodwin Pond and its drainage brook water and sediment. The analytical program contained in these three work plans involved analyzing samples for a variety of volatile and semi-volatile organic compounds, PCBs, pesticides, metals, and cyanide.

Based on the nature of the dismantlement work and its schedule, it was imperative to integrate Site characterization and remediation activities. Fieldwork commenced in the late summer of 1998 and was completed in January 2001. During the course of fieldwork, four interim corrective measures were completed at the following locations:

- 1) AOC-16 (Surficial Black Material),
- 2) AOC-7 (Underground Fuel Oil Storage Vault and Building 3 Pipe Trench),
- 3) AOC-6 (Material Laydown Area), and
- 4) Building 8 (Site Supply and Observation Wells).

The results of the Site characterization and remediation work were documented in a Draft S1C Site Confirmatory Chemical Sampling and Analysis (CS&A) Report. Based on EPA Region 1's comments on the Draft CS&A Report (USEPA 2002), additional work was performed in 2002 and 2003 to generate supplemental soil and Goodwin Pond water and sediment data, to support preparation of ecological and human health risk assessments, and to further assess potential releases to soil. The work was conducted in accordance with a Risk Assessment Work Plan (Mahoney 2003b) and three attendant Quality Assurance Project Plans (Mahoney 2002a, 2002b, and 2003a).

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

The Draft CS&A Report, including the risk assessments (Appendix N), was revised in 2004 (KAPL 2004) to address EPA's 2002 comments and included the supplemental data. EPA commented on the risk assessments (USEPA 2004a) and certain release assessments (USEPA 2004b), and comment resolution is contained in the Addendum to the CS&A Report (KAPL 2006). Comment resolutions were augmented with information and data generated under the Connecticut Property Transfer Program (OBG 2006a, OBG 2006b, OBG 2006c, and OBG 2006d). The EPA acknowledged the technical adequacy of both the release assessment (USEPA 2006a) and the risk assessments (2006b) comment responses in July 2006.

Proper characterization to support unrestricted release of the 10.8 acre Site was an important consideration from the onset of the dismantlement program. As a result of the characterization and remediation work, there were a total of approximately 1,300 soil samples, 79 pond sediment samples, 47 surface water samples, 10 fish samples and 149 groundwater samples collected under the RCRA Corrective Action Program. Detailed chemical analyses were performed on all samples in accordance with USEPA reviewed work plans, resulting in a database in excess of 121,000 individual data records. The density of characterization sampling, and subsequent confirmation sampling in remediated areas, provided a comprehensive vertical and lateral depiction of Site conditions and demonstrated that Site operations had no significant impact on the environment.

### **Summary of Facility Risks**

Human health and ecological risks were assessed for media at the Site and the neighboring Goodwin Pond. Risk assessment results are presented in detail in the S1C Site Confirmatory CS&A Report (KAPL, 2004) and the CS&A Addendum (KAPL, 2006).

#### **Ecological Risks**

Based on risk assessment results, chemicals in soil at the Site were determined to be at levels deemed unlikely to pose risk to ecological receptors (plants and animals). Terrestrial receptors for which risks were quantified included plants, invertebrates (insects and earthworms), mammals (represented by the short-tailed shrew, meadow vole, eastern cottontail, and red fox) and birds (represented by the American robin and kestrel).

Although detected concentrations of barium, lead and mercury in Goodwin Pond surface water exceeded the initial screening values, a more detailed toxicological evaluation indicated that risks to aquatic life in Goodwin Pond were low. Consequently it was concluded that the chemicals found in Goodwin Pond surface water were found to be unlikely to pose risk to fish, aquatic invertebrates, and aquatic plants that live in the water column.

Receptors for which risks were quantified based on exposure to Goodwin Pond sediment included benthic invertebrates (insects that live in sediment), birds (represented by the mallard and belted kingfisher), and mammals (represented by the raccoon). Some chemicals in the pond sediment posed a small potential risk to benthic invertebrates and the belted kingfisher. It was found that cyanide and DDE may pose risk to the belted kingfisher, however very conservative exposure assumptions were utilized, particularly a high bioconcentration factor that is highly

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

uncertain and assumptions that the kingfisher obtains all its food from Goodwin Pond. Consequently this potential risk to the belted kingfisher is most likely overestimated. Benthic invertebrates were found to potentially be at risk from exposure to some metals, pesticides and PCBs. A more detailed toxicological evaluation indicated that metal risks to benthic invertebrates were low because of the high organic matter content in Goodwin Pond sediment that removes these metals from the pool of chemical that can be taken up into the organisms. Additionally these chemicals found to potentially pose risk are not unique to the pond or necessarily related to the Site. These chemicals (such as DDT, PCBs, and mercury) were detected throughout the pond, including portions upstream of the S1C Site, and are attributed to anthropogenic "background."

**Human Health Risks**

Cancer, non-cancer, and lead risks were calculated for the most conservative potential future receptors for the S1C Site (resident adult and child) for each medium of concern at the site—proper (surface and subsurface soil) and for Goodwin Pond (surface water, fish, and sediment) for all chemicals identified as having potential risks.

The results for resident receptors exposed to all site media, including surface soil, indicate that cumulative cancer risks across all media for the lifetime resident are  $4.3 \times 10^{-5}$ , which is within EPA's acceptable risk range of  $10^{-6}$  to  $10^{-4}$ . The cumulative non-cancer HI is 0.6 for resident children, the most sensitive potential receptor. This is less than EPA's risk target of 1.0. The results for resident receptors exposed to all site media, including subsurface soil, indicate that cumulative lifetime cancer risks across all media are  $7.6 \times 10^{-5}$ , which is within EPA's acceptable risk range of  $10^{-6}$  to  $10^{-4}$ . The cumulative non-cancer HI was 1.5 for resident children, the most sensitive potential receptor. This exceeds EPA's risk target of 1.0, however the cumulative HIs for individual target organs are all less than 1.0. Therefore, there are no unacceptable risks posed by media at the S1C Site for any potential human receptors, even as presented in this worst case, unrealistic scenario.

**Lead Risks**—The results of the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Lead Model found that detectable levels were below levels of concern for children in a residential setting.

**Scope of Corrective Action**

As a result of the dismantlement program at the S1C Site, a considerable portion of the Site was excavated during removal of building/structure foundations and utility lines. This excavation activity allowed for extensive inspection of subsurface soil to assess the presence of contamination, and best select soil sample locations in accordance with the Corrective Action work plans.

The chemicals detected through soil and groundwater sampling revealed low levels of contamination associated with both waste management and spills (which were remediated), and results associated with common construction debris (e.g., asphaltic materials).

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

At certain soil sample locations, some inorganics, PCBs, and PAHs were sporadically detected above Connecticut Remediation Standard Regulation (RSR) criteria (e.g., residential-direct exposure criteria [R-DEC] or pollutant mobility criteria [GB-PMC]). These exceedances are addressed under the Connecticut Property Transfer Program (OBG 2006d).

All groundwater sampling results indicate that detected constituents are below the CTDEP RSR surface water protection criteria. These criteria are established to ensure that surface water quality is not degraded by contaminants in groundwater. Groundwater in the area, including that below the S1C Site, is classified by CTDEP as Grade B (unsuitable for drinking without treatment).

Interim corrective measures (ICMs) were completed at three Areas of Concern (AOC-6 -- Material Laydown Area; AOC-7 -- Underground Fuel Oil Storage Vault and Building 3 Pipe Trench; and AOC-16 -- Surficial Black Material). The ICMs included chemically contaminated media excavation and disposal off-site, followed by confirmation sampling. At AOCs 6 and 16, surface soils (approximately 1 foot deep) containing elevated levels of metals were removed in relatively small discrete areas. For both areas, a total of 360 cubic yards were excavated and disposed of off-site. At AOC-7, approximately 110 cubic yards of soil containing fuel oil compounds were excavated and shipped off-site for disposal.

A fourth interim corrective measure was completed for the Building 8 Site water production wells and associated observation wells where building demolition debris, that had paint containing PCBs, had fallen into the wells. For this action, the debris was removed and the wells were permanently closed (filled with bentonite and concrete in accordance with state requirements). The dried paint on the debris did not dissolve into the groundwater; hence, there was no concern for migration.

**Connecticut Property Transfer Program**

The S1C Site voluntarily entered into the Connecticut Property Transfer Program when the environmental conditions assessment form (ECAf) was submitted to the CTDEP on June 7, 2002 (KAPL 2002). In a letter dated January 3, 2003 (CTDEP 2003), CTDEP advised SNR that a Licensed Environmental Professional (LEP) should be retained to verify that an investigation has been performed at the Site in accordance with prevailing standards and guidelines and that the Site has been remediated in accordance with the CT RSRs to support unrestricted release of the S1C Site.

In complying with the RSRs, the LEP developed conceptual site models (CSMs) using the entire chemical database that was generated under the RCRA Corrective Action Program for soil and groundwater. This data consisted of inorganics (metals and cyanide), volatile organic compounds, PCBs, total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAH), and pesticides. Where substances, either unique to certain release areas or detected across the Site, were noted to have detections in excess of RSR criteria, more thorough evaluations were conducted. In certain instances, CTDEP required additional evaluations,

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

investigations, and remediation to close data gaps and provide validation of the CSMs that were developed. CSM details are contained in the S1C Site Verification Report (OBG 2006d).

**Soil**

Based on the CSM evaluation, additional soil samples were collected and analyzed for specific chemicals in the following areas:

- North-Central Building Complex (NCBC) - pesticides
- Eastern Drainage Area - TPH
- Cooling Tower Basin - hexavalent chromium, pesticides
- Building 25/Tunnel/26 area - pesticides

From the resultant data, it was determined that remediation of pesticide impacted soil in the NCBC and TPH impacted soil in the eastern drainage area was necessary to achieve unrestricted release of the Site. Although the data showed that there was no RSR exceedance for the Building 25 area, soil that was historically used to backfill the building foundation was removed since it was found to contain construction and demolition debris (e.g., asphalt, brick, electrical conduit) (OBG 2006b).

**NCBC Remediation**

During the course of RCRA Corrective Action sampling and analysis work, elevated pesticides were detected in the NCBC. Pesticides were historically used in the area for termite control. There was no history of pesticide spills or disposal in the area.

Since some of the pesticides, particularly dieldrin, exceeded CTDEP RSR criteria (both residential direct exposure (38 ppb) and pollutant mobility (7 ppb)), KAPL performed an extensive delineation sampling program in 2004. The program entailed collecting soil samples from six depth intervals (0 to 2 ft, 4 to 6 ft, 8 to 10 ft, 13 to 15 ft, 18 to 20 ft, and 21 to 23 ft) over an approximate two-acre area.

Based on the 2004 program, a Remedial Action Plan (RAP) was prepared and submitted to the CTDEP in October 2004. The primary objective of the proposed remedial action was to mitigate pesticide impacts to NCBC area soils such that applicable CTDEP criteria were met, allowing future unrestricted use of the NCBC area without the need for administrative restrictions (e.g., environmental land use restrictions) or engineering controls (e.g., caps). Excavation and off-site disposal were identified as the means to address the objective for the pesticide-impacted area.

The remediation took place from November 2004 through March 2005 and resulted in the excavation and off-site disposal of approximately 61,000 tons of soil from the former NCBC area. Post-excavation sampling and analysis of the soils at the final limits of the excavation provided results that were less than the applicable RSR criteria. Further details regarding the remediation activities are presented in the Remedial Action Report dated April 2006 (OBG 2006c).

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

**Eastern Drainage Area Remediation**

The former eastern drainage area is located along the eastern portion of the Site near the western shoreline of Goodwin Pond. The former eastern drainage area includes five former outfall drainage pathways: Outfall D-1, Outfall D-2, Outfall D-3, Outfall D-4 and Outfall D-5. The outfalls were used to drain stormwater from roadways and an employee automobile parking lot for approximately 50 years. Other than stormwater drainage to outfalls, inter-swale areas received parking lot debris from routine maintenance activities (such as snow plowing, periodic sealing and general maintenance/repair). Historical operations at this portion of the Site did not involve the management of liquid petroleum products, nor were there any significant spills. Rather, only parking lot construction and maintenance material, as well as incidental leakage due to normal employee automobile parking, could have been released in this area.

Physical and chemical characterization of the area was completed in 2005, with analytical data indicating that TPH existed in soils in five general areas (outfalls D-1 to D-4 and 1 inter-swale area) located within the former eastern drainage area with extractable total petroleum hydrocarbon (ETPH) concentrations greater than the Connecticut RSR R-DEC for TPH. Asphalt and sealant debris were observed in soil samples collected in these areas.

Based on the 2005 characterization, the RAP was prepared and submitted to the CTDEP in September 2005 and was designed to address TPH-impacted soils that were detected at ETPH concentrations greater than the R-DEC. The remedial action program resulted in multiple excavations over a total area of approximately 3,100 square feet to depths up to approximately 4 feet below grade, and disposal of approximately 352 tons of TPH-impacted soil at a licensed off-site facility. Further details regarding the remediation activities are presented in the Remedial Action Report dated April 2006 (OBG 2006a).

**Groundwater**

Upon reviewing the CSM, which included groundwater monitoring information associated with the RCRA Corrective Action program, the CTDEP directed KAPL to proceed with an abbreviated groundwater monitoring program at six locations, primarily for inorganics. Monitoring wells were installed on February 17 through 19, 2004 and two rounds of data were collected in February and April. Monitoring results showed that the groundwater quality was not impacted; and therefore, CTDEP issued an approval dated November 22, 2004 for the cessation of this alternative groundwater monitoring program. Details of the monitoring program are contained in the Verification Report (OBG 2006d).

**Verification Report Conclusion**

The Verification Report documents that investigations at the S1C Site that have occurred in accordance with prevailing standards and guidelines, and remediation that has occurred in accordance with the RSRs comply with CTDEP verification requirements. The report provides justification for unrestricted release of the property with no further action for soils and

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

groundwater. The report was submitted to the CTDEP by the LEP on April 17, 2006. In CTDEP response to the report submittal, it was determined that the report will not be audited (acknowledgement of its acceptance) (CTDEP 2006).

**Property Transfer**

The U.S. Government will transfer the subject property under the CTDEP Property Transfer Act Connecticut General Statutes, Section 22a-133k. In June 2002, the Department of Energy filed the required Environmental Condition Assessment Form (ECAAF), which summarized the actions taken under the RCRA Corrective Action Program. All paperwork submitted to EPA Region 1 under the Corrective Action Program was subject to CTDEP review under the land transfer program. The property will be transferred "unrestricted" (Form 2). CTDEP supports this conclusion.

**Summary of Alternatives**

EPA and CTDEP are proposing that the Site be released for unrestricted use. Hence, no other action alternatives are deemed necessary for evaluation.

**Evaluation of the Proposed Remedy and Alternatives**

Based on the scope of characterization work completed at the S1C Site, including the effectiveness of remediation at four RCRA ICMs, the two remedial actions required by CTDEP, and the human health and ecological risk assessment conclusions, no further action is warranted. These conclusions apply to both the S1C Site property and the adjacent property (including Goodwin Pond) with respect to S1C Site operations. Hence, the aforementioned provides justification for unrestricted release of the subject properties with no further action.

**Public Participation**

Prior to commencement of Site dismantlement activities, the S1C Site prepared an Environmental Impact Statement which detailed three alternatives for the disposal of the S1C reactor plant in accordance with Federal National Environmental Policy Act (NEPA) regulations (Reference 10 CFR 1021). The alternatives evaluated included prompt dismantlement and disposal of the entire S1C prototype reactor plant; deferred dismantlement to allow for the decay of radioactivity prior to dismantlement; and "no action," meaning continuing surveillance and monitoring for an indefinite period of time. The evaluation concluded that the environmental and socioeconomic impacts for all of the disposal alternatives would be small. The public was afforded the opportunity to review and comment on the draft Environmental Impact Statement during a 45-day comment period lasting from July 5, 1996 to August 19, 1996. Oral comments were received during a public hearing held on August 7, 1996. All comments were taken into



**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

consideration during preparation of the Final Environmental Impact Statement, which was issued in November 1996.

Concerning the RCRA Corrective Action Program, EPA Region 1 and the Connecticut Department of Environmental Protection are soliciting input and comment from the community on the investigation and remediation of the KAPL S1C Site under the RCRA Corrective Action Program, and release of the Site for unrestricted future use under RCRA. The CTDEP has set a public comment period from July 24, 2006 through September 7, 2006 to encourage public participation in the process. The comment period includes a public meeting, at which CTDEP will present this Statement of Basis, answer questions, and accept both oral and written comments.

The public meeting is scheduled for 7:00 p.m., August 24, 2006 and will be held at the Windsor Town Hall, 275 Broad Street, in Windsor, Connecticut.

The Administrative Record is available at the following locations:

Windsor Public Library  
323 Broad Street  
Windsor, Connecticut 06095  
(860) 285-1910  
Hours: Monday – Thursday, 10:00 a.m. – 9:00 p.m.  
Friday, closed  
Saturday, 10:00 a.m. - 1:00 p.m.  
Sunday, closed

Connecticut Department of Environmental Protection  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3023  
Hours: Monday – Thursday, 8:30 a.m. - 4:30 p.m.

U.S. Environmental Protection Agency Docket Room, Region 1  
1 Congress Street  
Boston Massachusetts 02114-2023  
(888) 372-7341  
(617) 918-1111

Comments will be summarized and responses provided in the Response to Comments. The Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record. To send written comments or obtain further information, contact:

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

Mr. Robert A. O'Meara  
U.S. Environmental Protection Agency, Region 1  
1 Congress Street  
Boston, Massachusetts 02114-2023  
(617) 918-1360

Mr. Maurice Hamel  
Remediation Division  
CT Department of Environmental Protection  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3787

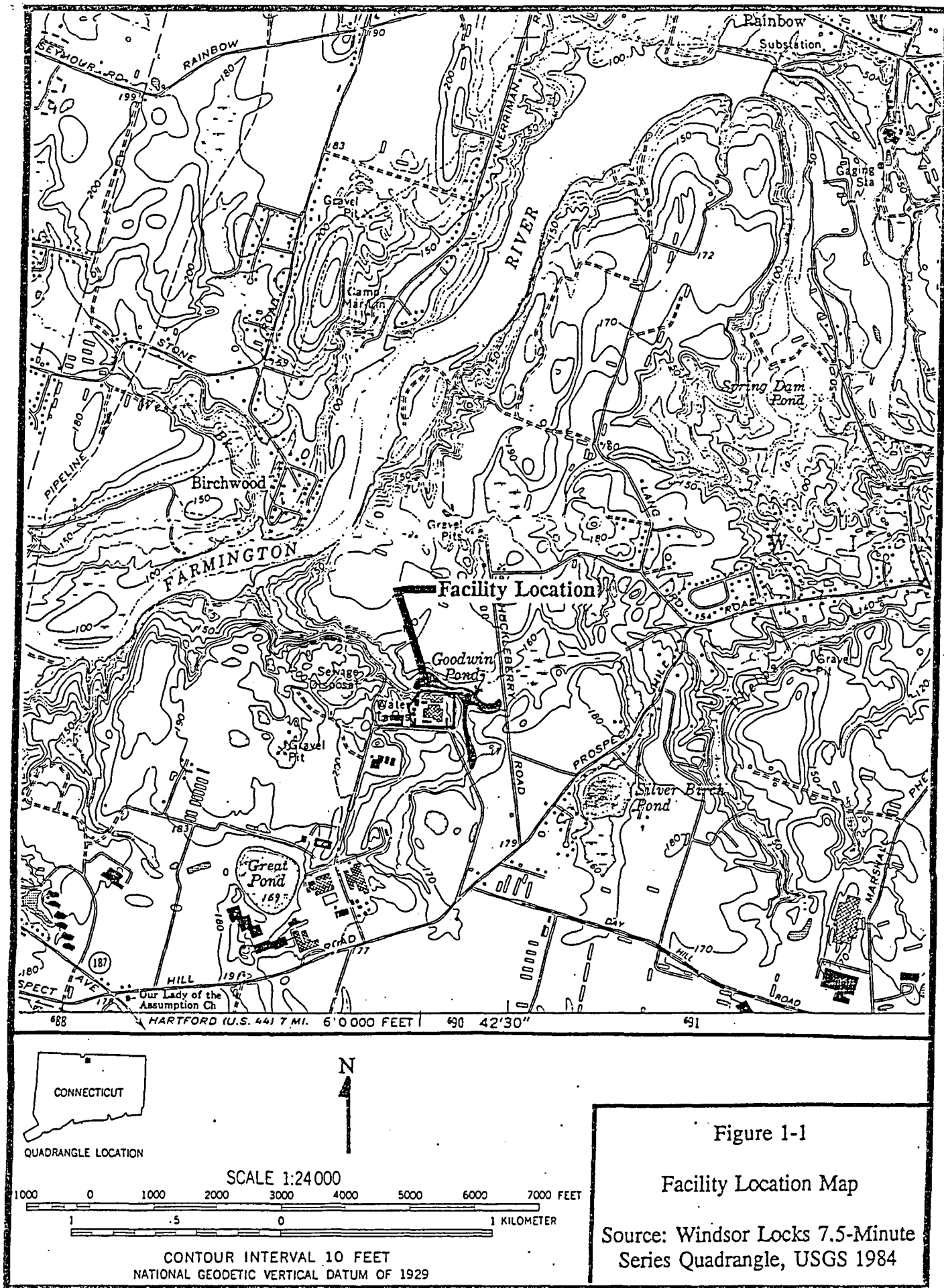
**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

**References**

- CTDEP 2003. Connecticut Department of Environmental Protection letter to SNR, dated January 3, 2003; Re: Environmental Condition Assessment Form.
- CTDEP 2004. CTDEP Approval letter to SNR, dated November 22, 2004; RE: Knolls Atomic Power Lab, Windsor, CT.
- CTDEP 2006. CTDEP letter, dated May 22, 2006; RE: Acknowledgement of Receipt of Verification of Investigation & Remediation, Knolls Atomic Power Lab, 1900 Day Hill Road, Windsor.
- KAPL 1995a. SNR letter REC&SD:SPT#95-47, dated July 5, 1995; Subject: [INTERNET MAIL] - Knolls Atomic Power Laboratory-Windsor Site Sampling Visit Work Plan; Transmittal Of.
- KAPL 1995b. SNR letter REC&SD:SPT#95-74, dated September 26, 1995; Subject: [INTERNET MAIL] - RCRA Corrective Action Program at the Knolls Atomic Power Laboratory-Windsor Site; Transmittal of Background Information.
- KAPL 1997. Sampling Visit Report for the Windsor Site, Knolls Atomic Power Laboratory, Windsor, Connecticut, Volumes I & II, September 1997.
- KAPL 2002. Knolls Atomic Power Laboratory. Environmental Condition Assessment Form. June 7, 2002.
- KAPL 2004. Final S1C Site Confirmatory Chemical Sampling and Analysis Report, March 2004.
- KAPL 2006. Addendum to the Final S1C Site Confirmatory Chemical Sampling and Analysis Report, July 2006.
- Mahoney 2002a. Eileen Mahoney Associates, Inc.: Quality Assurance Project Plan, Fish Sampling Goodwin Pond, KAPL S1C Site, October 2002.
- Mahoney 2002b. Eileen Mahoney Associates, Inc.: Addendum to the Quality Assurance Project Plan, Supplemental Sediment and Surface Water Sampling Goodwin Pond, KAPL S1C Site, Windsor, Connecticut, December 2002.

**Statement of Basis  
Knolls Atomic Power Laboratory S1C Site  
Windsor, Connecticut  
(EPA I.D. Number CT6890113792)  
Corrective Action Program**

Mahoney 2003a.	Eileen Mahoney Associates, Inc.: Addendum to the Quality Assurance Project Plan, Supplemental Soil Sampling, KAPL S1C Site, Windsor, Connecticut, March 2003.
Mahoney 2003b.	Eileen Mahoney Associates, Inc.: Risk Assessment Work Plan, KAPL S1C Site, Windsor, Connecticut, May 2003.
OBG 2006a.	O'Brien & Gere Engineers, Inc.: Former Eastern Drainage Area Remedial Action Report, Knolls Atomic Power Laboratory, S1C Site, Windsor, CT. March 2006.
OBG 2006b.	O'Brien & Gere Engineers, Inc.: Former Building 25/Tunnel/26 Footprint Project Summary Report. March 2006.
OBG 2006c.	O'Brien & Gere Engineers, Inc.: Pesticide Remedial Action Report, Knolls Atomic Power Laboratory, S1C Site, Windsor, CT. April 2006.
OBG 2006d.	O'Brien & Gere Engineers, Inc.: Verification Report, Knolls Atomic Power Laboratory, S1C Site, Windsor, Connecticut, April 2006.
USEPA 1986.	RCRA Facility Assessment Guidance, October 1986.
USEPA 2002.	Region 1 letter, dated March 26, 2002; Subject: Knolls Atomic Power Laboratory, Windsor, Connecticut, Technical Review of the December 2001 S1C Site Confirmatory Chemical Sampling and Analysis Report.
USEPA 2004a.	Region 1 letter, dated May 28, 2004; Subject: Technical Review of Appendix N Ecological and Human Health Risk Assessments of the March 2004 CSA Report, Knolls Atomic Power Laboratory S1C Site, Windsor, Connecticut.
USEPA 2004b.	Region 1 letter, dated June 22, 2004; Subject: Technical Review of the March 2004 S1C Site, Confirmatory Chemical Sampling and Analysis Report (CS&A), Knolls Atomic Power Laboratory S1C Site, Windsor, Connecticut.
USEPA 2006a.	Region 1 Letter, dated July 11, 2006; Subject: Technical Review of the June 2006 Confirmatory Sampling Report Response to Comments, Knolls Atomic Power Laboratory, Windsor, Connecticut.
USEPA 2006b.	Region 1 Letter, dated July 12, 2006; Subject: Technical Review of June 2006, Risk Assessment Replacement Pages, Knolls Atomic Power Laboratory (KAPL) S1C Site, Windsor, Connecticut.



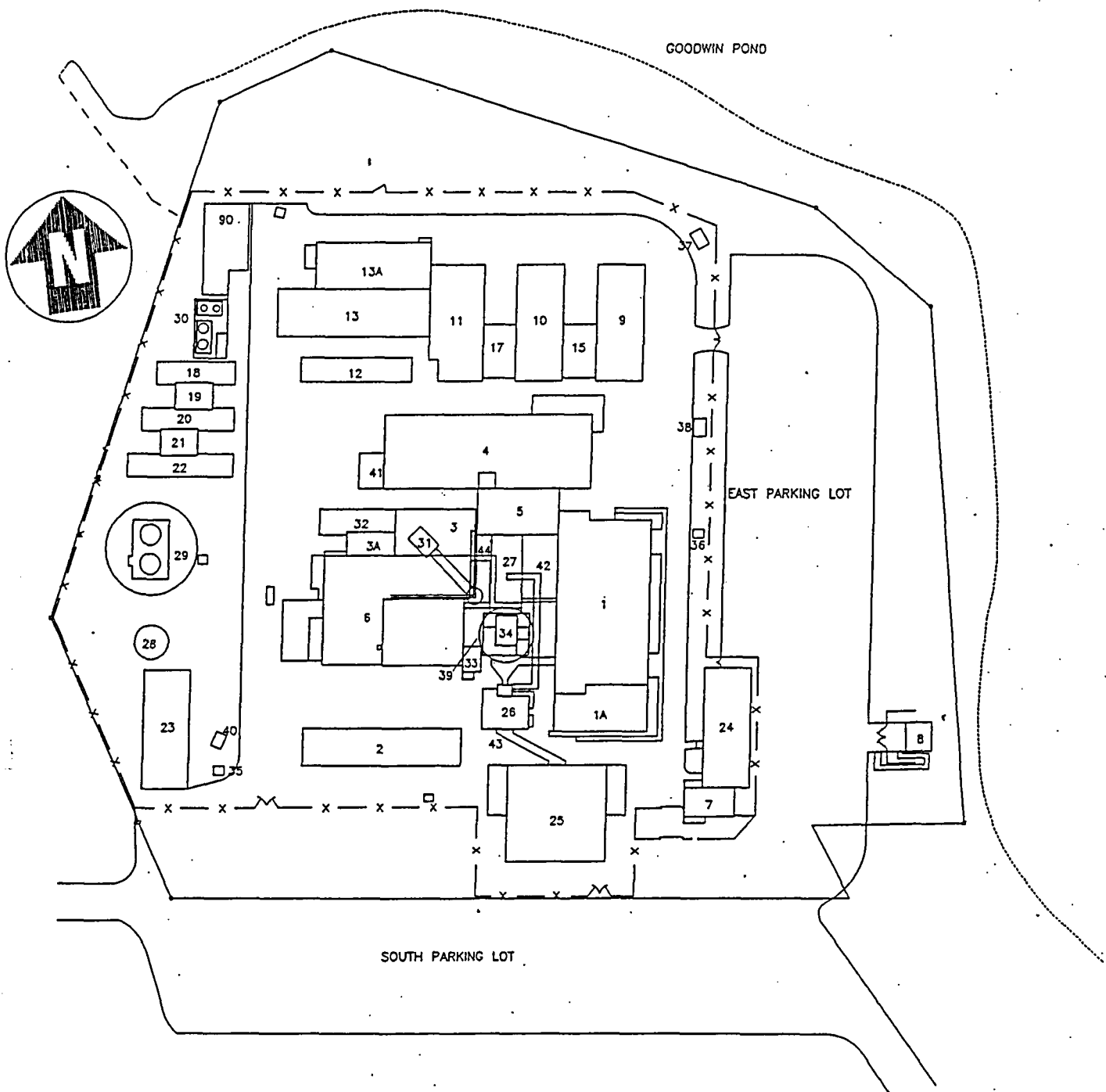


FIGURE 1-2  
S1C SITE BUILDING AND STRUCTURE LAYOUT