FILE COPY

DOE/EIS-0275

FINAL ENVIRONMENTAL IMPACT STATEMENT

S1C Prototype Reactor Plant Disposal

Volume 2 of 2

November 1996

Prepared by the
U. S. Department of Energy
Office of Naval Reactors

Printed on recycled paper

TABLE OF CONTENTS

VOLUME 2 of 2

THIS PAGE IS INTENTIONALLY BLANK

APPENDIX E

COMMENTS AND RESPONSES

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK

Introduction

This Appendix did not appear in the Draft Environmental Impact Statement. It has been added to the Final Environmental Impact Statement to present comments received following distribution of the Draft Environmental Impact Statement together with Naval Reactors' responses to those comments. In cases where text of the Final Environmental Impact Statement has been changed from the Draft Environmental Impact Statement, a sidebar has been placed in the margin of the Final Environmental Impact Statement adjacent to the revised text.

On June 24, 1996, Naval Reactors began distribution of the Draft Environmental Impact Statement on the S1C Prototype Reactor Plant Disposal. Over 140 notices and Draft Environmental Impact Statements were distributed to regulatory agencies, elected officials, organizations, and individuals who have expressed an interest in the disposal of the defueled S1C Prototype reactor plant. The public comment period began with publication of the Notice of Availability in the *Federal Register* (61FR35211) on July 5, 1996 and remained open for 45 days, ending on August 19, 1996. In addition to the *Federal Register* notice, a public notice was published in the *Hartford Courant* newspaper. During the comment period, a public hearing was held in Windsor, Connecticut, as announced in the *Federal Register* and *Hartford Courant* notices.

A total of 18 written statements and 14 oral statements were received as follows:

	Written	Oral
Federal Agencies	2	0
State Agencies	3	1
Federal Officials	1	0
Local Officials	2	4
Organizations	5	3
Individuals	5	6

In the Final Environmental Impact Statement Summary, Naval Reactors has identified the prompt dismantlement alternative as its preferred alternative.

The State of Connecticut Department of Environmental Protection; The Honorable Barbara B. Kennelly, U.S. House of Representatives; Dr. Charles J. Petrillo, Director of Health, Town of Windsor; Donald Trinks, Health and Public Safety Committee, Town of Windsor; Charles V. Wall, Sanitarian, Windsor Community Health Services; Leo Canty, Windsor Issues Forum; Mark Sussman, Windsor Conservation Commission; Robert A. Bell, Business Representative, Teamsters Local 559; Anthony DeFrancesco, Jr., Business Manager,

Boilermakers Local 237; and 7 private citizens supported the prompt dismantlement alternative. Rosemary Bassilakis, Citizens Awareness Network; and 2 private citizens supported the deferred dismantlement alternative. There was no support expressed for the no action alternative.

This appendix provides responses to all other comments and issues identified during the public review. A copy of each comment letter received is exhibited in this appendix with the corresponding comment response(s) immediately following each letter. A copy of the public hearing transcript is also exhibited with corresponding comment responses following the transcript. For purposes of clarity, when necessary, individual comments in the letters and public hearing transcript have been annotated with sidebars and corresponding comment numbers. Letters received only in support of a specific alternative are included for the record at the end of this appendix.

Index of Comments and Responses

THIS PAGE IS INTENTIONALLY BLANK

COMMENTS AND RESPONSES

THIS PAGE IS INTENTIONALLY BLANK

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF ENVIRONMENTAL REVIEW
79 ELM STREET, HARTFORD, CT 06106
Tel. - 424-4114 Fax - 424-4053

August 19, 1996

Mr. C. G. Overton, Chief
Windsor Field Office
Office of Naval Reactors
U. S. Department of Energy
P. O. Box 393
Windsor, Connecticut 06095

RE: Draft Environmental Impact Statement
S1C Prototype Reactor Plant Disposal

Dear Mr. Overton:

This letter is in response to the subject document that was forwarded to the Department by your cover letter dated June 24, 1996. The various offices of the Department to which you distributed this document and other disciplines of the agency have reviewed the Draft Environmental Impact Statement (DEIS), and this is a coordinated response.

The Department supports the selection of the Prompt Dismantlement alternative, which will allow the unrestricted reuse of the Knolls Atomic Power Laboratory (KAPL) site. This alternative has a significant environmental benefit because it eliminates the uncertainty and risks associated with a 30 year or indefinite caretaking operation for the S1C reactor and will immediately address existing site conditions. With the nuclear fuel already removed from the reactor and site, the remaining radiological risks associated with prompt dismantlement of the reactor are minimal, and the work can be accomplished without exposing workers and the public to unsafe conditions. Also, the prompt dismantlement alternative has the added advantage of being the least costly alternative.

While the DEIS, in general, is adequate with respect to the evaluation of the dismantlement of the reactor, the DEIS does not provide a sufficient basis for determining the impacts of the project goal of releasing the site for unrestricted use. This deficiency results primarily from the omission of specific information regarding the characterization of any contamination from KAPL activities and any corrective actions that may be necessary. The following technical comments focus primarily on this deficiency and other general

observations regarding the proposed action.

1.) A maximum radiation exposure limit of 15 millirem/year from all sources, of which a maximum of 4 millirem/year can be from ingestion of radioactivity in water, should be the standard used in the final site assessment, and the adherence to this standard should be specifically stated in the Final Environmental Impact Statement (FEIS). The Department believes that this is a reasonable and achievable goal.

2.) The DEIS is vague with regard to a time frame for the final radiological survey that would be performed following dismantlement of the reactor. In addition, there is no discussion as to what actions would take place if additional contamination was identified during the final survey. Specifically, when would the area be further remediated, and who would perform this activity? Also, would adjacent properties be sampled and surveyed during this final survey?

3.) A designation survey of the drainage brook performed by the Oak Ridge Institute for Science and Education (ORISE) for the Asea Brown Boveri, Inc. (ABB) property (formerly Combustion Engineering), which is adjacent to the KAPL site, identified areas of highly enriched uranium contamination. Alpha spectrometry analysis of one area resulted in a total uranium concentration of 16,740 pCi/g and a U-235 enrichment of 58%. This information is inconsistent with the reported values that are presented in the DEIS for locations on the drainage brook that are virtually the same but have much lower values. This apparent discrepancy must be resolved. Also, the responsibility for this condition in the drainage brook is uncertain, and it is possible that this contamination could have come from either the KAPL site or ABB site. Why was there no attempt made by KAPL to determine the uranium enrichment of the samples they obtained? The DEIS should more fully evaluate this condition and respond accordingly.

4.) Section 4.5.4.2 states, "Only one of the ten "deep" (12 inches) samples had a higher concentration of cobalt-60 than the two-inch deep samples taken at the same location. Therefore, there is no reason to believe that there are higher concentrations of cobalt-60 buried deeper in the brook sediment by siltation." If one sample *did* have higher concentrations at a deeper level, then how can this assumption be stated so definitely?

5.) Section 4.5.4.1 states, "Radioactive materials attributable to Windsor Site operations have never been disposed of or buried on the Windsor Site property." Does this statement imply that no site-characterization survey should be performed? What documentation is available to verify that this statement is accurate? Has the entire site been evaluated for the presence of radioactive contamination?

6.) Section 5.1.13 states, "In the event that identified facilities are not available in time for treatment of mixed wastes generated at the Windsor Site, the Site Treatment Plan states that other options would be evaluated and an Alternate Measures Plan would be submitted...." This potential situation should be addressed now, rather than waiting until it develops.

7.) There is no consideration in the DEIS of possible S1C-generated contamination in the water or terrestrial environment of adjacent sites other than the drainage brook that borders the ABB property. The Department believes that other adjacent properties should be defined and sampled in order to verify that S1C-generated radiological material and hazards do not exist.

8.) There is no discussion in the DEIS of possible reverse groundwater flow conditions in the drainage brook or other watercourses caused by seasonal fluctuations in rainfall combined with the use of the facility's water supply production well, and what effect this condition would have had on the disposition of radioactive contamination.

9.) The DEIS does not evaluate the on-site septic system or dry-well with regard to the potential chemical and/or radioactive contamination of these systems (tanks and pipes), any sediment that may be in the tanks, the soil or groundwater.

10.) There is no description or discussion of the final disposition of below grade non-process systems. Will surveys be performed on these systems to verify that they are free of contamination?

11.) The DEIS states that buildings and systems will be removed to four feet below grade. There should be a discussion and explanation presented as to why four feet was selected as the removal limit.

12.) There is no plan-of-action described in the event that residual radioactivity is detected once the buildings are removed.

13.) The DEIS documents some presence of radioactive contaminated soils and groundwater, but offers a limited discussion as to how this contamination might affect the general public and the relationship of such exposure to draft regulations proposed by EPA. It is mentioned that a subsistence farmer moving in and beginning to farm the area in 1997 would receive a dose of 13.6 millirem/year due to the presence of cobalt-60 soil contamination. An average decay-corrected soil contamination value of 1.36 pCi/gram is used to reach this conclusion, although values of soil concentrations as high as 10.9 pCi/gram are reported. In addition, this assumption is based solely on cobalt-60 contamination even though the ORISE survey, previously referenced, found

enriched uranium contamination on the bank of the drainage brook.

14.) There is no mention that water sampling will be part of the final radiological survey. The Department believes that the final radiological survey of this site should include water sampling.

15.) A transportation plan is delineated for the movement of the reactor vessel and other reactor plant components, but no options are presented for the transportation of contaminated building materials, if such a need should develop.

16.) An accident analysis is performed for various scenarios, but no specific safeguards that will employed to prevent or minimize these accidents are described.

17.) The dose assessment computer programs (GENII, RSAC-5 and WATER RELEASE) that were used all calculate dose by summing internal and external sources. In the analyses of the samples taken, only gamma emitters are identified. Without knowing if there are alpha and/or beta sources present, it seems that a complete internal dose assessment cannot be performed.

18.) Many of the above concerns regarding residual radioactive contamination (buildings, below grade systems, septic tank, dry well, soil, groundwater, etc.) may be addressed in the decommissioning plan for this facility, which has not been included as a part of the DEIS or been available to the Department for review and comment through another review procedure. The purpose of a DEIS is to disclose and account for all environmental problems before the proposed action commences. Since DOE has not disclosed the technical details of its promised post-dismantlement radiological survey and soil sampling (e.g., sampling locations, depths of sampling), the Department cannot evaluate the technical sufficiency of DOE's plans. Perhaps the most efficient way of remedying this situation would be to offer the decommissioning plan to the Department for review and comment prior to the preparation of the FEIS and then incorporate all of this information into the FEIS. Following this suggestion would establish a complete record of decision upon which to move this project forward.

19.) The DEIS reports in Section 3.1.4 that, "A voluntary facility assessment addressing the potential for environmental chemical contamination would be completed to support Windsor Site inactiviation and future release of the property....The report would summarize findings and would provide recommendations for any additional investigation or cleanup required to support the goal of unrestricted release of the Windsor Site." All of the above points made in connection with future radiological testing apply equally to future chemical pollutant testing.

20.) The DEIS in Section 2.5.1 incorrectly states the regulatory authority the Department has over hazardous air pollutants (including radionuclides). The State of Connecticut, through the Department, has concurrent regulatory jurisdiction with the EPA for airborne radionuclides, and the Clean Air Act (CAA) expressly preserves state regulatory power over such air pollutants. Section 116 of the CAA defines air pollutant to include "...radioactive (including source material, special nuclear material , and by-product material) substance or matter which is emitted into or otherwise enters the ambient air." Indeed, DOE's State RCRA permit for the Windsor facility sets specific limits on the emissions to air of radionuclides, the violation of which may subject DOE to injunctive action and civil penalties of up to $25,000 per day. The DEIS should be corrected.

21.) Under the Prompt Dismantlement alternative, the permitted RCRA hazardous waste and radioactive mixed waste (RMW) storage building may have to used prior to shipment of wastes off-site to an ultimate disposal facility. Once all hazardous and RMW have been removed from the site and the storage building is no longer required, the RCRA storage permit can lapse. However, if the dismantlement of the facility gets extended, this storage permit should remain active. It should be noted that the RCRA storage permit is for hazardous wastes and RMW generated on-site only and contains a maximum waste storage capacity. No hazardous wastes or RMW may be accepted from other sites and stored at this facility.

22.) If 5 acres or more are disturbed during dismantlement, a stormwater discharge permit pursuant to EPA regulations promulgated in November 1990 will be required. The Bureau of Water Management has issued a general permit which will cover these discharges. For further information and to obtain the necessary registration forms, contact the Bureau at 424-3018.

23.) The DEIS notes that the ultimate transfer of ownership of this site will have to conform to the Property Transfer Program administered by the Department. KAPL personnel have contacted staff in this program to discuss this requirement. In anticipation of filing for a transfer of the property for unrestricted use under the Property Transfer Program and to avoid duplication of investigative and remedial efforts, the requirements of this program should be recognized when any facility assessment work is developed and performed. These efforts should provide sufficient documentation to evaluate the degree and extent of any releases to the environment and determine whether any remediation is necessary to comply with the Remediation Standard Regulations. KAPL personnel are aware of the current Transfer Act Site Assessment Guidance Document and that this document will be replaced within the next several months by a significantly more comprehensive technical guidance document for site investigations and demonstrations of compliance with the Remediation Standard

Regulations. It is recommended that you remain current with the requirements of this program and obtain a copy of this new guidance material when it is available.

The above concerns must be addressed in order to achieve unrestricted use of the site. They are intended to support that goal and the selection of the Prompt Dismantlement alternative. I hope they are helpful in completing your environmental evaluation. If I can be of any further assistance, please give me a call. Than you.

Sincerely,

Brian J. Emerick

Brian J. Emerick
Supervising Environmental Analyst

cc: G. Leavitt, DEP/PERD
R. Robinson, DEP/PERD
O. Inglese, Jr., DEP/PERD
P. Franson, DEP/WEED
K. McCarthy, DEP/AQMRD
A. Rapkin, DEP/OLC
D. Leff, DEP/OAC
M. Sullivan, DEP/OCE

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Comment 1.
The limits cited by the State of Connecticut are included in draft regulations under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission. As discussed in the Draft Environmental Impact Statement, Sections 3.1.4 and 5.1.5.1, any future occupant of the Windsor Site would receive less radiation exposure than limits specified in draft regulations under consideration. These sections were clarified in the Final Environmental Impact Statement to include the numerical radiation exposure limits under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission.

Comment 2.
As stated in Section 5.1.1 of the Draft Environmental Impact Statement, the Windsor Site could be made available for other uses as early as 2001 under the prompt dismantlement alternative following completion of final radiological surveys. Following all dismantlement and disposal activities, a final radiological verification survey of the entire Windsor Site would be performed as described in Section 5.1.5.1 of the Draft Environmental Impact Statement. Final radiological verification surveys of the Windsor Site are estimated to occur in the year 2000 under the prompt dismantlement alternative. As stated in Section 5.1.5.1 of the Draft Environmental Impact Statement, Federal and State regulators would be invited to perform verification surveying and sampling. In the unlikely event that radiological survey results indicated residual radioactivity exceeding the applicable release criteria, the area would be cleaned up and resurveyed. Any necessary radiological remediation and subsequent confirmatory surveys would be performed by Naval Reactors to support prompt release of the Windsor Site. Additional information on the final radiological release process, which would also include sampling of adjacent properties and water, can be found in Appendix G of the Final Environmental Impact Statement.

Comment 3.
As discussed in Section 4.5.4.2 of the Draft Environmental Impact Statement, the drainage brook is not on Federal Government property, the brook sediments contain much higher concentrations of radionuclides originating from the Combustion Engineering, Inc. site than the concentrations of radionuclides originating from the S1C Prototype reactor plant, and the brook is the subject of a separate evaluation process. For these reasons, the Draft Environmental Impact Statement did not include potential remediation of the drainage brook in any of the alternatives under immediate consideration. Nevertheless, since the Council on Environmental Quality regulations for implementing the National Environmental Policy Act require that the existing environment be described and potential cumulative effects be considered, Naval Reactors did include in Section 4.5.4.2 of the Draft Environmental Impact Statement available information on the radiological conditions of the drainage brook.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Additional information on the radioactivity concentrations in the drainage brook has become available since the Draft Environmental Impact Statement was issued. The Department of Energy's Formerly Utilized Sites Remedial Action Program (FUSRAP) has issued a report which consolidates available information on radiological analysis of samples on the Combustion Engineering, Inc. site (Reference 4-28 of the Final Environmental Impact Statement). Naval Reactors assisted in the preparation of this report by making available for additional analysis the samples taken in 1991 which were discussed in the Draft Environmental Impact Statement. FUSRAP analyzed these samples for uranium isotopic composition as well as for cobalt-60 and, for a few samples, nickel-63. The FUSRAP report provides the most complete radiological description of the drainage brook currently available, and Naval Reactors has incorporated this description into Section 4.5.4.2 of the Final Environmental Impact Statement.

The commenter states that a past sample taken from the drainage brook by the Oak Ridge Institute for Science and Education (under contract with the Formerly Utilized Sites Remedial Action Program), which was analyzed specifically for all uranium isotopes, appears inconsistent with the results shown in the Draft Environmental Impact Statement. In the Draft Environmental Impact Statement, uranium results were reported based solely on gamma analysis for uranium-235. As discussed in Section 4.5.4.2 of the Draft Environmental Impact Statement, "The total uranium-234, uranium-235, and uranium-238 radioactivity concentration would be from twenty to forty-five times greater than the radioactivity concentration of uranium-235 alone, depending on the degree of enrichment. The enrichment of these samples is unknown since only uranium-235 was measured." Also, the Oak Ridge Institute result cited by the commenter is based on the analysis of a dried sample. The results shown in the Draft Environmental Impact Statement are based on the analysis of samples which have not been dried. Section 4.5.4.2 of the Draft Environmental Impact Statement states that drying the samples could increase the concentration of the samples by about a factor of four. Applying these two factors to the highest sample result reported in the Draft Environmental Impact Statement for samples located near the Oak Ridge Institute sample location, would place the sample results in the same order of magnitude as the Oak Ridge Institute 16,740 picocuries per gram result. Tables 4-1, 4-2 and 4-3 in the Final Environmental Impact Statement show that uranium concentrations at two adjacent sampling locations in the drainage brook sometimes differ by more than an order of magnitude. Thus, there is no significant discrepancy.

It should be noted that the Oak Ridge Institute sample referred to by the commenter was taken near trash piles and a partially buried barrel located on the drainage brook bank (Figures 4-2 and 4-3 of the Final Environmental Impact Statement). This trash pile area has even higher levels of uranium contamination (24,090 picocuries per gram), and the sample referred to by the commenter may have been affected by uranium in the trash piles.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

The commenter stated that the responsibility for the uranium in the drainage brook is uncertain, and that it is possible that this contamination could have come from either site. The different distributions of the uranium and cobalt-60 in the drainage brook samples clearly indicate that the uranium and cobalt-60 came from two different sources. The cobalt-60 is found throughout the entire length of the drainage brook and is found in the highest concentrations close to the Windsor Site outfall and upstream of the Combustion Engineering, Inc. site outfalls into the brook. This is consistent with the cobalt-60 (and nickel-63) originating from S1C Prototype reactor plant discharges. The high uranium concentrations are found at or downstream of the Combustion Engineering, Inc. site outfalls (and the nearby trash piles and partially buried barrel), which is consistent with the uranium originating from Combustion Engineering, Inc. Samples from upstream of the Combustion Engineering, Inc. site outfalls, but downstream of the S1C discharge point, have only natural background uranium concentrations.

In addition to the clear inference of this physical data, the S1C Prototype reactor plant only handled uranium in the form of high integrity, zirconium alloy clad nuclear fuel. Therefore, there was no dispersible uranium at the S1C Prototype reactor plant which could have been discharged. Combustion Engineering, Inc., on the other hand, manufactured uranium fuel. The Oak Ridge Institute report shows uranium contamination at several locations on the Combustion Engineering, Inc. site, and not just at the drainage brook.

The Department of Energy's Formerly Utilized Sites Remedial Action Program, which works on cleanup of sites associated with the Manhattan Project and early Atomic Energy Commission, has made a determination that it has authority to cleanup uranium contamination at the Combustion Engineering, Inc. site only if it is enriched above 20% in uranium-235. The uranium in the drainage brook includes both high enriched uranium (above 20%) and low enriched uranium. Therefore, the FUSRAP authority determination would only apply to a portion of the uranium contamination in the drainage brook.

Since the large majority of the radioactivity falls under FUSRAP authority or may be Combustion Engineering, Inc.'s responsibility (the drainage brook is on Combustion Engineering, Inc.'s property), and the regulatory process for addressing the radioactivity in the brook is still in its early phases, remediation of the brook is not being addressed within the scope of this Environmental Impact Statement process. Any action taken as a result of the National Environmental Policy Act decision making process for the disposal of the S1C Prototype reactor plant would not affect future evaluation of the drainage brook or any remedial action on the Combustion Engineering, Inc. site.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Comment 4.
The commenter is correct that the cited sentence is too definitive. The first sentence in the affected paragraph in Section 4.5.4.2 of the Draft Environmental Impact Statement, "On average, cobalt-60 concentrations are higher near the top layer of sediment," better represents the current level of knowledge regarding the vertical distribution of cobalt-60 in the drainage brook sediment. The sentence cited by the commenter has been removed. Future actions regarding characterization of the drainage brook will be performed as part of the Department of Energy's Formerly Utilized Sites Remedial Action Program evaluation of the Combustion Engineering, Inc. site adjacent to the Windsor Site.

Comment 5.
The statement does not imply that no site characterization survey should be performed. Section 5.1.5.1 of the Draft Environmental Impact Statement describes the radiological surveys that will be performed to release the Windsor Site for unrestricted use.

As described in Sections 2.1 and 4.2.1 of the Draft Environmental Impact Statement, the Windsor Site is a small 10.8-acre property that was almost entirely developed with paved areas and buildings since original construction in the late 1950s. Consequently, radioactive waste disposal on the Windsor Site was never practical.

The Windsor Site has generated and maintained detailed documentation of radioactive waste operations. Reports prepared annually since the beginning of Windsor Site operations describe the amount and disposition of radioactive waste that was generated at the Windsor Site. Each annual report states that radioactive waste was disposed of at an authorized radioactive waste disposal site. Copies of these reports have been provided to the State of Connecticut Department of Environmental Protection.

Extensive radiological survey records from Windsor Site operations provide a continuous data base that support radiological characterization of the Windsor Site. These records confirm that Naval Nuclear Propulsion Program radiological controls have effectively precluded significant environmental contamination, including radioactive waste disposal, at the Windsor Site. In addition to historical records, the State of Connecticut Department of Environmental Protection was provided with results of an aerial survey of the Windsor Site and surrounding environment. Aerial survey results demonstrated no evidence of unknown radiological conditions on or immediately adjacent to the Windsor Site. The results of this aerial survey have been added to Section 4.5.4 of the Final Environmental Impact Statement.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

The process described in Section 5.1.5.1 of the Draft Environmental Impact Statement will serve to verify whether the Windsor Site can be released from radiological controls in support of unrestricted future use.

Comment 6.
As discussed in Sections 3.1.2 and 5.1.13 of the Draft Environmental Impact Statement, any mixed waste that is generated at the Windsor Site is managed and disposed of within the framework of the Federal Facility Compliance Act. The requirements of this Act are implemented at the Windsor Site through a Site Treatment Plan. The Site Treatment Plan is enforced through a consent order issued by the Environmental Protection Agency - Region I. The Environmental Protection Agency must be notified within 30 days of identification of a delay in the availability of the planned treatment facilities. An alternate measures plan must be prepared and submitted to the Environmental Protection Agency and the State within 90 days of this initial notification. The State of Connecticut was fully involved in the development of this process which adequately provides for the timely treatment of mixed waste from the Windsor Site.

Comment 7.
Sections 4.3 and 4.4 of the Draft Environmental Impact Statement discuss the historical environmental monitoring program at the Windsor Site. Historical environmental monitoring for radioactivity has included sampling the drainage brook and Farmington River sediment, water in Goodwin Pond, the drainage brook, and the Farmington River, as well as sampling of fish from the Farmington River. In addition, radiation levels are monitored continuously at 12 perimeter locations and at off-site locations ranging from 4.1 to 17.5 miles off-site. Sample results have been provided to the State of Connecticut Department of Environmental Protection in annual reports (Reference 4-10 of the Draft Environmental Impact Statement). Since the Windsor Site was never used for disposal of solid radioactive waste, and since routine environmental monitoring has identified the effects, if any, from airborne and water pathways, there is no reason to suspect any unknown radiological conditions attributable to S1C operations in areas surrounding the Windsor Site. The results of an aerial survey of the Windsor Site, which has been added to Section 4.5.4 of the Final Environmental Impact Statement, demonstrated no evidence of unknown radiological conditions on or immediately adjacent to the Windsor Site. This will be confirmed through continued sampling under the Windsor Site environmental monitoring programs, plus the planned sampling of soil in adjacent areas as discussed in Section 5.1.5.1 of the Draft Environmental Impact Statement and in Appendix G which has been added to the Final Environmental Impact Statement.

**Commenter: Brian J. Emerick, Supervising Environmental Analyst,
State of Connecticut Department of Environmental Protection**

Comment Responses:

Comment 8.
As discussed in the response to State of Connecticut Department of Environmental Protection Comment 3, future actions regarding characterization of the drainage brook will be performed as part of the Department of Energy's Formerly Utilized Sites Remedial Action Program evaluation of the Combustion Engineering, Inc. site adjacent to the Windsor Site.

Comment 9.
As discussed in Sections 3.1.4 and 5.1.5 of the Draft Environmental Impact Statement, all Windsor Site systems will be removed. This includes the septic system and dry well. As appropriate, surveys of these systems and surrounding soil will be completed to allow unrestricted release of the Windsor Site as described in Sections 3.1.2, 3.1.4, 5.1.5, and 5.1.13 of the Draft Environmental Impact Statement. Additional information on the surveys planned for the Windsor Site is contained in Appendices F and G which have been added to the Final Environmental Impact Statement.

Comment 10.
Sections 3.1.4 and 5.1.5 of the Draft Environmental Impact Statement identify that "all Windsor Site systems would be completely removed including all process systems that are located below grade." The Environmental Impact Statement has been revised to delete the word "process" in the above sections to more clearly reflect the intention to remove all systems from the Windsor Site including all below grade systems. As appropriate, surveys will be performed on these systems and the surrounding soil as described in Sections 3.1.2, 3.1.4, 5.1.5 and 5.1.13 of the Draft Environmental Impact Statement.

As discussed in Section 3.1.4 of the Draft Environmental Impact Statement, there is one exception to the above expressed intention to remove all systems from the Windsor Site. That is the main water line into the Windsor Site, including the former pumphouse structure at the edge of the Site which now houses the termination of the main water line. Also, some structures or systems located on the easement around the Windsor Site will remain. These include the access road into the Windsor Site, storm drains associated with the access road, and the water, power and telephone lines into the Site. As discussed in Section 3.1.4, the municipal water supply piping would be left in a drained and laid-up condition, and the electrical service would be terminated. Leaving these systems in place could provide a benefit to a future property owner.

Comment 11.
As discussed in Section 3.1.4 of the Draft Environmental Impact Statement and the response to State of Connecticut Department of Environmental Protection Comment 10, Naval Reactors intends to completely remove industrial systems from the Windsor Site (and adjacent property where appropriate) regardless of system depth below grade except for a few systems which are being left in place which could provide a benefit to a future property owner.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Regarding building foundations, there is no law or regulation governing removal of building foundations. Demolition to four feet below grade is the same standard as was used for dismantlement of the Shippingport Atomic Power Station in Shippingport, Pennsylvania. Based on this standard, foundations for two buildings (6,200 square feet) and up to 370 linear feet of concrete trenches will remain on the Windsor Site. All of the foundations which remain on the Windsor Site would be completely emptied so that nothing but concrete shells remain. The foundations would then be backfilled with clean fill. The presence of benign subsurface concrete structures at the Windsor Site in small, limited areas would not encumber future possible uses of the property. For example, uses of the land surface, such as farming or gardening, would not be affected.

Comment 12.
As discussed in Section 5.1.5.1 of the Draft Environmental Impact Statement, in the unlikely event that radiological survey results indicated residual radioactivity exceeding the applicable release criteria, the area would be cleaned up and resurveyed. Any necessary radiological remediation and subsequent confirmatory surveys would be performed by Naval Reactors to support prompt release of the Windsor Site. Additional information on the final radiological release process, which would also include sampling of adjacent properties and water, can be found in Appendix G which has been added to the Final Environmental Impact Statement.

Comment 13.
As discussed in Sections 3.1.4 and 5.1.5.1 of the Draft Environmental Impact Statement and in the response to State of Connecticut Department of Environmental Protection Comments 1 and 18, the Windsor Site will be thoroughly surveyed and will meet the radiological release standards proposed in draft form by the Environmental Protection Agency. Additional information on this subject has been included in Sections 3.1.4 and 5.1.5.1 and in Appendix G of the Final Environmental Impact Statement.

The second half of this comment deals with aspects of the discussion of the drainage brook in the Draft Environmental Impact Statement. As discussed in the response to State of Connecticut Department of Environmental Protection Comment 3, the Draft Environmental Impact Statement did not specifically evaluate potential remediation of the drainage brook. The limited discussion of the drainage brook was focused on the cobalt-60 attributable to S1C Prototype reactor plant discharges. Naval Reactors agrees that future evaluation of the drainage brook should include a collective analysis of all radionuclides in the brook. The dose attributable to cobalt-60 was presented in Section 4.5.4.2 of the Draft Environmental Impact Statement in order to provide perspective on the levels of radioactivity in the drainage brook attributable to Windsor Site operations. The drainage brook is being evaluated outside of this Environmental Impact Statement process as discussed in the response to State of Connecticut Department of Environmental Protection Comment 3.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Comment 14.
As discussed in Section 4.3.3 of the Draft Environmental Impact Statement, water sampling of the drainage brook, Goodwin Pond, and the Farmington River for radioactivity has been routinely conducted as part of the Windsor Site environmental monitoring program (Reference 4-10) which will continue through the release of the Windsor Site. No radioactivity associated with Windsor Site activities has been detected in the water samples. Additional information on the final radiological release process, which would include sampling of ground water, is provided in Appendix G which has been added to the Final Environmental Impact Statement.

Comment 15.
Section 5.1.10.2 of the Draft Environmental Impact Statement identifies that an estimated 23 radioactive material shipments would be made. These shipments would take place after reactor plant dismantlement begins. Appendix C of the Draft Environmental Impact Statement indicates that the 23 radioactive material shipments would consist of 4 shipments of major components by rail and truck and 19 miscellaneous component shipments by truck. The miscellaneous component shipments would include miscellaneous components and other miscellaneous radioactive wastes such as building materials. Sections 5.1.10.2 and 5.1.13, and Appendix C have been revised in the Final Environmental Impact Statement to clarify the content of these miscellaneous shipments. The discussions on nonradioactive material shipments in Section 5.1.10.2 and Appendix C of the Draft Environmental Impact Statement focused on shipments of nonradioactive waste generated during dismantlement of the S1C Prototype reactor plant. Discussions on shipments of nonradioactive waste have been revised in the Final Environmental Impact Statement to include shipments of nonradioactive waste generated as part of Windsor Site restoration activities and to include incoming shipments of materials such as fill and topsoil.

Comment 16.
Sections 3.1.1 and B.1.3.5 of the Draft Environmental Impact Statement describe some of the measures taken to protect personnel, prevent the spread of radiological or hazardous materials, and mitigate the consequences of an accident. The measures are only a part of the comprehensive practices, procedures, and oversight traditionally employed by the Naval Nuclear Propulsion Program to ensure the safe conduct of work. These Naval Nuclear Propulsion Program measures have proven themselves in the successful operation of five Department of Energy facilities and six Naval Shipyards which have performed Naval Nuclear Propulsion Program work over the years (including the recent closure and release of the Naval Shipyards at Mare Island, California and Charleston, South Carolina).

Not withstanding this record, the accident analyses described in Appendices B and C of the Draft Environmental Impact Statement took no credit for preventative or mitigative measures. Thus, these analyses provide very conservative results. Even with these conservatisms, the results showed that there are no significant adverse impacts from any of the alternatives.

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

Comment 17.

Alpha, beta, gamma and x-ray emitters were included in the analyses of normal operations and accidents presented in the Environmental Impact Statement. Section 2.3 of the Draft Environmental Impact Statement provides a radiological characterization of the S1C Prototype reactor plant. Table 2-1 in the Draft Environmental Impact Statement lists the estimated radionuclide inventory, in curies, that is expected in the defueled reactor plant at four years and at thirty-four years after reactor shutdown. Table 2-1 clearly identifies that radionuclides emitting alpha, beta, gamma and x-ray radiation are expected to be present. All radionuclides listed were used in analyses of normal operations and facility and transportation accidents. Tables in Appendix B and Appendix C of the Draft Environmental Impact Statement list the source terms of radioactivity discharged in curies per year for normal operation (for example, see Table B-5) or in curies per accident (for example, see Section B.3.1.2) for hypothetical accident situations. Small changes to some of the numbers in these curie content tables have been made in the Final Environmental Impact Statement to reflect updated information on the curie content of the S1C Prototype reactor plant. These small changes caused small changes to be made to several other tables in the appendices. In addition, Appendix C, Table C-5 has been clarified in the Final Environmental Impact Statement to show all of the default and actual values used in the RADTRAN 4 computer program which was used in the transportation analysis.

Comments 18 and 19.

Sections 4.5.4 and 4.5.5 of the Draft Environmental Impact Statement discuss the minor environmental concerns which exist at the Windsor Site, the plans for addressing those concerns, and the plans for ensuring there are no unidentified concerns which require attention prior to release of the Site. A summary of the characterization and release processes and additional updated information are provided in Appendix F and Appendix G of the Final Environmental Impact Statement. There are no known conditions or concerns which would substantially impact implementation of any of the identified alternatives. More detailed work plans for addressing the environmental concerns (for example, the radiological survey plan and the voluntary facility assessment sampling plan) have been and will continue to be provided to the State for comment.

Comment 20.

Section 2.5.1 of the Draft Environmental Impact Statement discusses Federal environmental statutes and regulations which apply to the Windsor Site. This section has been revised in the Final Environmental Impact Statement to clarify that the State authorities discussed in that section are for the enforcement of Federal statutes and regulations. The comment correctly

Commenter: Brian J. Emerick, Supervising Environmental Analyst, State of Connecticut Department of Environmental Protection

Comment Responses:

notes that Section 116 of the Clean Air Act provides for concurrent State regulation of air pollutants. Section 2.5.5 of the Draft Environmental Impact Statement discussed State of Connecticut air pollution statutes and regulations which apply to the Windsor Site and operate concurrently with the Federal requirements. These State statutes and regulations do not currently contain specific limits on radionuclide emissions. The Resource Conservation and Recovery Act permit issued by the State in June 1996 for the Windsor Site does contain provisions that limit radionuclide emissions to air as indicated in the comment. Although the Department of Energy complies with the requirements of these provisions, it is not clear that these are valid provisions for a Resource Conservation and Recovery Act permit.

Comment 21.
The comment of the State of Connecticut Department of Environmental Protection is acknowledged. Naval Reactors intends to pursue renewal of the existing Resource Conservation and Recovery Act permit as required. The expiration date for the current permit is June 7, 2001. However, under the preferred prompt dismantlement alternative, it may not be necessary to renew the permit. Naval Reactors understands that the storage permit for the Resource Conservation and Recovery Act hazardous waste and radioactive mixed waste storage building is for on-site generated wastes only and contains a maximum waste storage capacity. There is no intention to accept hazardous wastes or radioactive mixed wastes from other sites and store them at the Windsor Site.

Comment 22.
The comment of the State of Connecticut Department of Environmental Protection is acknowledged. Naval Reactors is aware of the State of Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters From Construction Activities which requires activities that result in the disturbance of more than five acres to obtain a general stormwater permit. It is anticipated that excavation activities associated with the removal of below grade systems may disturb more than five acres. Consistent with the comment, Naval Reactors will work with the Bureau of Water Management to obtain this general stormwater permit at the appropriate time, before commencing excavation work which disturbs more than five acres. Sections 5.1.3.2 and 5.2.3.2 have been revised in the Final Environmental Impact Statement to include this permit in the discussion.

Comment 23.
The comment of the State of Connecticut Department of Environmental Protection is acknowledged. Section 2.5.5 of the Draft Environmental Impact Statement identifies that one of the State of Connecticut laws applicable to Windsor Site activities is the Property Transfer Program. As indicated in the State's comment, Naval Reactors personnel have already met with State staff, including State personnel cognizant of property transfer, and with Environmental Protection Agency Region I personnel to discuss this program. Naval Reactors has also taken actions to involve the State in the development of the voluntary facility assessment to avoid unnecessary duplication of effort in this area. Naval Reactors intends to continue such interactions to remain current with the requirements of this program.

STATE OF CONNECTICUT

CONNECTICUT HISTORICAL COMMISSION

August 8, 1996

Mr. Chris Overton
Windsor Field Office
Office of Naval Reactors
U.S. Department of Energy
PO Box 393
Windsor, CT 06095

Subject: Knolls Atomic Power Laboratory
Windsor, CT

Dear Mr. Overton:

The State Historic Preservation Office understands that the U.S. Department of Energy has released an Environmental Impact Statement regarding the proposed disposition of the above-noted facility (*Hartford Courant*, August 6, 1996). This office respectfully requests a review copy of this document in order that cultural resources may be properly evaluated and considered as part of the federal decision-making process for this property. In particular, we note that federal agencies are required to consult with our professional staff vis-a-vis the National Historic Preservation Act of 1966 and the National Environmental Policy Act. Both laws mandate coordination with the respective State Historic Preservation Office and the Advisory Council on Historic Preservation.

The State Historic Preservation Office looks forward to receiving the Environmental Impact Statement from the U.S. Department of Energy in the near future in order that we might provide timely guidance regarding the state's historic, architectural, and archaeological heritage.

For further information please contact Dr. David A. Poirier, Staff Archaeologist.

Sincerely,

Dawn Maddox
Deputy State Historic
Preservation Officer

cc: Mr. Don Klima/ACHP

TEL: (203) 566-3005 *FAX: (203)566-5078*
59 SOUTH PROSPECT ST. - HARTFORD, CONN. 06106 - 1901
AN EQUAL OPPORTUNITY EMPLOYER

THIS PAGE IS INTENTIONALLY BLANK

DEPARTMENT OF ENERGY
Schenectady Naval Reactors Office
Windsor Field Office
P.O. Box 393
Windsor, Connecticut 06095

SNR/WFO O#96-042
August 20, 1996

Ms. Dawn Maddox
Deputy State Historic Preservation Officer
Connecticut Historical Commission
State of Connecticut
59 South Prospect Street
Hartford, CT 06106-1901

Dear Madam,

As you requested in your letter to me dated August 8, 1996, I had delivered to your office on August 14, 1996, a copy of the Department of Energy (DOE) Office of Naval Reactors' Draft Environmental Impact Statement (EIS) for disposal of the S1C Prototype reactor plant located in Windsor, Connecticut.

Your letter also noted the consultation requirements of the National Historic Preservation Act of 1966 and the National Environmental Policy Act. As confirmed by your letter of July 19, 1995 (copy attached), your office was unaware of any areas of historic significance at or in proximity to the Knolls Atomic Power Laboratory site that predate site construction in 1957. However, your attached letter also noted that the prototype training facility might be of historic importance in the application of nuclear power to submarine technology.

The DOE Office of Naval Reactors does not consider the S1C Prototype Plant to be historically significant. The S1C Prototype Plant was the fifth of eight land based prototype plants built and operated by the Office of Naval Reactors, so S1C is not significant as being the first such plant. S1C was the prototype for a single U. S. Navy submarine, USS TULLIBEE, which has been decommissioned and disposed of. Thus, S1C is not historically significant as the prototype of a large class of Naval vessels. The training and research and development missions which the S1C Prototype Plant supported for over 30 years, while important for the national defense, were not unique compared to the other prototype plants. For these reasons, the Office of Naval Reactors stated on page 4-20 of the Draft EIS that the S1C Prototype Plant does not have historical significance to Naval or commercial nuclear power.

The Office of Naval Reactors held a public hearing at the Windsor Town Hall on August 7, 1996, to receive public comment on the Draft EIS. The stated preference of the large majority of speakers was for the prompt dismantlement alternative. None of the speakers indicated that the S1C Prototype Plant was of any historical significance.

Finally, I should note that the Office of Naval Reactors maintains a large amount of technical information and documentation for all of its reactor plants, both at land based

prototypes and in U. S. Navy ships. We intend to hold such information concerning the S1C Prototype in Federal archives indefinitely. Information such as this on earlier prototypes was used by historians in preparing the two official histories of the Naval Nuclear Propulsion Program, Nuclear Navy 1946-1962 by Richard G. Hewlett and Francis Duncan (University of Chicago Press, 1974) and Rickover and the Nuclear Navy - The Discipline of Technology by Francis Duncan (Naval Institute Press, 1990). Additionally, the EIS also provides a public record of the existence of this prototype plant and the plans for its disposal. Thus, considerable information about the S1C Prototype Plant will remain available in the future, protected in accordance with applicable statutory and other Federal restrictions.

I trust that the foregoing resolves any questions you have on the historic significance of the S1C Prototype Plant. If you have any further questions related to the S1C Prototype Plant, please call me at 860-687-5610.

Sincerely,

C. G. OVERTON
Chief, Windsor Field Office
Naval Reactors

Attachment: As Stated

cc: Dr. David A. Poirier
Staff Archaeologist
Connecticut Historical Commission
State of Connecticut
59 South Prospect Street
Hartford, CT 06106-1901

STATE OF CONNECTICUT

STATE BOARD OF EDUCATION

CONNECTICUT HISTORICAL COMMISSION

September 4, 1996

Mr. C. G. Overton
Department of Energy
Schenectady Naval Reactors Office
PO Box 393
Windsor, CT 06095

Subject: S1C Prototype Reactor Plant Disposal
Windsor, CT

Dear Mr. Overton:

The State Historic Preservation Office has reviewed the *Draft Environmental Impact Statement* prepared by the U.S. Department of Energy Office of Naval Reactors regarding the above-named project. This office believes that the document does not comprehensively address cultural resources issues pursuant to either the National Environmental Policy Act or the National Historic Preservation Act of 1966.

In particular, the State Historic Preservation Office believes that the S1C Prototype Reactor Plant is a significant aspect of Cold War history and the application of nuclear power to submarine technology. This office also believes that this facility is eligible for the National Register of Historic Places. Although not the first or unique, the S1C Prototype Reactor Plant appears representative of a rare engineering and training facility with respect to naval-related nuclear power. 1

The State Historic Preservation Office concurs with the Department of Energy's assessment that no feasible or prudent alternative exists which would provide for rehabilitation or reuse of the extant facility. This office offers no objection to the proposed remediation and dismantlement of the S1C Prototype Reactor Plant.

However, the State Historic Preservation Office recommends that the Department of Energy consult with the Advisory Council on Historic Preservation concerning Section 106 of the National Historic Preservation Act of 1966. In particular, this office recommends that a Memorandum of Agreement be drafted which provides for adequate mitigation of project-related impacts upon the historic and engineering integrity of this important research and development complex. We strongly encourage that the following stipulations be incorporated in the proposed Memorandum of Agreement: 1

1. Prior to dismantlement of the S1C Prototype Reactor Plant, the Department of Energy shall contact the Historic American Engineering Record to determine what level and kind of documentation is required for the property. Unless otherwise agreed to by the National Park Service, the Department of Energy shall ensure that all documentation is completed

TEL: (203) 566-3005
59 SOUTH PROSPECT ST. — HARTFORD, CONN. 06106

and accepted by HAER prior to dismantlement or demolition. Copies of the final documentation shall be provided to both HAER and the Connecticut State Historic Preservation Office.

2. The Department of Energy shall develop, in coordination with the State Historic Preservation Office, a public education component , including but not limited to interpretative materials, slide lectures, and popular reports which focus upon the historic significance of the S1C prototype plants. The Department of Energy shall consult with the *USS Nautilus* Museum regarding development of possible interpretative materials or educational handouts which describe the naval nuclear power application of S1C research and training programs. 1

3. The Department of Energy shall consult with the National Archives and the Historical Manuscripts and Archives at the University of Connecticut (Storrs) regarding possible disposition of S1C Prototype Reactor Plant design plans, construction drawings, and other written documents related to the Windsor, Connecticut, facility.

This office looks forward to working with the Department of Energy Schenectady Naval Reactors Office in the expeditious furtherance of the proposed undertaking as well as the professional management of the nation's cultural heritage.

For further assistance please contact Dr. David A. Poirier, Staff Archaeologist.

Sincerely,

Dawn Maddox
Deputy State Historic
Preservation Officer

cc: Mr. Don Klima/ACHP

DEPARTMENT OF ENERGY
Schenectady Naval Reactors Office
Windsor Field Office
P.O. Box 393
Windsor, Connecticut 06095

SNR/WFO O#96-050
September 17, 1996

Mr. John W. Shannahan
State Historic Preservation Officer
Connecticut Historical Commission
State of Connecticut
59 South Prospect Street
Hartford, CT 06106-1901

Dear Mr. Shannahan,

I want to express my appreciation for the time you and Dr. David Poirier of the State Historical Preservation Office spent with me and other personnel representing Naval Reactors on September 13, 1996. At the meeting, Naval Reactors provided the State Historical Preservation Office an overview of the Naval Nuclear Propulsion Program in general, and the Windsor Site in particular. The meeting enabled the State Historical Preservation Office and Naval Reactors to reach agreement on an appropriate course of action to resolve the State Historical Preservation Office comments on our Draft Environmental Impact Statement for Disposal of the S1C Prototype Reactor Plant.

Naval Reactors provided to the State Historical Preservation Office various publicly releasable documents which characterize the Windsor Site's significance and place in the Naval Nuclear Propulsion Program. We understand these documents will be submitted by the State Historical Preservation Office to the Archives and Special Collections Library at the University of Connecticut (Storrs). You and Dr. Poirier further informed us that, considering the classified nature of most of the documentation regarding site activities, these unclassified documents would satisfy the State Historical Preservation Office's desire to maintain records related to the history and operation of the S1C Prototype facility in Windsor. Dr. Poirier indicated this satisfied items one and two of the Connecticut Historical Commissions' September 4, 1996 letter.

With regard to item three of the Connecticut Historical Commissions' letter, the attached Memorandum of Agreement has been prepared for signature by the Department of Energy and the State of Connecticut for submission to the Advisory Council on Historic Preservation.

Once again, Naval Reactors appreciates the cooperation of the State Historical Preservation Office. If I can be of further assistance, please call me at (860) 687-5610.

C. G. OVERTON
Chief, Windsor Field Office
Naval Reactors

Attachment: As Stated

DEPARTMENT OF ENERGY
Schenectady Naval Reactors Office
Windsor Field Office
P.O. Box 393
Windsor, Connecticut 06095

SNR/WFO O#96-052
September 19, 1996

Mr. Don L. Klima
Director, Eastern Office of Review
Advisory Council on Historic Preservation
The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, D.C. 20004

Dear Mr. Klima,

Attached for acceptance by the Advisory Council on Historic Preservation is a Memorandum of Agreement signed by the Department of Energy Office of Naval Reactors and the Connecticut State Historic Preservation Officer.

The S1C Prototype reactor plant, in Windsor, Connecticut, was operated by Naval Reactors from 1959 to 1993 when it was permanently shut down. Enclosure (1) to this letter is the Draft Environmental Impact Statement for disposal of the S1C Prototype reactor plant. Enclosures (2) and (3) to this letter are the comments received from the Connecticut State Historic Preservation Office on the Draft Environmental Impact Statement and the Naval Reactors resolution of those comments, respectively.

Naval Reactors appreciates the cooperation of the Advisory Council on Historic Preservation in accepting the attached Memorandum of Agreement. It is appropriate to include a copy of the accepted Memorandum of Agreement in the Final Environmental Impact Statement. Therefore, we would appreciate your action on this Memorandum of Agreement by October 25, 1996, to support our schedule to complete our Environmental Impact Statement. If I can be of further assistance, please call me at (860) 687-5610.

C. G. OVERTON
Chief, Windsor Field Office
Naval Reactors

Attachment and Enclosures: As Stated

cc: (without Attachment and Enclosures)
Dr. David A. Poirier
Connecticut State Historic Preservation Office
Connecticut Historical Commission
59 South Prospect Street
Hartford, CT 06106-1901

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

SEP 27 1996

Mr. Chris Overton
U.S. Department of Energy
Windsor Field Office
Naval Reactors
P.O. Box 393
Windsor, CT 06095

REF: S1C Prototype Reactor Facility, Windsor, Connecticut

Dear Mr. Overton:

Enclosed is your copy of the executed Memorandum of Agreement for the referenced project. By carrying out the terms of the Agreement, you will have fulfilled your responsibilities under Section 106 of the National Historic Preservation Act and the Council's regulations. A copy of the Agreement has also been sent to the Connecticut State Historic Preservation Officer.

We appreciate your cooperation in reaching this Agreement.

Sincerely,

[redacted]. Klima
Director
Eastern Office of Review

Enclosure

MEMORANDUM OF AGREEMENT
SUBMITTED TO THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
PURSUANT TO 36 CFR 800.6(a)

WHEREAS, the Department of Energy has determined that any dismantlement of the S1C Prototype reactor plant will have an effect upon the Windsor Site, a property that may be considered eligible for the National Register of Historic Places, and has consulted with the Connecticut State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f);

WHEREAS, the Connecticut SHPO has agreed that remediation and dismantlement of the S1C Prototype reactor plant is an acceptable course of action and that the appropriate historical record should be maintained in documentary form;

WHEREAS, there is an extensive historical record regarding the Naval Nuclear Propulsion Program in Program reports, Congressional testimony, various texts, and other documentation;

NOW, THEREFORE, the Department of Energy and the Connecticut SHPO agree that the undertaking shall be implemented in accordance with the following stipulation in order to take into account the effect of the undertaking on historic properties.

Stipulation.

The Department of Energy will ensure that the following measures will be carried out.

Records and documentation regarding the construction and operation of the prototype facility including pertinent training and operation manuals and construction drawings will be maintained and preserved in accordance with applicable Federal regulations governing the maintenance of such records.

The Department of Energy shall provide the Connecticut SHPO with unclassified photographs from existing files which document the construction and physical appearance of the S1C Prototype facility in Windsor, Connecticut over its period of existence.

Execution of this Memorandum of Agreement by the Department of Energy and the Connecticut SHPO, its subsequent acceptance by the Council, and implementation of its terms, evidence that the Department of Energy has afforded the Council an opportunity to comment on the dismantlement of the S1C Prototype reactor plant and its effects on historic properties, and that the Department of Energy has taken into account the effects of the undertaking on historic properties.

DEPARTMENT OF ENERGY:

By: C G Overton Date: 9/17/96

C. G. Overton
Chief, Windsor Field Office
Naval Reactors

CONNECTICUT HISTORIC PRESERVATION OFFICE:

By: Date: 9/17/96

John W. Shannahan
Historic Preservation Officer
State of Connecticut

ADVISORY COUNCIL ON HISTORIC PRESERVATION:

By: Robert D. Bush Date: 9/17/96

Robert D. Bush
Executive Director

Commenter: Dawn Maddox, Deputy State Historic Preservation Officer, State of Connecticut Historical Commission

Comment Response:

Comment 1.

The concerns identified in the State of Connecticut Historical Commission letter have been addressed by Naval Reactors, the State of Connecticut, and the Advisory Council on Historic Preservation in the correspondence included in this appendix and by issuance of a Memorandum of Agreement, a copy of which is also included in this appendix. The memorandum identifies the measures that will be carried out to maintain a historical record of the prototype facility. Sections 4.7, 5.1.7 and 5.2.7 have been revised in the Final Environmental Impact Statement to reflect execution of the Memorandum of Agreement by the Department of Energy and the State of Connecticut, and its acceptance by the Advisory Council on Historic Preservation.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

August 19, 1996

OFFICE OF THE
REGIONAL ADMINISTRATOR

Mr. Christopher G. Overton, Chief
Windsor Field Office, Office of Naval Reactors
U.S. Department of Energy
PO Box 393
Windsor, Connecticut 06095

Dear Mr. Overton:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, we have reviewed the U.S. Department of Energy's (DOE'S) Draft Environmental Impact Statement (DEIS) for the proposed disposal of the S1C Prototype reactor plant, located in Windsor, Connecticut.

According to the DEIS, the S1C Prototype reactor plant, located at the Knolls Atomic Power Laboratory Windsor Site in Windsor, Connecticut, was permanently shut down in March 1993 as a result of the end of the Cold War and the projected downsizing of the U.S. Naval fleet. All spent nuclear fuel was removed from the reactor and shipped off-site (DEIS, p. S-1). The purpose of this EIS is to evaluate alternative disposal options for the 10.8-acre facility.

The DEIS evaluates three disposal options for the reactor plant: prompt dismantlement and disposal, deferred dismantlement and disposal, and a No Action alternative. Under the prompt dismantlement alternative, dismantlement of the reactor plant would begin immediately and release of the property would occur once any necessary investigation and cleanup of the site has been completed. Under the deferred dismantlement alternative, dismantlement of the reactor plant would be postponed for 30 years to allow for radioactive decay to occur at the site, followed by release of the property. Under No Action, the reactor plant would remain in a protected condition for an indefinite period of time. The DEIS concludes that all of these alternatives present a comparably very low level of risk to human health and that no adverse environmental affects will result from whichever alternative is chosen.

Based on our review of the DEIS, we believe that additional information should be provided to more fully disclose environmental conditions at the Windsor site and to evaluate the potential future disposition of this facility. In particular, we recommend that final EIS characterize the levels of contamination at the Windsor site, the type of contamination that exists (e.g., non-radioactive contamination), and what measures would be necessary for cleanup. In addition, we believe the final EIS should more fully address potential reuse options for the site, at least in general terms, 1

what the target levels for cleanup would be based on potential reuse, and whether there is community support for these potential uses of the site. 1

We are aware, as the DEIS indicates, that DOE intends to conduct a voluntary facility assessment that would address some of these issues. Given, however, that the purpose and need for this project is the disposal of the Windsor site property for future reuse, the EIS should address these issues so that adequate opportunity for public review and comment is provided under NEPA prior to DOE's decision on how to proceed. 2

Based on our review, we have rated this DEIS "EC-2" (Environmental Concerns-Insufficient Information) in accordance with our national rating system. An explanation of this rating is attached for your information.

Please feel free to call me (617/565-3400) or Patience Whitten of my staff (617/565-3413) if you have any questions or comments.

Sincerely,

John P. DeVillars
Regional Administrator

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION

Environmental Impact of the Action

LO–Lack of Objections
The EPA review has not identified any potential environmental impacts recurring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC–Environmental Concerns
The EPA review has identified environmental impact that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO–Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU–Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this potential will be recommended for referral to the CEQ.

Adequacy of the Impact statement

Category 1–Adequate
EPA believes that draft EIS adequately sets forth the environmental impact(s) of the preferred alternatives and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2–Insufficient Information
The draft EIS does not contain sufficient information for EPA to full assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyzes or discussion should be included in the final EIS.

Category 3–Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussion are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purpose of the NEPS and or/ Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEO.

**Commenter: John P. DeVillars, Regional Administrator,
United States Environmental Protection Agency - Region I**

Comment Responses:

Comments 1 and 2.
Sections 4.5.4 and 4.5.5 of the Draft Environmental Impact Statement discuss the minor environmental concerns which exist at the Windsor Site, the plans for addressing those concerns, and the plans for ensuring there are no unidentified concerns which require attention prior to unrestricted release of the Site. Broad support for the objective of unrestricted release of the Windsor Site was evident from the comments received during the public comment period. A summary of the release processes and additional updated information are provided in Appendix F and Appendix G which have been added to the Final Environmental Impact Statement. There are no known conditions or concerns which would substantially impact implementation of any of the identified alternatives. More detailed work plans for addressing the environmental concerns (for example, the voluntary facility assessment sampling plan) have been and will continue to be provided to the Environmental Protection Agency and the State of Connecticut Department of Environmental Protection for comment.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue - Room 142
Boston, Massachusetts 02210-3334

August 16, 1996

(ER96-456)

Mr. Christopher G. Overton, Chief
Windsor Field Office, Office of Naval Reactors
U.S. Dept. of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton:

This responds to your request for comments on the Draft Environmental Impact Statement for the disposal of the S1C Prototype Reactor Plant, in Windsor, Connecticut.

The document accurately indicates that there are few ecological resources on the site, itself, due to its highly developed nature. The document also indicates that the 3600-foot long drainage brook that carries stormwater from the site, and which received permitted discharges of cooling water, is classified as suitable for fish and wildlife habitat, as is the Farmington River, which receives flow from the drainage brook. The Department of Energy conducted comprehensive radiological sediment sampling of the drainage brook, including its confluence with the Farmington River, and monitored fish in the Farmington River for radiological residues attributable to the Reactor Site. DoE is voluntarily conducting additional sediment sampling of the drainage brook for chromate compounds that were released to the brook in its cooling water discharges.

We recommend that the Final EIS incorporate the findings of the voluntary assessment of chromate compounds in brook sediments, and that the assessment include investigation and documentation of the potential effects of other compounds released to the brook in cooling water, including copper, lead and zinc. 1

We also believe that the FEIS would be strengthened by including a discussion of the potential effects of the radioactive compounds in sediments and water of the discharge brook on the brook's biota. Although the document indicates that no fish in the Farmington River had tissue levels of radioactive compounds attributable to the Reactor Site, there is no indication if biota of the drainage brook either accumulated radioactive materials, or were adversely affected by their presence in sediments or water. 2

Mr. Christopher G. Overton, Chief

Similarly, the DEIS discusses the relative exposure and health risks of hypothetical human users of the Site, but neglects to assess the potential impacts to likely ecological receptors at the Site and in the drainage brook. We note that DoE has initiated a voluntary facility assessment that will involve collection and assessment of additional soil, sediment and water samples. It is likely that these data can provide much of the information needed to enhance the assessments we have recommended. 3

Thank you for the opportunity to review the DEIS. Please contact me at (617) 223-8565, if you have any questions regarding this letter.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

Commenter: Andrew L. Raddant, Regional Environmental Officer, United States Department of the Interior

Comment Responses:

Comment 1.
As discussed in Section 4.5.5.2 of the Draft Environmental Impact Statement, the Voluntary Facility Assessment Program will include further investigation of the drainage brook sediment. Sediment samples will be collected and analyzed for the inorganics identified in Appendix F, Target Parameters List C. This list includes copper, lead and zinc. A report containing a description of the sampling and analytical results and environmental setting characterization will be provided to the Environmental Protection Agency and the State of Connecticut Department of Environmental Protection. Naval Reactors will meet with both regulatory agencies to review report findings.

Comment 2.
As discussed in the response to State of Connecticut Department of Environmental Protection Comment 3, the Draft Environmental Impact Statement did not specifically evaluate potential remediation of the drainage brook. The limited discussion of the drainage brook was focused on the cobalt-60 attributable to S1C Prototype reactor plant discharges. A complete evaluation of the drainage brook will need to be performed as part of the overall evaluation of the brook and the rest of the Combustion Engineering, Inc. site.

Comment 3.
As discussed in Section 5.1.2 of the Draft Environmental Impact Statement, there are virtually no ecological resources currently on the Windsor Site property since the Site is small and mostly developed. The radiological release criteria that will be used for release of the Windsor Site, as discussed in Section 5.1.5.1 of the Draft Environmental Impact Statement and in the response to State of Connecticut Department of Environmental Protection Comment 1, are sufficiently stringent that any remaining radioactivity would be well within the variations in natural background radioactivity. Thus, after Windsor Site release, no appreciable health risk would remain for either human or nonhuman occupants of the Site, and the Site would be suitable for unrestricted use (for example, farming). If no use of the Windsor Site were to follow the cleanup, natural reforestation would be expected to occur. This represents at worst no change and most likely an improvement in the local ecological resources. Further detailed analysis is not considered necessary.

THIS PAGE IS INTENTIONALLY BLANK

ABB
ASEA BROWN BOVERI

August 19, 1996

Mr. C. G. Overton
Chief, Windsor Field Office
Department of Energy
P. O. Box 393
Windsor, Connecticut 06095

Subject: Draft Environmental Impact Statement - S1C Prototype Reactor Plant Disposal

Reference: (A) Letter, C. G. Overton (DOE) to Jack C. Moulton (CE), dated June 24, 1996

Dear Mr. Overton:

Reference (A) invited comments on the content of the Subject Draft Environmental Impact Statement. CE has prepared comments and questions to the Subject document and has included them as Enclosure I to this letter.

We appreciate the opportunity to comment on this important document and sincerely hope that our input is of assistance to a successful project. If there are any questions or comments regarding this matter, please feel free to contact me or Mr. Robert Sheeran at (860) 285-5021.

Very truly yours,
COMBUSTION ENGINEERING, INC.

John F. Conant
Sr. Project Manager

Enclosure

JFC:bwf

siceis.doc

ENCLOSURE I

COMMENTS APPLICABLE TO:
DRAFT EIS - S1C PROTOTYPE REACTOR PLANT DISPOSAL

1. Page S-4: Table S-1 notes 19 radioactive shipments for miscellaneous components and 4 radioactive shipments for major components. No shipments are included for soils, radioactive trash, and other radioactive debris. From this omission and other omissions throughout the report, one might infer that costs have not been allocated for radiological environmental cleanup.

2. Page S-4: Table S-1 does not include public risk from residual radioactive material left on and adjacent to the Windsor Site.

3. Page 2-9, Subsection 2.4: What welding materials were previously employed in the operation? What "impurities," specifically are contained within the lead in the S1C prototype plant? What hazardous materials were used at the plant? What quantities of hazardous materials were used at the plant? Were any solvents used (e.g., PCE, TCE, Acetone, etc.)? What water treatment chemicals were used? What biocides were used? What has been the historical hazardous waste generation (i.e., generator status)? Does zirconium exist in any form on the Site? What are the historical quantities of PCB containing materials? What is the quantity of asbestos containing materials, friable vs. non-friable? Were there any Connecticut regulated materials used (e.g., fuel oils, etc)? Do any underground or above ground storage tanks exist on Site? If underground or above ground storage tanks do exist, what is their respective capacity and what type(s) of material did they hold?

4. Page 2-10, Section 2.5.1: Federal Environmental Statute and Regulations, does not include Title 42 USC, 300, et. seq., Safe Drinking Water Act.

5. Pages 2-10 through 2-15: With regard to the "Applicable Regulatory Considerations" included on the noted pages, will the most stringent remediation criteria be selected from all of the regulations noted and used to release the S1C Site, including its environs? Will NRC and EPA Regulations be used as the basis for the eventual free release of the S1C Site? Will the CT Remediation Standard Regulations (RSR) for a GA area be complied with?

6. Page 3-1: With regard to the dismantlement operation (where grinding, sawing, flame cutting, plasma arc cutting, etc. are used) please explain the type(s) of emission monitoring that will be conducted both on/off the S1C Site. If emission monitoring is planned both on and offsite, where and what type of monitoring equipment will be installed? What are the types of constituents that will be monitored for? What applicable regulatory requirements will be used to judge the adequacy of the imposed monitoring program both to workers on Site and the public at large?

7. Page 3-4, Section 3.1.4: Windsor Site Restoration and Disposition of Property, notes that characterization is required for the Windsor Site. However, no mention is made of performing characterization and release of areas adjacent to the Site or bodies of water potentially affected by the Site.

8. Page 3-4: Line 23 notes that "The access roadway leading to the U.S Government owned property will be left intact." Will characterization and remediation of this road be done in order to declare it to be free of all contaminants from prior operations?

9. Pages 3-4 and 3-5: Will underground lines of all types be excavated and removed from the S1C Site? To what extent will this piping be surveyed to guarantee that it is not contaminated with any contaminants? Will any piping be left underground? If yes, why? If the piping goes beyond the S1C Site boundary, what action will be taken with regard to removal of this piping? How far will the removal of such piping extend beyond the S1C Site boundary? How does this apply to Site drainage lines, both covered and uncovered on the Site and the Site access road?

10. Pages 3-4 and 3-5: Will the release criteria for the S1C Site and materials released from the S1C Site meet NRC/EPA criteria as well as the DOE criteria? If not, why not?

11. Page 3-5: Line 1 states that "A final radiological survey of the Windsor Site would be performed ..." Who will prepare the survey plan? What regulations will be used as the basis to prepare the survey plan? Will the plan be reviewed by an independent agency(s) for completeness and compliance with selected regulations (e.g., the NRC or the EPA)? Who will approve the plan and QA the sampling and statistical analysis features of the plan?

12. Page 3-5: Line 5 states "...Order 5400.5 ..." This order is not in agreement with the current NRC/EPA guidelines as they relate to the free release of sites that have been decommissioned for unrestricted use. Please comment.

13. Page 3-6, Section 3.2.1: Caretaking Period Operations, does not require implementation of an environmental monitoring program, other than air, for the caretaking period. Please provide clarification.

14. Page 3-7, Section 3.2.3: Windsor Site Restoration and Disposition of the Property, addresses the voluntary facility assessment for soil within or adjacent to the Windsor Site. However, no mention is made of performing characterization and release of bodies of water potentially affected by the site. In addition, no mention is made of performing radiological characterization and release of areas adjacent to the site or bodies of water potentially affected by the site. Please provide clarification.

15. Page 3-8, Section 3.3: No Action Alternative. There are no provisions to characterize and release areas and bodies of water outside of the Windsor Site fence. Also, it does not require implementation of an environmental monitoring program, other than air, for the indefinite delay period. Please provide clarification.

16. Page 4-1, Line 14 states "The Windsor Site property and the surrounding Asea Brown Boveri, Inc. property..." Please note that Combustion Engineering, Inc. is the owner and operator of the property surrounding the Windsor Site property, not Asea Brown Boveri, Inc. All references in the Draft EIS identifying Asea Brown Boveri, Inc. as the owner, operator, successor in interest, or otherwise responsible for the property surrounding the Windsor Site, including, but not limited to, references on Page 3-5, Lines 18-21, and Page 4-9, Lines 12-16, must be corrected accordingly to eliminate Asea Brown Boveri, Inc. and substitute Combustion Engineering, Inc.

17. Page 4-3: With regard to the groundwater monitoring program involving the four monitoring wells, what chemical constituents are routinely monitored? How long has this program been in place? Have the resultant testing data been trended for evidence of an increase/decrease in reported values? If yes, does the trending data show evidence of an increase/decrease in the materials being tested for?

18. Page 4-3: Line 43 states that "...the production wells will be closed..." Does this mean that the well standpipe will be removed and the hole filled in or that the standpipe will be capped and left in place? If the plan is to leave the standpipe in place, why?

19. Page 4-4, Lines 3-9: Did nonradioactive waste water discharges contain any chemical additives (i.e., water treatment chemicals, etc.)? Historically, did drains and associated piping from inside or outside any of the buildings on the Site ever connect to the brook outfall?

20. Page 4-4, Lines 21-22: Characterize (in terms of capacity, use, material stored) "retention tank liquids."

21. Page 4-4, Lines 33-36: Did the on-site septic system ever receive process waste water including, but not limited to, solvents, washwaters, detergents, metal cleaning effluent, etc?

22. Page 4-5, Lines 1-8: Why were copper levels elevated in the stormwater? What were the levels? What corrective actions were taken?

23. Page 4-5, Lines 10-13: Pertaining to the cooling water system employing chromate containing constituents, what was the associated flow rate (average, maximum)? Over what period of time was this material used?

24. Page 4-6: With regard to paragraph 4.4.4 it is noted on line 27 "The annual radioactivity concentration at the nearest Windsor Site boundary ...was less than 0.01 of the Department of Energy .....guide for effluent release to unrestricted areas..." How does the same data compare to the NRC and EPA guidelines for the same airborne contaminants both at the Site boundary and downwind from the Site.

25. Page 4-6: With regard to paragraph 4.4.4 it is noted on line 30 that "There is no residual radioactivity in vegetation or in the surface layers of soil which would indicate any significant fallout from past emissions or airborne activity." Where on the S1C Site was the soil and vegetation sampled? Was trending applied to the data? What were the results of the trending? Was a similar type of sampling conducted away from the S1C Site? How far from the Site was the sampling conducted? Was trending applied to this data? Do the trended data show any sign of increase/decrease? If trending was not performed, why not?

26. Page 4-6, Lines 36-40: Does the facility operate boilers on Site? Has the cooling water operation (if exhausted to the atmosphere) or any underground or above ground storage tank been evaluated for VOC emissions? (Cooling water typically contains biocides which meet the definition of VOC pursuant to both federal and CT regulations).

27. Page 4-7, Lines 12-14: Where were the borings taken? What was the basis for determining boring locations (i.e., random,etc.)?

28. Page 4-7, Lines 21-27: Please provide the corresponding references for this discussion.

29. Page 4-9, on Line 12 it is stated: "The uranium 235 detected in the brook is due to discharges from the Asea Brown Boveri, Inc. (Combustion Engineering, Inc.) facility adjacent to the Windsor Site and is not attributable to the Windsor Site

operations," This statement is not supported by conclusive information identifying Combustion Engineering, Inc. as the undisputed and sole source of the uranium 235. Therefore, the phrase "... is due to discharges from the (Combustion Engineering, Inc.) facility adjacent to the Windsor Site..." and should be deleted.

30. Page 4-15, Section 4.5.4.2: Existing Radiological Conditions in the Surrounding Area Relating to S1C Prototype Operations. Makes a direct reference to a report by Argonne National Laboratory sponsored by the Department of Energy Office of Environmental Restoration for calculation of soil guidelines for the Windsor Site. This report is stamped with "Do Not Cite" and marked as a "Draft" so its use in the S1C EIS is suspect.

31. Page 4-15, Section 4.5.4.2: Soil guidelines were reported in the ANL Report as the quantity of each nuclide, which would yield the specified dose limit. Why weren't all nuclides evaluated collectively, since each nuclide will contribute dose to the public? When evaluated collectively, the individual isotopic soil guidelines would be lowered considerably. If the guidelines are applied as listed in the Report, the resulting dose could significantly exceed the selected dose limit. In addition, the Report does not demonstrate compliance with proposed 10 CFR 834 regulations pertaining to airborne effluent discharges of radioactive material and specific radionuclide concentration limits in various media.

32. Page 4-15: On line 8 it is stated that "...there is no reason to believe that there are higher concentrations of Cobalt-60 buried deeper in the brook sediments by siltation." The sampling levels noted may not provide sufficient data to be able to make this statement. Will further sampling be performed to establish statistical evidence to assure with some degree of confidence that the levels of Cobalt in the brook sediment, at all depth levels, do not exceed the free release criteria?

33. Page 4-15: On line 21 it is stated "...residual cobalt-60 and nickel-63 in the brook can be evaluated based on a report by Argonne National Laboratory..." NRC has submitted written comments on this report to the DOE. The comments take exception to many of the assumptions used and the conclusions drawn in the report.

34. Page 4-16, Lines 5-8: What is the hazardous waste generator status (i.e., CSQG, SQG, or LQG)? What (specifically) types of laboratory chemicals were discharged to the septic system?

35. Page 4-16, Lines 9-11: What types of battery acid was discharged to the dry well? Where is the dry well located on the Site? Over what time period did this practice take place? How will the dry well and the surrounding area be evaluated?

36. Page 4-16: On line 13 it is stated that "As part of the voluntary facility assessment, a work plan for sampling the Windsor Site was developed..." Is a copy of this plan available for review and comment at this time? Does this "work plan" include the sampling of local waterways? If not, why not? Does the plan include a planned data treatment with release criteria related to regulatory requirements? If not, why not? If yes, what are the regulatory criteria that are being used?

37. Page 4-16: On line 29 it states "...a report will be prepared and provided to the regulatory agencies. The report will summarize findings and will identify the need for any additional investigation..." There is no mention made in the EIS as to what regulations will be used to establish free release levels for all the chemical constituents used during the period in which the Site was in operation.

38. Page 4-17, Lines 4-15: Were samples analyzed for both tri- and hexavalent chromium? Of the samples that were obtained, were analyses performed for total or filtered chromium? The current chromium results (assuming that this represents a total) indicate a concentration range between 11-70 mg/L which is significantly higher than the established CT RSR for chromium of 0.05 mg/L in a GA area (Pollutant mobility criteria). What was the basis for determining the sampling locations (i.e., random, etc.)? Was this determination statistically valid?

39. Page 4-17: On line 26 it states "...conditions in soil at the Windsor Site and immediately surrounding areas." A definition of "immediately surrounding areas" is requested.

40. Page 4-17: On line 26 it states "Surface soil and sediments from the brook and Goodwin Pond will be collected and analyzed..." Will any samples be taken subsurface? If not, why not? If yes, at what depth(s) will the samples be taken? On what basis will the sample depth be selected?

41. Page 5-1, Section 5.0: Environmental Consequences, states that public exposure resulting from any of the reasonable alternatives would be negligible. This appears to be in direct conflict with Section 4.5.4.2 which indicates a possible exposure of 14 mrem/year. In addition, this calculated dose may be non-conservative.

42. Page 5-3: On line 3 it states "Prompt dismantlement activities would not involve any discharges of radioactive liquid effluents." Based on the extent of dismantling activities and the amount of dust and debris generated, it would appear that airborne contamination would be present and eventually become part of the liquid effluent flowing from the site. How can it be said that no radioactive liquid effluents will be generated? On what basis is this statement made?

43. Page 5-3, Lines 9-16: What type of effluents will be discharged to the septic system (e.g., domestic waste, laboratory waste, etc.)? It is stated that effluents will continue to be monitored: for what parameters and at what frequency?

44. Page 5-3, On line 12 it is stated that "Effluent from the sanitary sewer would continue to be treated in the anaerobic septic system..." Will the septic system be completely removed as part of the dismantlement option? If not, why not? If it is removed will all piping, junction boxes, holding tank(s) associated with the system also be removed? If not, why not? Will complete soil sampling be done around and under the boxes, lines, etc. that made up the septic system? If not, why not?

45. Page 5-5, Section 5.1.5.1: Expected Final Radiological Conditions of the Windsor Site Property After Prompt Dismantlement, states the extent of soil remediation is expected to be small. It also states that a typical cobalt-60 screening level is 1 pCi/g. This appears to be in conflict with Section 4.5.4.2, which shows an average concentration, along the drainage brook, of 1.36 pCi/g with hot spots of up to 10 pCi/g. The EIS makes no mention of remediating this cobalt.

46. Page 5-5, Section 5.1.5.1: Expected Final Radiological Conditions of the Windsor Site Property After Prompt Dismantlement, states that radiation exposures would be less than those proposed in the proposed EPA and NRC regulations; these proposed limits are 15 mrem/yr, and Cobalt at the creek alone almost exceeds this limit. When other nuclides are considered, the dose could easily exceed these proposed limits. Also, both of these proposed regulations require the application of ALARA, as does DOE's regulations.

47. Page 5-14, Section 5.1.13: Waste Management. Except for mixed waste (approximately 55 drums), this Section does not discuss the volume of soils that may have to be shipped as radioactive waste.

48. Pages 5-18 & 5-29: Will the facility Stormwater Pollution Prevention Plan (SPPP) be amended in response to these facility modifications? Will S1C be responsible for performing additional analyses (perhaps for radiological contamination) of its stormwater discharges?

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 1.
Section 5.1.10.2 of the Draft Environmental Impact Statement identifies that an estimated 23 radioactive material shipments would be made. These shipments would take place after reactor plant dismantlement begins. Appendix C of the Draft Environmental Impact Statement indicates that the 23 radioactive material shipments would consist of 4 shipments of major components by rail and truck and 19 miscellaneous component shipments by truck. The miscellaneous component shipments would include miscellaneous components and other miscellaneous radioactive wastes such as building materials. Sections 5.1.10.2 and 5.1.13, and Appendix C have been revised in the Final Environmental Impact Statement to clarify the content of these miscellaneous shipments. The costs presented in Sections 3.1.5 and 3.2.4, and the Summary Table S-1 have been updated in the Final Environmental Impact Statement to include estimates for the cost of completing surveys and performing any necessary remediation at the Windsor Site and other costs associated with releasing the property for unrestricted use.

Comment 2.
As discussed in Sections 3.1.4 and 5.1.5.1 of the Draft Environmental Impact Statement, any future occupant of the Windsor Site would receive less radiation exposure than limits specified in draft regulations under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission. As discussed in the response to State of Connecticut Department of Environmental Protection Comment 1, these sections have been clarified in the Final Environmental Impact Statement to include the numerical radiation exposure limits specified in the draft Environmental Protection Agency and Nuclear Regulatory Commission regulations. Since the radiation exposure limits specified in draft regulations are well within the range of normal background radiation levels as described in Appendix A of the Draft Environmental Impact Statement, there is no appreciable public health risk. Therefore, no change is required to Summary Table S-1 of the Draft Environmental Impact Statement for the prompt and deferred alternatives. Under the no action alternative, the public health risk for leaving the S1C Prototype reactor plant at the Windsor Site is included in Summary Table S-1.

Additional discussion of residual radioactivity on or adjacent to the Windsor Site is discussed in Appendix G which has been added to the Final Environmental Impact Statement. For the reasons stated in the response to Comment 3 from the State of Connecticut Department of Environmental Protection, remediation of the drainage brook is not being addressed within the scope of this Environmental Impact Statement process.

Comment 3.
Section 2.4 of the Draft Environmental Impact Statement provides general characterization of materials in the S1C Prototype reactor plant and specifically notes the presence of hazardous materials. Section 3.1.2 of the Draft Environmental Impact Statement discusses the management of waste generated during reactor plant dismantlement activities. As stated in Section 3.1.2, materials would be disposed of in accordance with all applicable Federal, State and local regulations, including thorough characterization and segregation of waste or recyclable materials prior to shipment off-site. Potential impact of disposal of these materials is provided in Sections 5.1, 5.2, 5.3, Appendix B, and Appendix C of the Draft Environmental

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Impact Statement. Thus, more detailed information is not required to evaluate the environmental impacts covered in this Environmental Impact Statement.

Similarly, Chapter 4 of the Draft Environmental Impact Statement provides a general discussion of ongoing Windsor Site characterization. Characterization of Windsor Site facilities and soils, based on historical use of chemicals, hazardous materials, or other regulated materials, is part of the voluntary facility assessment discussed in Sections 3.1.4 and 5.1.5.2 of the Draft Environmental Impact Statement. Both the Environmental Protection Agency - Region I and State of Connecticut Department of Environmental Protection have been provided with a work plan that details sampling for potential chemical contamination. In July 1996, Naval Reactors met with personnel from the Environmental Protection Agency - Region I and the State of Connecticut Department of Environmental Protection to finalize the sampling plan. Appendix F of the Final Environmental Impact Statement provides a discussion of the process for completing the ongoing voluntary facility assessment and the results to date. In addition, as noted in Section 2.5.1 of the Draft Environmental Impact Statement, a separate evaluation conducted by the Environmental Protection Agency in 1988 concluded that the Windsor Site does not require remediation under the Federal Superfund program. Consequently, characterization and, if necessary, clean up of any low-level chemical contamination is not expected to be a significant factor in implementation of any of the identified alternatives.

Comment 4.
Sections 2.5.1 and 2.5.5 have been updated in the Final Environmental Impact Statement to include the Safe Drinking Water Act in the list of Federal and State statutes and regulations applicable to Windsor Site activities.

Comment 5.
As discussed in Sections 3.1.4 and 5.1.5.1 of the Draft Environmental Impact Statement, any future occupant of the Windsor Site would receive less radiation exposure than limits specified in draft regulations under consideration. As discussed in the response to State of Connecticut Department of Environmental Protection Comment 1, these sections were clarified in the Final Environmental Impact Statement to include the numerical radiation exposure limits under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission. Appendix G has been added to the Final Environmental Impact Statement and discusses the process that would be followed to verify final radiological conditions at the Windsor Site.

For chemical remediation, the criteria selected will similarly allow unrestricted release of the Windsor Site following dismantlement. As discussed in Sections 3.1.4 and 3.2.3 of the Draft Environmental Impact Statement, the criteria will be agreed to by the Environmental Protection Agency and the State of Connecticut, consistent with their authority under the Comprehensive Environmental Response, Compensation and Liability Act, the Resource Conservation and Recovery Act and the State of Connecticut Property Transfer Program to ensure that the criteria are sufficiently stringent to allow unrestricted release of the Windsor Site property.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 6.
As discussed in Section 5.1.4 of the Draft Environmental Impact Statement, the presence of radioactivity and materials such as asbestos insulation, lead-based paint and lead shielding introduce the potential for minor emissions of criteria pollutants and hazardous air pollutants from dismantlement operations. Monitoring will be performed in accordance with applicable Federal and State regulations to ensure emissions are adequately controlled. Compliance with these regulations is not expected to require off-site monitoring.

Comment 7.
Sections 4.3 and 4.4 of the Draft Environmental Impact Statement discuss the historical environmental monitoring programs at the Windsor Site. Historical environmental monitoring for radioactivity has included sampling of sediment in the drainage brook and the Farmington River, water in the Goodwin Pond, drainage brook, and Farmington River, as well as sampling of fish in the Farmington River. In addition, radiation levels are monitored continuously at 12 perimeter locations and at off-site locations ranging from 4.1 to 17.5 miles off-site. Sample results have been provided to the State of Connecticut Department of Environmental Protection in annual reports (Reference 4-10 of the Draft Environmental Impact Statement). Since the Windsor Site was never used for disposal of solid radioactive waste, and since routine environmental monitoring has identified the effects, if any, from airborne and water pathways, there is no reason to suspect any unknown radiological conditions attributable to S1C in areas surrounding the Windsor Site. The results of an aerial survey of the Windsor Site, which has been added to Section 4.5.4 of the Final Environmental Impact Statement, demonstrated no evidence of unknown radiological conditions on or immediately adjacent to the Windsor Site. This will be confirmed through continued sampling under the Windsor Site environmental monitoring programs, plus the planned sampling of soil in adjacent areas as discussed in Section 5.1.5.1 of the Draft Environmental Impact Statement and in Appendix G which has been added to the Final Environmental Impact Statement.

Section 4.5.5 of the Draft Environmental Impact Statement states that the voluntary corrective action program includes sampling of areas adjacent to the Windsor Site to confirm that no significant contamination has occurred resulting from Windsor Site operations. Additional information on the nonradiological assessment process can be found in Appendix F which has been added to the Final Environmental Impact Statement.

Comment 8.
Windsor Site operational history reviews revealed only one instance involving a release of material on the access road. This instance involved a minor traffic accident on the access road which resulted in a small leak of an ethylene glycol and water mixture (antifreeze) from the radiator of one vehicle. The antifreeze was contained and immediately cleaned up from the pavement and did not pose a threat to the environment. Although the amount was small (approximately one gallon) and resulted in no potential environmental impact, the appropriate regulatory agencies were notified. Since Windsor Site operational history reviews identified no other known spills, no further sampling of the access road or adjacent area is considered necessary.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 9.
As discussed in the response to State of Connecticut Department of Environmental Protection Comment 10, Sections 3.1.4 and 5.1.5.2 of the Draft Environmental Impact Statement have been clarified to state that all systems would be completely removed from the Windsor Site. The majority of the systems are located on government-owned property. However, some underground systems are located on Combustion Engineering, Inc. property used under a permanent easement. For example, relatively short lengths of abandoned sewage and industrial waste system piping extend onto Combustion Engineering, Inc. property from the southwest corner of the government-owned Windsor Site. These lines are believed to be capped near manholes located on Combustion Engineering, Inc. property. These lines would be removed to their point of termination at the capped end or at the manholes if the lines are found to be intact and plugged instead of cut and capped. All wastes from system removal will be fully characterized as part of routine waste management practices described in Section 3.1.2 of the Draft Environmental Impact Statement.

A section of the present day industrial drain line, which terminates at the Windsor Site outfall, also lies on Combustion Engineering, Inc. property. The present day industrial drain line will be removed entirely as part of Windsor Site dismantlement. A memorandum of agreement would be established with Combustion Engineering, Inc. before removal of any piping located on Combustion Engineering, Inc. property not included in easements for the Windsor Site.

As discussed in Section 3.1.4 of the Draft Environmental Impact Statement, there is one exception to the above expressed intention to remove all systems from the Windsor Site. That is the main water line into the Windsor Site, including the former pumphouse structure at the edge of the Site which now houses the termination of the main water line. Also, some structures or systems located on the easement around the Windsor Site will remain. These include the access road into the Windsor Site, storm drains associated with the access road, and the water, power and telephone lines into the Site. As discussed in Section 3.1.4, the municipal water supply piping would be left in a drained and laid-up condition, and the electrical service would be terminated. Leaving these systems in place could provide a benefit to a future property owner.

Comment 10.
The Naval Reactors radiological release criteria for the Windsor Site and materials released from the Windsor Site are as restrictive as comparable Nuclear Regulatory Commission and Environmental Protection Agency criteria. As discussed in Sections 3.1.4 and 5.1.5.1 of the Draft Environmental Impact Statement, any future occupant of the Windsor Site would receive less radiation exposure than limits specified in draft regulations under consideration. As discussed in the response to State of Connecticut Department of Environmental Protection Comment 1, these sections were clarified in the Final Environmental Impact Statement to include the actual numerical radiation exposure limits under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission. Appendix G of the Final Environmental Impact Statement provides a comparison of release criteria and discusses the process that would be followed to verify final radiological conditions at the Windsor Site.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 11.
The Knolls Atomic Power Laboratory is preparing the survey plan, which will be approved by Naval Reactors. The plan will meet the requirements of Department of Energy Order 5400.5 (Radiation Protection of the Public and the Environment) and will meet the dose limits specified in draft regulations under consideration by the Environmental Protection Agency and the Nuclear Regulatory Commission. Although the Windsor Site is not on the National Priorities List and does not require cleanup under the Comprehensive Environmental Response, Compensation and Liability Act, the property transfer requirements of the Act still apply as discussed in Section 2.5.1 of the Draft Environmental Impact Statement. In addition, the State of Connecticut Property Transfer Program applies to the Windsor Site as discussed in Section 2.5.5 of the Draft Environmental Impact Statement. To ensure that the survey plan is sufficient to allow transfer of the property under these programs, Naval Reactors will solicit and resolve comments on the plan from the Environmental Protection Agency and the State.

Comment 12.
The intent is to meet the dose limits of the Department of Energy Order as well as the dose limits contained in the draft Environmental Protection Agency and Nuclear Regulatory Commission regulations. This has been clarified in the Final Environmental Impact Statement.

Comment 13.
The Draft Environmental Impact Statement does not document the presence of radioactive contaminated soils or ground water on the Windsor Site. No such environmental contamination is known to exist on the Windsor Site. As discussed in Section 5.2.2 of the Draft Environmental Impact Statement, environmental monitoring would continue in addition to the specific monitoring discussed in Section 3.2.1. The elements of the Windsor Site environmental monitoring program, which includes sampling of air, surface waters, ground water and sediment, are discussed in Sections 4.3, 4.4 and Reference 4-10 of the Draft Environmental Impact Statement. Sections 3.2.1 and B.1.1.1 have been modified for clarity in the Final Environmental Impact Statement.

Comment 14.
Sections 4.3 and 4.4 of the Draft Environmental Impact Statement discuss the historical environmental monitoring programs at the Windsor Site. Historical environmental monitoring for radioactivity has included sampling of sediment in the drainage brook and the Farmington River, water in the Goodwin Pond, drainage brook, and Farmington River, as well as sampling of fish in the Farmington River. In addition, radiation levels are monitored continuously at 12 perimeter locations and at off-site locations ranging from 4.1 to 17.5 miles off-site. Sample results have been provided to the State of Connecticut Department of Environmental Protection in annual reports (Reference 4-10 of the Draft Environmental Impact Statement). Since the Windsor Site was never used for disposal of solid radioactive waste, and since routine environmental monitoring has identified the effects, if any, from airborne and water pathways,

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

there is no reason to suspect any unknown radiological conditions attributable to S1C in areas surrounding the Windsor Site. The results of an aerial survey of the Windsor Site, which has been added to Section 4.5.4 of the Final Environmental Impact Statement, demonstrated no evidence of unknown radiological conditions on or immediately adjacent to the Windsor Site. Additional information on the radiological release process for the Windsor Site, which would include sampling of adjacent properties and water, can be found in Appendix G which has been added to the Final Environmental Impact Statement.

The commenter's description of the scope of the voluntary facility assessment is incorrect. Section 4.5.5 of the Draft Environmental Impact Statement states that both surface water and ground water will be sampled from areas within and adjacent to the Windsor Site to confirm that no significant contamination has occurred resulting from Windsor Site operations. Additional information on the nonradiological assessment process, which would include limited sampling of adjacent properties and water potentially affected by Windsor Site chemical releases, can be found in Appendix F which has been added to the Final Environmental Impact Statement.

Comment 15.
Regarding characterization and remediation, the commenter is correct. The no action alternative by definition is an indefinite period of no action and would consist only of caretaking activities for the S1C Prototype reactor plant and the Windsor Site, as described in Section 3.2.1 of the Draft Environmental Impact Statement, and is consistent with the requirement of the Council on Environmental Quality regulations that a no action alternative be analyzed. As stated in Section 3.3.1 of the Draft Environmental Impact Statement, caretaking period operations for the no action alternative would be the same as for the deferred dismantlement alternative "except that the voluntary facility assessment process and any associated remediation activities would not be completed." Likewise, the radiological survey plan process and any associated remediation activities would not be completed. With regard to environmental monitoring during this period, see the response to Combustion Engineering, Inc. Comment 13.

Comment 16.
Naval Reactors acknowledges the commenter's preference for use of the term Combustion Engineering, Inc. instead of Asea Brown Boveri, Inc. The Final Environmental Impact Statement has been revised to reflect this preference.

Comment 17.
As indicated in Section 4.3.2 of the Draft Environmental Impact Statement, details of the ground water monitoring program are contained in the Knolls Atomic Power Laboratory Environmental Monitoring Report (Reference 4-10). This report is updated annually; copies have been routinely provided to Combustion Engineering, Inc. and other interested members of the public and are available at the Town of Windsor Public Library for review.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

As discussed in the environmental monitoring report, the principal purpose of the wells is to monitor for indications of migration of chemical contaminants from spills of Stretford solution on adjacent Combustion Engineering, Inc. property in the early 1980s. In the past, Stretford solution constituents have been sporadically detected in these wells. Results for other constituents and parameters, as indicated in the environmental monitoring reports, have been unremarkable. Consequently, no analytical trending of the data has been performed.

Comment 18.
Naval Reactors acknowledges that Section 4.3.2 of the Draft Environmental Impact Statement does not specify the method of closure for the service water production wells. This section was left general because applicable State of Connecticut regulations define at least two acceptable closure methods that block the pathway from surface water to ground water and the closure method to be used has not been selected. Naval Reactors will ensure that the former production wells at the Windsor Site are closed in accordance with all applicable Federal and State regulations by a qualified vendor licensed by the State of Connecticut.

Comment 19.
Nonradioactive waste water discharges contained chemical additives utilized in Windsor Site operations. Chemicals associated with these waters included phosphate-containing compounds such as sodium phosphate, oxygen scavenging compounds such as sodium sulfite, corrosion control compounds such as potassium chromate and organo-phosphate compounds, and chlorine for the treatment of site drinking water. Historically, nonsanitary drains and associated piping from inside and outside buildings (stormwater runoff) have discharged to the drainage brook through the Windsor Site outfall. All discharges from the Windsor Site were made in accordance with Federal and State requirements which, after 1975, included a permit issued by the Environmental Protection Agency - Region I as part of the National Pollutant Discharge Elimination System permit program. The State of Connecticut Department of Environmental Protection ultimately assumed responsibility for this permit. As discussed in Section 4.3.4 of the Draft Environmental Impact Statement, this permit was terminated in February 1996 because all industrial waste water discharges from the Windsor Site have been terminated. Discharges from the Windsor Site are in accordance with a State general stormwater permit.

Comment 20.
Section 4.3.4 of the Draft Environmental Impact Statement describes certain nonradiological discharges from the Windsor Site as "retention tank liquids." This phrase refers to nonradiological, nonhazardous waste water from the S1C Prototype plant which was accumulated and intermittently discharged. Two tanks were used to accumulate the waste water, which was limited to processed S1C Prototype plant bilge water and steam generator blowdown water. Each tank had a capacity of 5,000 gallons, and approximately 2,500 gallons per day were discharged when the S1C Prototype was in full operation. The waste water accumulated in the retention tanks was analyzed prior to discharge to confirm acceptability with all applicable Federal and State requirements.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 21.
Industrial process wastewaters were not disposed of via the Windsor Site septic system. As stated in Section 4.5.5.1 of the Draft Environmental Impact Statement, only small amounts of chemicals have been disposed of at the Windsor Site. Until 1978, small quantities of expired acids and oxidizing agents were discharged to the septic system and leach field. Minute quantities of a variety of laboratory chemicals (residuals from laboratory analyses) have been included in drain water from two analytical laboratories that discharged to the septic system and leach field. The general types of chemicals disposed of included acids and caustics, such as nitric acid, sulfuric acid and sodium hydroxide; salts, such as potassium chloride; sulfites, such as sodium sulfite; phosphates, such as sodium phosphate; and organics, such as acetone and Freon-113. Only sanitary waste and small quantities of dilute nonhazardous pH buffer solutions are currently disposed of via the septic system and leach field. These discharges have been consistent with the established applicable regulations. In addition, there was a one-time accidental discharge of 15 gallons of solution containing 7 parts per million cadmium in late 1991. As described in Appendix F of the Final Environmental Impact Statement, the voluntary facility assessment includes an assessment of the septic system environs.

Comment 22.
Copper levels in stormwater have ranged from none detectable to 0.17 milligrams per liter. As discussed in Section 4.3.4 of the Draft Environmental Impact Statement, in October 1995, the State of Connecticut Department of Environmental Protection modified the General Permit for the Discharge of Stormwater Associated with Industrial Activity. This modification changed the comparison value for copper from 0.014 milligrams per liter to the current value of 0.200 milligrams per liter. All sample results meet this updated value. No corrective action is required.

Comment 23.
Section 4.3.4 of the Draft Environmental Impact Statement states that prior to 1980, water containing chromate compounds from cooling water systems were discharged to the drainage brook from the Windsor Site. The chromate compounds were used to inhibit corrosion and biological growth in the cooling water systems from about 1960 to 1980. These discharges were made in accordance with applicable Federal and State regulations and were incorporated in a National Pollutant Discharge Elimination System permit in 1975. The maximum daily cooling water discharge allowed by the permit was 43,000 gallons per day.

Comment 24.
The annual airborne radioactivity concentration at the nearest Windsor Site boundary, allowing for typical diffusion conditions, was less than 0.01 percent of the level permitted by Nuclear Regulatory Commission regulations, 10 CFR Part 20, Appendix B, Table 2 (Effluent Concentrations), for the mixture of radionuclides present in the Windsor Site effluent air emissions. The Environmental Protection Agency does not have similar air effluent concentration limits. However, 40 CFR Part 61, Subpart H (National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities), Section 61.92 includes a 10 millirem per year exposure standard. The dose to the maximally exposed

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

member of the public from Windsor Site effluent air emissions in 1994 was less than 1 percent of this standard. As with the comparison to Department of Energy standards discussed in Section 4.4.4 of the Draft Environmental Impact Statement, these additional comparisons demonstrate that airborne radiological emissions from the Windsor Site were negligible.

Comment 25.
The conclusion in Sections 4.4.4 and 5.4.3 of the Draft Environmental Impact Statement that "there is no residual radioactivity in vegetation or in surface layers of soil which would indicate any significant fallout from past emissions of airborne radioactivity," was based on the fact that Windsor Site effluent air is continuously monitored for airborne particulate radioactivity to confirm that only minute amounts of radioactivity are released to the atmosphere. As noted in Section 4.4.4 of the Draft Environmental Impact Statement, airborne radioactivity releases are reported in the Knolls Atomic Power Laboratory Environmental Monitoring Report (Reference 4-10 of the Draft Environmental Impact Statement). As discussed in that report, radiation doses from airborne effluents, including fallout, are too small to be measured and must be calculated using computer models qualified for this specific task. These models conservatively estimate the radiation exposure to the public through many pathways, including radioactivity in surface soil, vegetation and animal pathways from airborne radioactivity sources. The above statement from Sections 4.4.4 and 5.4.3 of the Draft Environmental Impact Statement has been replaced in the Final Environmental Impact Statement with a discussion on how public radiation exposure is determined based on actual measured airborne emissions.

Comment 26.
The Windsor Site no longer operates boilers. Operation of the two Windsor Site heating boilers, which were registered with the State of Connecticut Department of Environmental Protection, permanently ceased in June 1995. The heating oil was stored in underground storage tanks that were vented to the atmosphere until 1988 when the tanks were removed and replaced by above ground tanks that were also vented to the atmosphere. The above ground tanks were also removed in 1995. Both the above ground and below ground tanks were evaluated for Volatile Organic Compound emissions and did not require permitting by the State of Connecticut Department of Environmental Protection. The Windsor Site also had four diesel generators which had seven associated diesel fuel tanks. These diesel tanks were also evaluated for Volatile Organic Compound emissions and did not require permitting by the State. Temporary fuel storage tanks that could be brought on site would be evaluated for Volatile Organic Compound emissions prior to being brought on site. To date no temporary fuel storage tanks have been used at the Windsor Site.

As discussed in Section 4.4.5 of the Draft Environmental Impact Statement, Windsor Site heating is now provided by three liquid propane heating units. Air emissions, including Volatile Organic Compounds, associated with operation of the units and filling the pressure-type liquid propane storage tanks, are below that which would require any regulatory permits.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

As stated in Section 4.3.4 of the Draft Environmental Impact Statement, non-contact cooling water was formerly used at the Windsor Site. Biocides used in the non-contact cooling water did not meet the definition of Volatile Organic Compounds pursuant to the Federal or State regulations.

Comment 27.
Section 4.5.2 of the Draft Environmental Impact Statement provides information concerning the geologic setting of the Windsor Site, which covers about 10 acres. Geologic conditions at the Windsor Site have been investigated at various times and locations. Both the Knolls Atomic Power Laboratory and Combustion Engineering, Inc. have performed investigations in support of site development. In addition, the U. S. Geological Survey has taken borings in areas on and adjacent to the Windsor Site (Reference 4-13 of the Draft Environmental Impact Statement). Overall, 22 borings have been taken in the developed areas of the Windsor Site and 10 borings have been taken in undeveloped areas of the Site. Additional borings have also been taken as part of the Voluntary Facility Assessment Program during the drilling of ground water monitoring wells as discussed in Appendix F of the Final Environmental Impact Statement.

Comment 28.
The corresponding references for the discussion on soils at the Windsor Site are: Metzler, K.J. and K. Rozsa, Connecticut Department of Environmental Protection, *Soil Catenas of Connecticut*, Hartford, Connecticut, April 1986; and United States Department of Agriculture, Soil Conservation Service, Soil Survey Series 1958, No. 14, *Soil Survey, Hartford County, Connecticut*, Sheet Number 20, February 1962. These references have been added to Section 4.5.2 and the list of references in the Final Environmental Impact Statement.

Comment 29.
As discussed in Section 4.5.4.2 of the Draft Environmental Impact Statement and the response to the State of Connecticut Department of Environmental Protection Comment 3, the uranium in the drainage brook near the Windsor Site originated from facilities on Combustion Engineering, Inc. property. Because the Council on Environmental Quality regulations require consideration of the existing environment and the potential cumulative impacts, Section 4.5.4.2 of the Draft Environmental Impact Statement provides information on the radiological condition of the drainage brook.

Additional information on the radioactivity concentrations in the drainage brook has become available since the Draft Environmental Impact Statement was issued. The Department of Energy's Formerly Utilized Sites Remedial Action Program (FUSRAP) has issued a report which consolidates available information on the radiological analysis of samples on the Combustion Engineering, Inc. site. Naval Reactors assisted in the preparation of this report by making available for additional analysis the 1991 samples which were discussed in Section 4.5.4.2 and Figure 4-1 of the Draft Environmental Impact Statement. The FUSRAP report provides the most complete radiological description of the drainage brook and excerpts have been incorporated into the Final Environmental Impact Statement.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

The distributions of the uranium and cobalt-60 in the drainage brook samples clearly indicate that the uranium and cobalt-60 came from different sources. Cobalt-60 is found throughout the entire length of the drainage brook and is found in the highest concentrations close to the Windsor Site outfall. The high uranium concentrations are found at or downstream of the Combustion Engineering, Inc. outfalls and the nearby trash piles and partially buried barrel on Combustion Engineering, Inc. property discussed in response to State of Connecticut Department of Environmental Protection Comment 3. This is consistent with the uranium originating from Combustion Engineering, Inc. operations. Both uranium and cobalt-60 concentrations in drainage brook samples have been reported annually to Combustion Engineering, Inc. and the State of Connecticut Department of Environmental Protection.

In addition to the clear inference of this physical data, the S1C Prototype reactor plant only handled uranium in the form of high integrity, zirconium alloy clad nuclear fuel. Therefore, there was no dispersible uranium at the S1C Prototype reactor plant which could have been discharged. Combustion Engineering, Inc. on the other hand, manufactured uranium fuel. The FUSRAP report shows uranium contamination at several locations on the Combustion Engineering, Inc. site, and not just at the drainage brook.

Comment 30.
The Argonne National Laboratory report (Reference 4-22 of the Draft Environmental Impact Statement) was prepared at the request of the Department of Energy Office of Environmental Restoration. The use of this report in the Draft Environmental Impact Statement was made with the knowledge and consent of the Department of Energy Office of Environmental Restoration and is considered to be appropriate by Naval Reactors because it had been made available by the Department of Energy for public review.

Comment 31.
Naval Reactors agrees that future evaluation of the drainage brook should include a collective analysis of all radionuclides in the brook. The dose attributable to cobalt-60 was presented in section 4.5.4.2 of the Draft Environmental Impact Statement in order to provide perspective on the levels of radioactivity in the drainage brook attributable to Windsor Site operations. Resolution of comments on the report prepared by Argonne National Laboratory for the Department of Energy's Formerly Utilized Sites Remedial Action Program is part of the separate process, outside of this Environmental Impact Statement process, to comprehensively evaluate the Combustion Engineering, Inc. site (including the drainage brook) and is beyond the scope of this Environmental Impact Statement. Naval Reactors has forwarded the comment to the Department of Energy's Formerly Utilized Sites Remedial Action Program.

Comment 32.
Please refer to the response to State of Connecticut Department of Environmental Protection Comment 4.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comment 33.
Resolution of Nuclear Regulatory Commission comments on the report prepared by Argonne National Laboratory for the Department of Energy's Formerly Utilized Sites Remedial Action Program is part of the separate process to comprehensively evaluate the Combustion Engineering, Inc. site adjacent to the Windsor Site, and is beyond the scope of this Environmental Impact Statement. Naval Reactors has forwarded the comment to the Department of Energy's Formerly Utilized Sites Remedial Action Program.

Comment 34.
The Windsor Site is permitted by the State of Connecticut Department of Environmental Protection for greater than ninety day storage (>90 days) of hazardous waste. Based on the definition in 40 CFR Part 260, the Windsor Site would be classified as a large quantity generator (that is, generation of greater than 1,000 kilograms of hazardous waste in any single calendar month). On average, the Windsor Site generates 14,400 kilograms of hazardous waste per year.

Until 1978, small quantities of expired acids and oxidizing agents were discharged to the septic system and leach field. Minute quantities of a variety of laboratory chemicals (residuals from laboratory analyses) have been included in drain water from two analytical laboratories that discharged to the septic system and leach field. The general types of chemicals disposed of included acids and caustics, such as nitric acid, sulfuric acid and sodium hydroxide; salts, such as potassium chloride; sulfites, such as sodium sulfite; phosphates, such as sodium phosphate; and organics, such as acetone and Freon-113. Only sanitary waste and small quantities of dilute nonhazardous pH buffer solutions are currently disposed of via the septic system and leach field. These discharges have been consistent with the established applicable regulations. In addition, there was a one-time accidental discharge of 15 gallons of solution containing 7 parts per million cadmium in late 1991.

Comment 35.
As stated in Section 4.5.5.1 of the Draft Environmental Impact Statement, small amounts of dilute battery acid rinse water were disposed of in a dry well. The dry well was used prior to 1991 to dispose of small battery acid samples and associated rinse water. The acid was dilute sulfuric acid. The dry well is located near the middle of the Windsor Site (See Appendix F, Figure F-1, Location 3). As stated in Section 3.1.4 of the Draft Environmental Impact Statement and the response to State of Connecticut Comment 7, all Windsor Site underground systems will be completely removed and characterized to allow unrestricted release of the Site, including the dry well.

Comment 36.
As stated in Section 4.5.5.1 of the Draft Environmental Impact Statement, the voluntary facility assessment work plan for the Windsor Site was submitted to the Environmental Protection Agency - Region I and the State of Connecticut Department of Environmental Protection in September 1995. In July 1996, Naval Reactors met with personnel from the Environmental Protection Agency - Region I and the State of Connecticut Department of

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Environmental Protection to finalize the sampling plan. A description of the sampling plan and a summary of the results to date are also provided in Appendix F of the Final Environmental Impact Statement. As described in Appendix F, sampling under the work plan is approximately 70 percent complete. Naval Reactors understands that the Environmental Protection Agency will solicit public comments on future actions (including additional detailed characterization, risk assessment, or no action) as part of the process for documenting the conclusions of the assessment under the Resource Conservation and Recovery Act.

Regarding sampling of surface waters, please see the response to Combustion Engineering, Inc. Comment 7. Regarding the criteria which will be used, please see the response to Combustion Engineering, Inc. Comment 5.

Comment 37.
For chemical remediation, the criteria selected will allow unrestricted release of the Windsor Site following dismantlement. As discussed in Sections 3.1.4 and 3.2.3 of the Draft Environmental Impact Statement, the criteria will be agreed to by the Environmental Protection Agency and the State of Connecticut, consistent with their authority under the Comprehensive Environmental Response, Compensation and Liability Act, the Resource Conservation and Recovery Act and the State of Connecticut Property Transfer Program to ensure that the criteria are sufficiently stringent to allow unrestricted release of the Windsor Site property.

Comment 38.
The samples discussed in Section 4.5.5.2 of the Draft Environmental Impact Statement were analyzed for total chromium. Sampling was conducted within the drainage brook bed at locations utilized historically for radiological characterization. Regarding the commenter's concern that measured levels of chromium were significantly above the established State of Connecticut Department of Environmental Protection Remediation Standard Regulation for chromium, Naval Reactors notes that the referenced 0.05 milligrams per liter pollutant mobility criterion is for leachable chromium by Toxicity Characteristic Leaching Procedure (Environmental Protection Agency Method 1311) or Synthetic Precipitation Leaching Procedure (Environmental Protection Agency Method 1312). Analysis for leachable chromium by either of these methods was not performed for the 1978 study, rather the total chromium content of the sediment was analyzed. The State of Connecticut Department of Environmental Protection Remediation Standard Regulations do not specify standards for surface water sediment. A more appropriate and conservative benchmark for comparison of the 1978 total chromium data is the 100 parts per million direct exposure residential soil criteria for hexavalent chromium used in the Draft Environmental Impact Statement. All samples collected from the drainage brook and analyzed for total chromium in 1978 were below this standard.

As discussed in Appendix F, which has been added to the Final Environmental Impact Statement, additional sampling will be conducted to identify any conditions requiring remedial actions or further investigation. Samples will be collected and analyzed for the target parameters provided in Appendix F Lists C (Inorganics - includes chromium),

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

D (Polychlorinated Biphenyls (Aroclors)), G (Volatile Organic Compounds) and H (Semi-Volatile Organic Compounds).

Comment 39.
As illustrated in the third paragraph of Section 4.5.5.2 of the Draft Environmental Impact Statement, the terminology of "immediately surrounding areas" as used in Section 4.5.5.2 refers to the drainage brook and the Goodwin Pond. Appendix F has been added to the Final Environmental Impact Statement and includes a discussion of sampling that will be done of the drainage brook and Goodwin Pond.

Comment 40.
Appendix F of the Final Environmental Impact Statement provides a discussion of soil and sediment sampling for investigation of chromium. Subsurface soil samples would be obtained near system piping as the piping is removed. Samples would be taken at selected piping joints, at locations where piping integrity has been lost, and at locations with visual evidence of leakage. Subsurface sediment samples would be collected from several locations covering the entire area of Goodwin Pond and the portion of the drainage brook upstream of the nearest Combustion Engineering, Inc. outfall (See Figure F-2 in Appendix F). Sediment from the bottom of Goodwin Pond and the drainage brook bed would be collected to a depth of two feet. Based on the low-flow conditions and limited sediment load in Goodwin Pond and the drainage brook, this depth was deemed adequate to penetrate sediments potentially affected by Windsor Site operations.

Comment 41.
As indicated in the response to the State of Connecticut Department of Environmental Protection Comment 3, remediation of the drainage brook is not included in any of the alternatives under consideration in this Environmental Impact Statement. For the actions covered by this Environmental Impact Statement, exposures are summarized in Table S-1 of the Draft Environmental Impact Statement. These exposures are judged to be negligible.

The radiological dose discussed in Section 4.5.4.2 of the Draft Environmental Impact Statement only includes the dose from radionuclides in the drainage brook that are attributable to Windsor Site operations and provides perspective on the impact of Windsor Site operations on the adjacent property. As discussed in the response to the State of Connecticut Department of Environmental Protection Comment 3, conditions in the drainage brook are part of a separate comprehensive evaluation of the Combustion Engineering, Inc. site.

Comment 42
The commenter is correct in noting that airborne particulate contamination can indirectly result in waterborne contamination. The Draft Environmental Impact Statement acknowledges that airborne contamination can indirectly result in waterborne contamination. Section B.1.3.1 of Appendix B states, "There are two processes by which radionuclides might enter water - via liquid discharge or via airborne discharges."

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

The statement in Section 5.1.3.1 of the Draft Environmental Impact Statement was only intended to apply to direct liquid discharges of radioactivity. None of the alternatives evaluated by this Environmental Impact Statement would result in any direct discharge of radioactive liquid effluents.

With regards to airborne discharges, effluents from the Windsor Site have no discernible effect on normal background radiation levels as discussed in the response to Combustion Engineering, Inc. Comment 25. Nonetheless, computer models, which are discussed in Section B.1.3.1 of the Draft Environmental Impact Statement, are used to calculate exposures to humans from airborne discharges and account for the indirect waterborne pathway. Dose estimates included in Summary Table S-1, Chapter 5 and Appendices B and C of the Draft Environmental Impact Statement all take into account the indirect waterborne pathway.

Comment 43.
Until 1978, small quantities of expired acids and oxidizing agents were discharged to the septic system and leach field. Minute quantities of a variety of laboratory chemicals (residuals from laboratory analyses) have been included in drain water from two analytical laboratories that discharged to the septic system and leach field. The general types of chemicals disposed of included acids and caustics, such as nitric acid, sulfuric acid and sodium hydroxide; salts, such as potassium chloride; sulfites, such as sodium sulfite; phosphates, such as sodium phosphate; and organics, such as acetone and Freon-113. Only sanitary waste and small quantities of dilute nonhazardous pH buffer solutions are currently disposed of via the septic system and leach field. These discharges have been consistent with the established applicable regulations. In addition, there was a one-time accidental discharge of 15 gallons of solution containing 7 parts per million cadmium in late 1991. As discussed in Sections 3.1.4 and 5.1.5.2 of the Draft Environmental Impact Statement and the response to Combustion Engineering, Inc. Comment 44, the septic system will be completely removed and soil will be sampled as appropriate to allow unrestricted release of the Windsor Site.

Section 5.1.3.2 of the Draft Environmental Impact statement also notes that the only liquid effluent from the Windsor Site in the future would be stormwater runoff. These effluents will be monitored in accordance with the appropriate State of Connecticut General Permit for the Discharge of Stormwater.

Comment 44.
As discussed in Sections 3.1.4 and 5.1.5.2 of the Draft Environmental Impact Statement, all Windsor Site systems including the underground septic system piping, junction boxes, and tanks will be completely removed. During removal, inspections will be performed and soil will be sampled as appropriate to allow unrestricted release of the Windsor Site. Appendix F has been added to the Final Environmental Impact Statement and provides a discussion of sampling in the vicinity of the septic system leach field.

**Commenter: John F. Conant, Senior Project Manager,
Asea Brown Boveri - Combustion Engineering, Inc.**

Comment Responses:

Comments 45 and 46.
As discussed in the response to State of Connecticut Department of Environmental Protection Comment 3, the Draft Environmental Impact Statement did not specifically evaluate potential remediation of the drainage brook. The limited discussion of the drainage brook in Section 4.5.4.2 of the Draft Environmental Impact Statement is focused on the cobalt-60 attributable to S1C Prototype reactor plant discharges. The comparison of the average drainage brook cobalt-60 concentration to specific concentration guidelines was intended to provide a general perspective on the significance of the residual cobalt-60. Naval Reactors agrees that future evaluation of the drainage brook should include a collective analysis of all radionuclides in the brook as well as an evaluation of localized higher concentrations. The drainage brook is being evaluated apart from this Environmental Impact Statement as discussed in the response to State of Connecticut Department of Environmental Protection Comment 3.

With regard to the application of the ALARA (As Low As Reasonably Achievable) concept to Windsor Site release, the most recent draft of the Environmental Protection Agency site release regulation does not require an ALARA demonstration provided that the Environmental Protection Agency release criteria (15 millirem per year overall, 4 millirem per year for ground water from beta and gamma emitters) are met. The Department of Energy applies ALARA to site release, but starts from a higher dose criterion before applying ALARA. The proposed Nuclear Regulatory Commission release regulation includes the Environmental Protection Agency dose criteria and includes an ALARA evaluation.

The radiological release process that is further discussed in Appendix G of the Final Environmental Impact Statement would result in a site that not only meets the absolute release criteria of all three standards, but on average is well under those criteria. Thus, the ALARA concept would be met for release of the Windsor Site.

Comment 47.
As discussed in Section 5.1.5.1 of the Draft Environmental Impact Statement, the extent of soil remediation, if any, is expected to be small. The potential small volume of soil would fall within the category of miscellaneous waste unsuitable for recycling or volume reduction discussed in Section 5.1.13 of the Draft Environmental Impact Statement. The Final Environmental Impact Statement has been revised to provide a quantitative estimate of the volume of the miscellaneous low-level radioactive waste associated with dismantlement activities at the Windsor Site other than S1C Prototype reactor plant dismantlement.

Comment 48.
No changes to the current Stormwater Pollution Prevention Plan would be made for the deferred dismantlement or no action alternatives. Effluents would continue to be monitored and reported as discussed in Sections 5.2.3.2 and 5.3.3.2 of the Draft Environmental Impact Statement. For the dismantlement period under the deferred dismantlement alternative, additional stormwater permits would be obtained as discussed in the response to State of Connecticut Department of Environmental Protection Comment 22. The Windsor Site Stormwater Pollution Prevention Plan would then be adjusted accordingly.

BARBARA B. KENNELLY
1ST DISTRICT, CONNECTICUT

COMMITTEE ON WAYS AND MEANS
SUBCOMMITTEE ON HUMAN RESOURCES
SUBCOMMITTEE ON SOCIAL SECURITY

VICE CHAIR, DEMOCRATIC CAUCUS

201 CANNON BUILDING
WASHINGTON, DC 20515
(202) 225-2265

ONE CORPORATE CENTER
HARTFORD, CT 06103
(203) 278-8888

Congress of the United States
House of Representatives
Washington, DC 20515

September 10, 1996

Mr. C. G. Overton
Chief
Windsor Field Office
Department of Energy
P.O. Box 393
Windsor, Connecticut 06095

Dear Mr. Overton:

I am writing to express my support for the prompt dismantlement of the S1C Prototype reactor plant at the Knolls Atomic Power Laboratory Site in Windsor, Connecticut.

The Windsor site has preformed an admirable service to the United States Navy and the nation for almost forty years. Like my constituents who live and work near the site, I believe it is time for the reactor to be dismantled and the site made available for new applications.

Of the three options outlined in your Draft Environmental Impact Statement, I believe that prompt dismantlement is the most beneficial to the community and the state. Because the spent fuel already has been removed from the reactor, there is minimal environmental risk from prompt dismantlement. In addition, immediate dismantlement would ensure that the waste would be disposed of properly once and for all and would allow the site to be re-developed. The other options -- deferring dismantlement for thirty years or taking no action -- will keep this waste on site unnecessarily, precluding any economic advantages the region could gain from the site. Lastly, prompt dismantlement would be the least costly of the three options in the DEIS.

Naturally, any shipment of waste and reactor components from the site must be performed carefully and in consultation with all local authorities. Although I am concerned about the circumstances surrounding the November, 1995 shipment of radioactive fuel rods from the Windsor site, I am confident that the Department has the capability to conduct a dismantlement that safeguards the environment and surrounding communities and will work with local authorities to ensure future shipments take place safely. 1

I appreciate your efforts on behalf of the Knolls Atomic Power Laboratory Site, and look forward to working with you on this endeavor on the coming weeks.

Sincerely,

Barbara

Barbara B. Kennelly
Member of Congress

BBK:alg

Commenter: The Honorable Barbara B. Kennelly, United States House of Representatives

Comment Response:

Comment 1.
The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are very small.

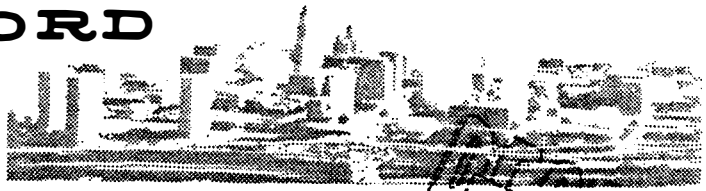
All shipments of radioactive materials from the Windsor Site would be low-level radioactive waste or recyclable material. Low-level radioactive materials have been shipped safely from Naval Nuclear Propulsion Program facilities, including the Windsor Site during its operations, for over 35 years. All shipments have been accomplished in accordance with applicable transportation regulations.

Although there is no regulatory requirement for prenotification of such shipments from the Windsor Site in Connecticut or to escort these shipments, Naval Reactors has periodically interfaced with appropriate regulatory agencies regarding such shipments and will continue to do so. In the past, such as the November 1995 shipment of the spent nuclear fuel from the Windsor Site, overweight and oversize permits were required for the heavy hauler shipment leg to the Griffin Line. This required coordination with the State of Connecticut Department of Transportation. Additionally, a Town of Windsor police escort accompanied this part of the shipment to ensure traffic safety. Due to the very infrequent use of the Griffin Line, the rail shipment was coordinated with City of Hartford and Town of Bloomfield law enforcement officials to ensure traffic safety at places where the Griffin Line crosses roads. Similar coordination would occur for the one or two rail shipments that would result from the prompt and deferred dismantlement alternatives.

For further discussion of the spent nuclear fuel shipment which occurred in November 1995, please refer to the response to Public Hearing Comment 11.

CITY OF HARTFORD

OFFICE OF THE CITY MANAGER
550 Main Street, Hartford, CT 06103



COUNCIL – MANAGER GOVERNMENT

August 19, 1996

Mr. C. G. Overton, Chief
Windsor Field Office
Office of Naval Reactors
U.S. Department of Energy
P.O. Box 393
Windsor, CT 06095

Re: S1C Nuclear Reactor Plant, Windsor, CT
Draft Environmental Impact Report

Dear Mr. Overton:

The purpose of this letter is to provide the City of Hartford's official comments concerning the disposal of the S1C reactor plant in Windsor, Connecticut. The attached Court of Common Council resolution was approved on August 12, 1996, and expresses the safety concerns that the City of Hartford has with respect to shipments of radioactive materials from the S1C reactor plant.

In particular, the City of Hartford is requesting that this office be notified well in advance of any further shipments of radioactive materials through the City of Hartford. Additionally, the City of Hartford is requesting information concerning the radiation levels associated with the February 1995 nuclear fuel shipment and the likely radiation exposure to city residents. We would also expect this type of information to accompany any future shipments through the City of Hartford. 1

While the City of Hartford acknowledges that it may be beneficial to have the S1C reactor plant disposed of, our overriding concern is that the Department of Energy use every possible safety precaution in making shipments of radioactive materials from the site.

Your cooperation in this matter is greatly appreciated.

Sincerely,

Saundra Kee Borges
City Manager

SKB/JHM/jwv

Court of Common Council

CITY OF HARTFORD

550 MAIN STREET
HARTFORD, CONNECTICUT 06103

August 12, 1996

This is to certify that at a meeting of the Court of Common Council, August 12, 1996, the following RESOLUTION was passed.

WHEREAS, The U. S. Department of Energy has issued a draft environmental impact statement for the disposal of the SIC Nuclear Reactor Plant in Windsor, Connecticut; and

WHEREAS, The disposal of the SIC Nuclear Reactor Plant may involve shipments of radioactive materials through the City of Hartford; and

WHEREAS, Prior to the issuance of the draft environmental impact statement, the Department of Energy caused a shipment of highly radioactive nuclear fuel from the SIC Reactor Plant to be shipped through the City of Hartford in February, 1995; and

WHEREAS, The City of Hartford was not informed by the Department of Energy as to the radiation levels which would exist surrounding the radioactive fuel container, nor was the potential radiation exposure to Hartford residents identified to the City by the Department of Energy; and

WHEREAS, The aforesaid shipment of nuclear fuel was allegedly delayed in the City of Hartford due to a railroad switching problem which could have resulted in increased radiation exposure to nearby residents; and

WHEREAS, While the City of Hartford acknowledges the Town of Windsor's desire to have the SIC Reactor Plant removed from the site, the City of Hartford is concerned that the U. S. Department of Energy take all safety precautions necessary in making any shipments of radioactive material; and

WHEREAS, The Department of Energy is accepting written comments on the draft environmental impact statement until August 19th, 1996; now, therefore, be it

RESOLVED, That the City Manager shall prepare a correspondence to the Department of Energy on behalf of the Court of Common Council expressing safety concerns about further shipments of radioactive materials through the City of Hartford and the potential radiation exposure to Hartford residents. Said correspondence shall include the Court of Common Council's strong desire to be notified prior to any further shipments of radioactive fuel and a request for the Department of Energy to supply further information about radiation levels and potential exposures from the December 1995 nuclear fuel shipment and any future shipments which may occur.

Attest:

Daniel M. Carey,
City Clerk

Copies to: City Manager, Director of Public Works and Director of Health.

Commenter: Saundra Kee Borges, City Manager, City of Hartford, Connecticut

Comment Response:

Comment 1.
The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are very small.

All shipments of radioactive materials from the Windsor Site would be low-level radioactive waste or recyclable material. Low-level radioactive materials have been shipped safely from Naval Nuclear Propulsion Program facilities, including the Windsor Site during its operations, for over 35 years. All shipments have been accomplished in accordance with applicable transportation regulations.

Although there is no regulatory requirement for prenotification of such shipments from the Windsor Site in Connecticut or to escort these shipments, Naval Reactors has periodically interfaced with appropriate regulatory agencies regarding such shipments and will continue to do so. In the past, such as the November 1995 shipment of the spent nuclear fuel from the Windsor Site, overweight and oversize permits were required for the heavy hauler shipment leg to the Griffin Line. This required coordination with the State of Connecticut Department of Transportation. Additionally, a Town of Windsor police escort accompanied this part of the shipment to ensure traffic safety. Due to the very infrequent use of the Griffin Line, the rail shipment was coordinated with City of Hartford and Town of Bloomfield law enforcement officials to ensure traffic safety at places where the Griffin Line crosses roads. Similar coordination would occur for the one or two rail shipments that would result from the prompt and deferred dismantlement alternatives.

For further discussion of the spent nuclear fuel shipment which occurred in November 1995, please refer to the response to Public Hearing Comment 11.

THIS PAGE IS INTENTIONALLY BLANK

TOWN OF WINDSOR • CONNECTICUT
FIRST IN STATE • FIRST IN SERVICE • FIRST IN VALUE

August 13, 1996

Mr. C. G. Overton, Chief
Windsor Field Office
Office of Naval Reactors
U.S. Department of Energy
P.O. Box 393
Windsor, CT 06095 - 0393

RE: Comments on the Draft Environmental Impact Statement on the Disposal of the S1C Prototype Reactor Plant

Dear Mr. Overton:

The Windsor Health Department on behalf of the Town of Windsor has reviewed the document entitled Draft Environmental Impact Statement S1C Prototype Reactor Plant Disposal dated June 1996 and prepared by the U.S. Department of Energy Office of Naval Reactors. While the EIS is quite detailed, the Town wishes to make the following comments regarding this draft.

First, sections 5.1.6, 5.2.6, and 5.3.6 make reference to the "socioeconomic" impacts of the three alternative actions being considered. None of these sections makes reference to the fact that the 10.8 acres of land occupied by this facility is not presently taxed by the Town of Windsor. If the "Prompt Dismantlement Alternative" is selected and the property is released for unrestricted use, there is a good possibility that this property could be placed back on the tax rolls and benefit the town and its residents economically. This fact should be part of the EIS as a benefit for the Prompt Dismantlement Alternative and a "cost" for both the "Deferred Dismantlement " and the "No Action" alternatives. 1

Second, section 3.1.4 refers to completion of a "voluntary facility assessment" which would address the potential for environmental chemical contamination and which would support the Site inactivation and future release of property. The section goes on to state that "following completion of all sample collecting and analytical work, a report would be prepared and provided to the U.S. Environmental Protection Agency, Region I and the State of Connecticut Department of Environmental Protection." While we applaud this action, we feel that such an assessment report should be sent to appropriate Town of Windsor officials for their review and comment also. 2

Third, the Deferred Dismantlement Alternative assumes that the political, legal, and environmental thinking stated in the discussion of this alternative, i.e. that diamantlement will take place after a 30 year caretaker period, will still be the thinking in 30 years. Given the rapid changes occurring in the political, legal, and environmental areas and given the possible closure of existing disposal sites, we feel that there is a real possibility that the Windsor Site could become the permanent disposal site for the Prototype reactor plant and the low level radioactive waste if the Deferred 3

275 Broad Street • Windsor, Connecticut 06095-2994
FAX: (860) 285-1909 http://www.state.ct.us/MUNIC/WINDSOR/windsor.htm

Dismantlement Alternative is selected. Wording reflecting this possibility should be placed in the appropriate sections of the report. 3

Fourth, the transportation of the S1C reactor from the site to its final destination should be timed such that delays along rail routes are minimized to the extent possible. While the reactor is packaged so that radiation is contained with no danger to the public, the fact remains that any prolonged delay of the train at any one location is perceived as endangering residents or the public in general in that area. 4

Finally, cost for the No Action Alternative as stated in Table S-1 is slightly misleading in that it does not take into consideration the eventual need for a permanent disposal decision. This can be clarified by putting a footnote in the table with wording similar to that which appears in the last sentence of Section 3.2.2 which states "taking into consideration the eventual need for a permanent disposal decision, the no action alternative would ultimately result in a higher figure." 5

In summary, for the reasons stated in the EIS and for the additional issues stated above, the Town of Windsor fully endorses the Prompt Dismantlement Alternative as the disposal strategy for the defueled S1C Prototype reactor plant. This alternative appears to be supported by the evidence as presented in the Environmental Impact Statement. We look forward to our continuing involvement in the shutdown process.

Very truly yours,

Charles J. Petrillo, Jr. Dr.PH
Director of Health

cc: Mayor Francis Brady
Town Council
Town Manager

275 Broad Street • Windsor, Connecticut 06095-2994
FAX: (860) 285-1909 http://www.state.ct.us/MUNIC/WINDSOR/windsor.htm

Commenter: Dr. Charles J. Petrillo, Director of Health, Town of Windsor, Connecticut

Comment Responses:

Comment 1.
The commenter correctly identifies that the land comprising the Windsor Site is not presently on the tax rolls of the Town of Windsor. If the property were to be transferred to a taxpaying entity, it is expected that the land would be added to the tax rolls. However, considering the small size of the Windsor Site, the impact on the tax base of the town is not expected to be significant. Sections 5.1.6, 5.2.6 and 5.3.6 have been revised in the Final Environmental Impact Statement to reflect the above.

Comment 2.
A copy of the voluntary facility assessment report will be provided to the Town of Windsor for information when it is provided to the State of Connecticut and the Environmental Protection Agency - Region I.

Comment 3.
The analysis of the deferred dismantlement alternative in the Draft Environmental Impact Statement is consistent with reasonably foreseeable radioactive waste disposal practices. In particular, there are no active discussions of closing the Savannah River Site in South Carolina, and an Environmental Impact Statement (Reference 5-2 of the Draft Environmental Impact Statement) analyzing future radioactive waste disposal operations at the Savannah River Site was recently issued.

Naval Reactors acknowledges that analysis of any action 30 years in the future brings with it uncertainties about how such an action would be executed. The relative certainty of the prompt dismantlement alternative is one of the favorable aspects of this alternative. In the Final Environmental Impact Statement, Naval Reactors has identified the prompt dismantlement alternative as the preferred alternative. Also, an acknowledgment of the greater degree of certainty associated with the prompt dismantlement alternative has been added to the Final Environmental Impact Statement Summary.

Comment 4.
The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of

Commenter: Dr. Charles J. Petrillo, Director of Health, Town of Windsor, Connecticut

Comment Responses:

the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are very small.

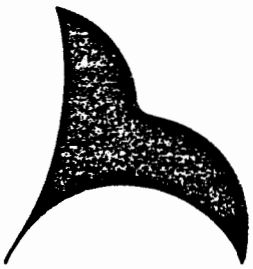
All shipments of radioactive materials from the Windsor Site would be low-level radioactive waste or recyclable material. Low-level radioactive materials have been shipped safely from Naval Nuclear Propulsion Program facilities, including the Windsor Site during its operations, for over 35 years. All shipments have been accomplished in accordance with applicable transportation regulations.

Although there is no regulatory requirement for prenotification of such shipments from the Windsor Site in Connecticut or to escort these shipments, Naval Reactors has periodically interfaced with appropriate regulatory agencies regarding such shipments and will continue to do so. In the past, such as the November 1995 shipment of the spent nuclear fuel from the Windsor Site, overweight and oversize permits were required for the heavy hauler shipment leg to the Griffin Line. This required coordination with the State of Connecticut Department of Transportation. Additionally, a Town of Windsor police escort accompanied this part of the shipment to ensure traffic safety. Due to the very infrequent use of the Griffin Line, the rail shipment was coordinated with City of Hartford and Town of Bloomfield law enforcement officials to ensure traffic safety at places where the Griffin Line crosses roads. Similar coordination would occur for the one or two rail shipments that would result from the prompt and deferred dismantlement alternatives.

For further discussion of the spent nuclear fuel shipment which occurred in November 1995, please refer to the response to Public Hearing Comment 11.

Comment 5.
The following additional words have been added to Note 8 of Table S-1 in the Final Environmental Impact Statement: "Taking into consideration the eventual need for a permanent disposal decision, the no action alternative would ultimately result in a higher figure."

THIS PAGE IS INTENTIONALLY BLANK



Greater
Hartford
Transit District

August 19, 1996

Mr. Christopher G. Overton, Chief
Windsor Field Office, Office of Naval Reactors
U.S. Department of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton:

Thank you for providing the Greater Hartford Transit District (GHTD) with a copy of the Draft Environmental Impact Statement for the "S1C Prototype Reactor Plant Disposal", Windsor, Connecticut. This public agency has a particular interest in the timing of the Windsor plant disposal plans of the U.S. Energy Department.

The Greater Hartford Transit District is the lead agency for the development of the Griffin Line for light rail passenger service from downtown Hartford ultimately to Bradley International Airport. A US Department of Transportation required "Major Investment Study" was completed in 1995 and the Capitol Region Council of Governments (CRCOG) has selected the light rail alternative for the Griffin corridor. GHTD is currently working with CRCOG, the private sector and other public agencies to secure financing for engineering the Griffin Line as a light rail facility.

If any material from the Windsor facility is planned for disposal via the current Griffin Line tracks in the next 12 to 18 months, there likely would not be any disruption of the implementation of the Griffin Line as currently envisioned. If, however, plans called for disposal of material via the current Griffin Line facility, e.g. in the 24, 36 or 48 month time frame (from the current date) then, it is possible, even probable that the current tracks will be in the process of being replaced in order to support light rail operation. In this latter time frame there would also likely be other related construction at designated station stops along the Griffin Line which could be incompatible with the disposal plans. Any later disposal via the Griffin Line would have to be reassessed since it is then expected to be providing ongoing passenger service which may be incompatible with the removal of any material from the Windsor plant. 1

Please contact me to pursue this matter further. I will be happy to discuss this matter and share further timing information as it may impact the Department of Energy's disposal plans.

Sincerely.

Paul A. Ehrhardt

Paul A. Ehrhardt
Chairman

One Union Place • Hartford, CT 06103 • (203) 247-5329 • FAX: 549-3879

Commenter: Paul A. Ehrhardt, Chairman, Greater Hartford Transit District

Comment Response:

Comment 1.
Naval Reactors holds a 5 year lease from the State of Connecticut Department of Transportation for occasional use of the Griffin Line. This lease expires March 31, 2000 and can be terminated by the State of Connecticut Department of Transportation. The State of Connecticut Department of Transportation has not provided any indication that it intends to terminate this lease early.

If the preferred alternative of prompt dismantlement is selected, use of the Griffin Line by Naval Reactors should be complete by the end of 1998. In the event of any potential conflict, Naval Reactors would work with the Greater Hartford Transit District to minimize any inconvenience or delay.

Additional detailed engineering evaluation of dismantlement methods has indicated that it may be desirable to ship the S1C Prototype reactor plant primary shield tank in a single large package by rail rather than cutting it into smaller sections for truck shipment. In that case, there would be two rail shipments rather than one as discussed in the Draft Environmental Impact Statement. A discussion on the possibility of a second rail shipment has been added to the Final Environmental Impact Statement. Although radiological and nonradiological impacts from both truck and rail shipments are very small, rail shipments have lower impacts than truck shipments. Therefore, the transportation analysis in the Final Environmental Impact Statement continues to assume one rail shipment.

THIS PAGE IS INTENTIONALLY BLANK

August 15, 1995

Mr. C. C. Overton, Chief

Windsor Field Office

Office of Naval Reactors

U. S. Department of Energy

P. O. Box 393

Windsor, CT 06095

COMMENT: DEPARTMENT OF ENERGY (DOE) OFFICE OF NAVAL REACTORS' DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR DISPOSAL OF THE S1C PROTOTYPE REACTOR PLANT LOCATED IN WINDSOR, CONNECTICUT.

I comment that there is an injustice (typically seen in the disposal of nuclear waste) present in the "Prompt Dismantlement Alternative" for S1C reactor disposal. This alternative says, in effect, take the contaminated things away to another place, we are through benefitting from it in Connecticut.

Of Course, this was a Navy reactor, so the benefit (in the traditional "cost-benefit" sense went to the United States and its far flung naval nuclear program. But, Connecticut got some benefits no other states such as the states which contain the D. O. E. radioactive waste disposal sites got. Indeed, the "Prompt Dismantlement Alternative" puts the "costs" (that is, exposure to workers and poss-

ible accident consequences, for example) on these locales after Connecticut, has received the benefits such as jobs, repair contracts, and economic benefits of Naval Personnel stationed at the Windsor, site.

Connecticut should have to absorb some of the what I call costs now. The way this can be done would be to use the "Deferred Dismantlement Alternative". This would prevent one part of this country from using another (as yet unnamed, but South Carolina, Washington, and New Mexico, come to mind) to free it of the radioactive waste created within its borders, which I have labled an "injustice". Thus, there is an additional reason to favor the "Deferred Dismantlement Alternative" not included in the DEIS analysis. 1

It would be foolish to believe the people of north Connecticut, would welcome this nuclear waste any longer than necessary. But, this "Deferred Dismantlement Alternative" is a more responsible way to act than to give the radioactive materials to someone far away, for all intents and purposes "gone". 1

You may publish and otherwise circulate this COMMENT in furtherance of the E.I.S. process. Thank you for the opportunity to comment.

Sincerely,

John F. Doherty

Dr. John F. Doherty
289 Angell St.
Providence, R. I. 02906

Commenter: Dr. John F. Doherty, Providence, Rhode Island

Comment Response:

Comment 1.

The Draft Environmental Impact Statement fully discloses the fact that some of the alternatives (prompt dismantlement and deferred dismantlement) assume that waste would be removed from one location in the country and placed in another location. As analyzed in Section 5 and summarized in Section 6 of the Draft Environmental Impact Statement, there are no significant impacts to the public for any of the identified alternatives. The decision maker can take this into account in making the decision on the alternative selected for implementation. Please refer to Public Hearing Comment 17 (Mr. McCormick) for further discussion on disposal site options and impacts.

THIS PAGE IS INTENTIONALLY BLANK

Mrs. Jean Pottinger
241 Nahum Drive Apt. A-2
Hartford, Conn. 06112-2659
August 12, 1996

Mr. C. G. Overton
Chief, Windsor Field Office
Naval Reactors
Department of Energy
P.O. Box 393
Windsor, Conn. 06095

Dear Mr. Overton,

Thank you for the opportunity to comment on the Department of Energy's "Draft of the Environmental Impact Statement" for the final disposal of the S1C Prototype Reactor plant in Windsor, Connecticut. This letter is to reinforce my comments made at that meeting on August 7, 1996.

As I stated last year, the Greater Hartford Transit District and the Capitol Region Council of Governments are studying the feasibility of having a light-rail train system on the Griffin Line. If they are successful in getting funds to build it and the fact that the Lockheed Martin Corp., the contractor that runs Knolls Atomic Power Laboratory for the Federal Government, has renewed thier license from the ConnDot to ship radioactive material or other freight on the Griffin Line until March 2000, what kind of time-frame are you looking at? How soon and how long will it take to ship the low-level radioactive parts on the Griffin Line? 1

When the Department of Energy shipped the high-level radioactive fuel rods on November 29, 1995, both the City of Hartford and the Town of Bloomfield Officials said that "they were not notified of the shipment in advanced" I know that the shipment has to be kept secret for security reasons, but shouldn't the necessary Officials be notified in case of an emergency? 2

Finally, when the shipment reached Union Station in Hartford, it was switched to Amtrak lin to travel to Springfield, Mass. When the shipment reached Conrail freight yards on Windsor Street in Hartford, the Department of Energy ran into a "snafu" when Conrail refused to activate the switch at Fishfry St. (which would have allowed the train to continue on to Springfield) until the track was cleared for two (2) hours in both directions. As a result, the high-level radioactive waste was

left standing across the street from Bellevue Square Housing Project for four (4) hours, putting the Tenants if grave danger. Both the Griffin Line and Amtrak Line passed through heavily populated areas in Hartford. 2

Since the Town of Windsor wants to promptly dismantle the S1C Prototype Reactor and clean up the area as soon as possible, which will necessitate the use of trucks and/or rail (Griffin Line and Amtrak) to ship the low-level radioactive waste out of Connecticut, it is of utmost importance that the Department Of Energy should make arrangements with all parties concerned in this matter, before-hand, to insure that the safe and swift transportation of all radioactive materials through heavily populated areas in the future. 2

Sincerely,

Mrs. Jean Pottinger

Mrs. Jean Pottinger

cc: Hartford City Manager Sandra Kee Borges
Hartford City Council Louis Watkins, Jr.
Mr. Tom Johnson, Director, Hartford Public Works Department
The Honorable Senator Eric Coleman
The Honorable Representative Kenneth Green
The Honorable Hartford Mayor Michael P. Peters

Commenter: Jean Pottinger, Hartford, Connecticut

Comment Responses:

Comment 1.
Naval Reactors holds a 5 year lease from the State of Connecticut Department of Transportation for occasional use of the Griffin Line. This lease expires March 31, 2000 and can be terminated by the State of Connecticut Department of Transportation. The State of Connecticut Department of Transportation has not provided any indication that it intends to terminate this lease early.

If the preferred alternative of prompt dismantlement is selected, use of the Griffin Line by Naval Reactors should be complete by the end of 1998. In the event of any potential conflict, Naval Reactors would work with the Greater Hartford Transit District to minimize any inconvenience or delay.

Additional detailed engineering evaluation of dismantlement methods has indicated that it may be desirable to ship the S1C Prototype reactor plant primary shield tank in a single large package by rail rather than cutting it into smaller sections for truck shipment. In that case, there would be two rail shipments rather than one as discussed in the Draft Environmental Impact Statement. A discussion on the possibility of a second rail shipment has been added to the Final Environmental Impact Statement. Although radiological and nonradiological impacts from both truck and rail shipments are very small, rail shipments have lower impacts than truck shipments. Therefore, the transportation analysis in the Final Environmental Impact Statement continues to assume one rail shipment.

Comment 2.
The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are very small.

All shipments of radioactive materials from the Windsor Site would be low-level radioactive waste or recyclable material. Low-level radioactive materials have been shipped safely from

Commenter: Jean Pottinger, Hartford, Connecticut

Comment Responses:

Naval Nuclear Propulsion Program facilities, including the Windsor Site during its operations, for over 35 years. All shipments have been accomplished in accordance with applicable transportation regulations.

Although there is no regulatory requirement for prenotification of such shipments from the Windsor Site in Connecticut or to escort these shipments, Naval Reactors has periodically interfaced with appropriate regulatory agencies regarding such shipments and will continue to do so. In the past, such as the November 1995 shipment of the spent nuclear fuel from the Windsor Site, overweight and oversize permits were required for the heavy hauler shipment leg to the Griffin Line. This required coordination with the State of Connecticut Department of Transportation. Additionally, a Town of Windsor police escort accompanied this part of the shipment to ensure traffic safety. Due to the very infrequent use of the Griffin Line, the rail shipment was coordinated with City of Hartford and Town of Bloomfield law enforcement officials to ensure traffic safety at places where the Griffin Line crosses roads. Similar coordination would occur for the one or two rail shipments that would result from the prompt and deferred dismantlement alternatives.

For further discussion of the spent nuclear fuel shipment which occurred in November 1995, please refer to the response to Public Hearing Comment 11.

THIS PAGE IS INTENTIONALLY BLANK

UNITED STATES DEPARTMENT OF ENERGY

In the Matter

-of-

a Public Hearing to Receive Comments on the Draft Environmental Impact Statement for the S1C Prototype Reactor Plant Disposal.

Windsor Town Hall
Windsor, Connecticut

August 7, 1996
7:00 p.m.

PRESIDING:

ANDREW SEEPO

Director of Radiological/ Environmental Controls and Safety, Schenectady Naval Reactors Office, Department of Energy

PRESENT:

CHRIS OVERTON, Naval Reactors Windsor Field Office

JEFF HILL, Naval Reactors Windsor Field Office

P R O C E E D I N G S

MR. SEEPO: Good evening, ladies and gentlemen. Thank you for attending. My name is Drew Seepo. I am the Director of Radiological/Environmental Controls and Safety at the Department of Energy Naval Reactors Schenectady Office. I will be the moderator for tonight's public meeting. With me this evening are Mr. Chris Overton and Mr. Jeff Hill from the Naval Reactors Windsor Field Office.

(A slide presentation accompanied the remarks of Mr. Seepo and Mr. Overton.)

On July 1st, 1996, the Department of Energy announced in the Federal Register the availability of the Draft Environmental Impact Statement, or Draft EIS for short, concerning disposal of the S1C Prototype reactor plant. After completion of general distribution of the document to public officials and interested citizens, Naval Reactors filed copies with the Environmental Protection Agency. On July 5th, the Environmental Protection Agency published another notice of availability in the Federal

Register to start the formal comment period.

Tonight's meeting is being held as part of the decision-making process required by the National Environmental Policy Act, or NEPA. NEPA is our basic national charter for protection of the environment. NEPA procedures ensure that environmental information is made available to public officials and citizens before decisions are made and before actions are taken.

The Draft EIS was developed with consideration of public input received during the scoping phase of the NEPA process.

The purpose of tonight's meeting is to receive comments on the Draft EIS. We are here to listen to what you have to say. It is our responsibility to receive statements so that your comments can be considered in the development of the Final EIS. For that reason, this meeting is being recorded.

The order of tonight's meeting will begin with a brief overview by Mr. Overton of the SIC Prototype plant and the dismantlement alternatives addressed in the Draft EIS. This presentation will last approximately 15 minutes. We will then take a short break and reconvene the meeting to receive public comments. After all oral comments have been given, I will conclude the meeting.

The comment period is the time we listen to you. As stated in the July 1st Notice of Availability, speakers will be allotted five minutes each to allow sufficient time for all individuals desiring to speak. Please be considerate of your fellow participants by adhering to this limit. The order in which speakers will be heard is as follows: Federal government, State government, county government, local government, organizations, private citizens. As time permits depending on the number of persons requesting to speak, individuals who have spoken subject to the five-minute rule will be afforded additional speaking time. Additional time will be allotted first to elected officials or speakers representing multiple parties, or organizations.

PAULINE E. WILLIMAN
CERTIFIED SHORTHAND REPORTER

Persons wishing to speak on behalf of organizations are requested to identify the organization that they represent. Anyone wishing to speak who did not register on the way in should, at the break following Mr. Overton's presentation, fill out a registration form at the table by the door. That way, we can assure that all persons who want to speak are given an opportunity to do so.

This is not an evidentiary hearing. Speakers will not be cross-examined. However, to ensure that comments are clearly reflected in the record, we may ask some clarifying questions.

Whether or not you speak this evening, you may also provide written comments. Oral and written comments will be considered equally in the development of the Final EIS. Responses to each comment or question will be addressed in the Final EIS. If you have written comments with you this evening, you may leave them with support staff at the registration table. If you choose to provide written

comments at a later time, they should be sent to Mr. Overton. His address is as indicated above (on a slide projection). The address is also shown on the first page of the Draft EIS and is available at the registration table. Your written comments should be postmarked by August 19th to be considered during development of the Final EIS. Comments postmarked after that date will be considered to the extent practicable. A written transcript of tonight's meeting will be included in the Final EIS. Distribution of the Final EIS will include placing a copy in the Windsor Library. Following completion of the Final EIS, Naval Reactors will issue a Record of Decision after a 30-day waiting period.

I would like to now introduce Mr. Chris Overton, from the Naval Reactors Windsor Field Office. He will provide a general overview of the SiC reactor plant and discuss alternatives for reactor plant disposal.

MR. OVERTON: Thank you, Mr. Seepo.

The SiC Prototype reactor plant

is located on a Federally-owned 10.8-acre site in Windsor. The access road to the site is located off of Day Hill Road just west of its intersection with Prospect Hill Road.

This photograph was taken in October of 1995. The S1C Prototype is this structure here. Reactor plant operations commenced in 1959. For over 30 years, the S1C Prototype reactor plant served as a reactor plant component and equipment test facility as well as a training platform for Naval personnel.

As a result of the end of the Cold War and the downsizing of the Navy, the S1C Prototype reactor plant was shut down in 1993. Because the S1C Prototype reactor plant is the only activity at this small site and there is no further need for this plant, a decision is needed on its disposal. For that purpose, a Draft Environmental Impact Statement was prepared.

This is a drawing of the S1C Prototype. This prototype is roughly the aft

half of the USS Tullibee, the only submarine constructed in its class. The reactor plant, located in the purple section called the reactor compartment, provided steam for turbines located in the engine room, the green section.

This is a simplified schematic of a submarine nuclear propulsion plant. Typical of Naval nuclear propulsion plants, the S1C Prototype reactor plant is a rugged, compact pressurized water reactor. Major components inside the reactor compartment include the reactor vessel, steam generators, pressurizer and main coolant pumps. The reactor compartment is separated from the rest of the prototype by shielded walls or bulkheads.

Because of its high density, lead is an excellent radiation shielding material. The reactor compartment bulkheads contain lead to shield the crew members from radiation during reactor operation. The S1C reactor plant contains over 100 tons of lead.

The reactor plant contains other hazardous materials used in the construction of

the plant but in much lesser quantities. These include polychlorinated biphenyls, or PCBs, and chromium found in small amounts in common industrial materials such as paint, rubber, adhesives and brazing alloys.

Another factor requiring consideration in disposing of the SIC Prototype reactor plant is the radioactivity remaining from reactor operation.

Defueling the reactor removed about 95 percent of the radioactivity from the shutdown reactor plant, but some radioactivity remains. Of the remaining 5 percent, approximately 99.9 percent is an integral part of the reactor plant's internal structural metals and components. This is a result of structural metals becoming activated during reactor operations. The other 0.1 percent of the remaining radioactivity is radioactive corrosion and wear products which have been deposited onto the inside surfaces of piping systems and components.

Tonight, I will first discuss the

alternatives Naval Reactors considered for disposal of the SIC Prototype reactor plant. Later I will cover the potential environmental consequences. Alternatives considered in the Draft Environmental Impact Statement included: prompt dismantlement; deferred dismantlement; one piece off-site disposal; entombment; on-site disposal, and the no action alternative.

These alternatives were eliminated from further consideration: [Slide stating one piece off-site disposal, entombment, and on-site disposal were eliminated from detailed review.]

The one piece off-site disposal alternative is based on the submarine reactor compartment disposal program for dismantling decommissioned U.S. Navy submarines. Defueled reactor compartments are packaged in their entirety at the Puget Sound Naval Shipyard. The packaged reactor compartments are then sent by barge and special ground transport for disposal at the Department of Energy's low-level waste burial ground at the Hanford Site in Washington

State.

As a single package, the SIC Prototype reactor compartment would measure approximately 23 feet in length, 24 feet in diameter and would weigh approximately 400 tons.

This alternative was ruled out because, unlike Puget Sound Naval Shipyard, the Windsor Site is not located adjacent to navigable water. Transport of the SIC Prototype reactor compartment to the nearest barge facility on the Connecticut River is considered impractical by either highway or rail due to interferences and load limiting bridges along the route.

The entombment and on-site disposal alternatives were both ruled out from further consideration because both alternatives would result in restrictions on the future use of tha Windsor Site land. The Windsor Site has never been used for burial or permanent storage of radioactive or hazardous waste materials.

The remaining alternatives,

prompt dismantlement, deferred dismantlement and no action, were evaluated in detail.

The first alternative would involve the prompt dismantlement of the reactor plant. All structures and radioactive material would be removed from the Windsor Site. The Site would be carefully surveyed to confirm that it could be released for unrestricted use. That means, when this alternative is complete, this property could be used for any purpose that the future owner desires, whether it be agricultural, residential or industrial.

Prompt dismantlement involves cutting out piping, valves, pumps and instrumentation and placing the items in containers for shipping. Large components, including the steam generators, pressurizer, and reactor pressure vessel would be packaged individually.

To the extent practical, the resulting low-level radioactive metals would be recycled at existing commercial facilities that recycle radioactive metals. The remaining low-level radioactive waste would be disposed at the

Department of Energy's Savannah River Site in South Carolina.

The Savannah River Site currently receives low level radioactive waste from Naval Reactors sites in the eastern United States. Both the volume and the content of the S1C Prototype reactor plant waste fall within the projections of the Naval Reactors waste provided to the Savannah River Site which, in turn, are included in the July 1995 Savannah River Site Waste Management Final Environmental Impact Statement.

Under the deferred dismantlement alternative, the S1C Prototype reactor plant would be kept in protective storage for about 30 years. This would allow almost all of the cobalt-60 radioactivity to decay away. Nearly all of the gamma radiation within the reactor plant comes from cobalt-60.

Cobalt-60 has a radioactive half-life of about five years. After 30 years, only two percent of the original radioactivity will remain. The reactor plant would then be

dismantled and disposed of in the same manner as under the prompt dismantlement alternative.

During the 30-year caretaking period, the defueled S1C Prototype reactor plant would be periodically monitored. The monitoring would verify the overall physical integrity of the plant and verify that all the radioactivity remains contained.

The National Environmental Policy Act specifically requires consideration of a "no action" alternative. This no action alternative would involve keeping the S1C Prototype reactor plant in protective storage indefinitely.

The no action alternative would leave the long-lived radioactivity and lead shielding at the Windsor Site indefinitely. This alternative would preclude releasing the land for unrestricted use and would not provide for permanent disposal.

The environmental consequences can be broken down into two major affected groups. The first group consists of the workers involved with disassembling the S1C Prototype

reactor plant and then transporting material off-site.

The second major affected group is the general public, both in the area surrounding the Windsor Site and along the routes used to transport material from the dismantled prototype.

The health risks we considered for the Windsor Site workers, transportation crews, and the general public are summarized on this slide [Workers and public: radiological and non-radiological. Accidents: facility and transportation]. We looked at the possible side effects from disassembly processes as well as the risks associated with transportation.

This is a comparison of costs for the various alternatives. These costs are all in 1996 dollars to offset the effects of inflation.

The deferred dismantlement process is roughly the sum of the other two alternatives since the deferred dismantlement alternative is a combination of the other two

alternatives.

The no action alternative will have the highest cost since dismantlement will need to take place some time in the future. The dollar amount on the slide only represents care-taking and not dismantlement or disposal.

Therefore, of the three alternatives, prompt dismantlement will result in the lowest cost overall.

We have concluded that all of the alternatives would have minimal impact on the general public and the environment.

The principal impact associated with prompt dismantlement is that Windsor Site workers would receive some exposure to radiation. The occupational radiation exposure associated with the prompt dismantlement alternative is comparable in magnitude to the radiation exposure routinely received during operation and maintenance of Naval prototype reactors and would be well within Federal guidelines. Prompt dismantlement has the advantage of not requiring long-term commitment

of the land for surveillance and maintenance of the SIC Prototype reactor plant. Prompt dismantlement results in the lowest cost.

While deferred dismantlement has the advantage of less radiation exposure, radiation exposure is low for all alternatives. Deferred dismantlement delays the unrestricted release of the land for reuse and has a higher cost.

That concludes my presentation. Thank you for your courtesy and attention.

We'll take a short break and then reconvene the meeting to take public comments. After all comments have been given, Mr. Seepo will conclude the meeting.

MS. BASSILAKIS: Can we just ask questions, rather than to make comment?

MR. SEEPO: The way the meeting is structured, ma'am, is that there will not be a question and answer period. We're going to take a five or ten minute break. We want to reconfigure the podium for speakers and determine how many people have registered and,

at that time, we'll start the public comment period.

One final reminder: Anyone wishing to speak needs to register at the front table so that we can determine the number of speakers and the sequence in which people will be afforded the opportunity to speak.

Thank you.

(A short recess was taken.)

MR. SEEPO: Would everyone please be seated. We're ready to reconvene.

At this time we have 14 individuals that have registered to provide public comment. I'm going to quickly read the names, and the names will be read in the order in which we'd like to have the commenters speak.

First would be Mr. Mike Firsick from the Connecticut Department of Environmental Protection. We have three local government representatives: Mr. Charles Wall from the Town of Windsor, Mr. Don Trinks from the Town of Windsor Council, and Mr. Louis Watkins from the Hartford City Council. We have four individuals

representing organizations: Rosemary Bassilakis; Leo Canty, I believe it is, Jean Pottinger and Mark Sussman. We also have six private citizens that have registered: Harold Chase, Lillian Goldberg, Don Johnson, Mary Mullen-Barnett, Gary Johnson and Tom McCormick.

Anyone else that desires to speak, I would request to please go back to the registration table and sign up, and we'll get you onto the list.

At this time, I'd like to call Mr. Mike Firsick. We'd like you to use the podium up front, if that's not a problem, Mr. Firsick.

MR. FIRSICK: Hi. I just have a brief comment. My name is Mike Firsick. I'm a physicist in the Radiation Control Group in the Department of Environmental Protection. We are currently preparing our comments, and we're conferring with other agencies in the Department and we will be submitting our comments in to the Department of Energy on August 19th.

MR. SEEPO: Thank you, Mr.

Firsick.

Number two, I'd like Mr. Don Trinks to come up, please. Just for the record, Mr. Trinks, if you could state your title and affiliation.

MR. TRINKS: O.K. I'm here on behalf of the Health and Public Safety Committee of the Town of Windsor.

I have not taken an official poll on the full proposal, but I'm sure if I did they would call for an immediate dismantling and removal of all the SIC core operation. The vital industrial and residential use of nearby sites have been in the shadow of this reactor too long.

We appreciate the many alternatives you've offered; however, any one short of dismantling - permanently and shortly - will be totally unacceptable to our group.

Thank you.

MR. SEEPO: Thank you, Mr. Trinks.

Mr. Charles Wall.

MR. WALL: Good evening. My name is Charles Wall. I'm a sanitarian with the Community Health Services. We have looked through the Draft Environmental Impact Statement and have some comments.

First, Sections 5.1.6, 5.2.6 and 5.3.6 refer to the socioeconomic impacts of the three alternative actions. None of these sections make reference to the fact that the acres of land comprising the facility are not presently on the tax roll. Under the prompt dismantling alternative, if this land were released for unrestricted use, there is a good possibility this property could be placed back on the tax rolls and the town would benefit from this economically. This fact should be part of the environmental impact under the socioeconomic impact as a benefit from the prompt dismantling alternative and as a cost of the deferred dismantling and no action alternatives. 1

Secondly, Section 3.1.4 refers to completion of a voluntary facility assessment which would address the potential for 2

environmental chemical contamination being completed to support Windsor Site inactivation and future release of the property, and it goes on to state that, following all sample collection and analytical work, a report will be prepared and provided to the U.S. EPA, Region I, and the DEP in the State of Connecticut. We feel we should be part of that group. 2

Third, under the deferred dismantlement, in the environmental data and the discussion on that alternative, the plant will still be in place 30 years from now. We think that that is unrealistic, given the changes that have occurred just in the last ten years and considering the changes that are occurring in both the political and the environmental climate in the area. And given possible closure of the existing permanent disposal site in Savannah River which may be in effect, we feel there is a possibility the site may become a permanent one, so we think that you should perhaps introduce wording to that effect. 3

Finally, the cost of the "no 4

action" alternative as stated in Table S-1 is slightly misleading because you're only considering the same 30-year period that you are for the deferred dismantlement, and I think it may be clarified that that period can go on a lot longer, and sooner or later we're going to have to make a permanent disposal decision, at more cost, and perhaps introduce that which you have stated in 3.2.2 which indicates that the "no action" alternative without a permanent disposal decision, no action to be taken, would also result in higher radioactivity. And, in summary, for those reasons, we fully urge the prompt dismantlement alternative as the disposal alternative of choice for that facility.

We will be submitting written comments before the period is over. Thank you.

MR. SEEPO: Thank you very much, Mr. Wall.

Mr. Louis Watkins.

MR. WATKINS: Good evening. My name is Louis Watkins, and I'm a Councilperson in the City of Hartford, and my comments are

purely mine. I have not told my colleagues, haven't consulted the Mayor on this particular discussion, but my concern is certainly very deep, because the last time this facility did major work, use of the Griffin Line railhead which sits behind the Bellevue Square housing project that's been there for a long period of time, was required.

I like to think if we're going to dismantle this, if it happens, that you're very sympathetic with the Town of Windsor, that you want to clear up this particular area of land, and I understand, I think you should use every possible safety precaution for the town and certainly the neighboring towns and industries, so that we will understand you give us consideration when you remove this, if you decide to remove it, and remove it safely.

I am concerned as well as anyone else that the last time we removed something, that this is all top secret, and we don't know who is exposed to anything, let alone the amount of time it sits behind the Bellevue Square

4

4B

5

housing project waiting to get on the right track. I am concerned about this.

I am also concerned and I'd like to know if, once we load this, if we start moving it on rails, what intervals or levels we will measure; I mean how many times will we measure this before -- after we load this, before we even move it. I am concerned about that.

Also the plan for safety of escorting this out of the Hartford area and really, I don't really just mean out of the Hartford area, I'm not concerned only about Hartford but this town and protecting where it's going to go through any town. In the bottom of my heart I am concerned about that, and I'd like to thank you all too, but I want to make sure that we do everything possible to make sure that it's safely moved, what exposure is going to happen if it's moved from one rail to the next rail.

I don't know, if we had an escort to get it out of this particular New England

area and you have someone meet you before you get to wherever you're going. I understand that that might still be under discussion, but I'm hoping that we work together and be concerned about safety for everyone, concerned about safety from the time it's loaded, which includes the workmen, and I'm not saying it because I don't think you care, but I'm saying it because we want every possible precaution taken.

Thank you very much.

MR. SEEPO: Thank you, Mr. Watkins.

The next speaker will be Rosemary Bassilakis. Hopefully I pronounced your name correctly.

MS. BASSILAKIS: You did.

My name is Rosemary Bassilakis. I live in Haddam, Connecticut and I'm a member of the Citizens Awareness Network, CAN, and I come to you today not just as an outsider but also as a resident who lives in a reactor community. I live a mile from the Haddam nuclear power plant. I also come representing the

organization that intervened in northwestern Massachusetts in connection with the currently decommissioned reactor at the Yankee Rowe plant.

I think it's very important, and a point I have is this reactor, the Yankee Rowe reactor, was allowed to be decommissioned without an environmental impact study and in violation of the Atomic Energy Act which allows the people the right to a public hearing. This is not a public hearing, and I do hope that the public will be allowed the right to a public hearing.

What I would like to bring up right now is litigation that my group is involved with. There is currently litigation going on with the Nuclear Regulatory Commission because the Nuclear Regulatory Commission allowed Yankee Commons, that's the owner of this reactor, to get involved with rapid dismantlement of the reactor.

The contention that our group has is that this rapid dismantlement may have

exposed workers to higher radiation levels than they would have been exposed to if they had let the reactor sit for 30 years and then dismantle it. This is in violation of the ALARA mandate. The ALARA mandate is a mandate which states that workers should be exposed to levels as low as reasonably achievable, so the court has accepted the validity of our contention and they have granted disclosure of all of Yankee Commons files so that they can pull together a brief.

So I come to you today. You may not think the decision is somewhat simple, although I think it might not be very popular in this room, and that is what should be most important is the workers' safety and that if they can be exposed to less radiation by letting the reactor sit for 30 years, then that's what should be done. This is the ALARA mandate, and it's also what's safest for the people.

We're talking about people's lives. Radiation causes sickness and it's pretty well known it causes disease and death and that is more important than $14 million.

So that's my opinion on the dismantlement. I would also like to say that as very hard as it is in the community, my community, the State of Connecticut and the nation itself needs to analyze whether or not it's fair to clean up one community by contaminating another community. You want to take away the reactor here and then it's going to get buried in someone else's community, and we feel as if there are some ethical questions that need to be addressed there.

Thank you.

MR. SEEPO: Thank you very much.

Mr. Leo Canty, please.

MR. CANTY: My name is Leo Canty. I live on 27 Devon Way in Windsor, and I'm here on behalf of an organization called the Windsor Issues Forum. I've lived in Windsor since five years after the Knolls plant was put in place making me almost a better than 30-year resident of the community, and we've been involved -- our organization, Windsor Issues Forum, have been involved in a lot of issues and

actually we had a vote of our membership last night, and our official position is that we'd like the prompt dismantlement. Our organization has been working over the last year on a variety of issues, and it wasn't until yesterday actually that our organization adopted its by-laws and statement of principles and other things, and I'd like to let you hear two of these statements of principles that we embraced, to give you an idea where we're coming from on that.

One is we believe our children are the hope for a brighter future and we'll do everything we can to nurture and to educate them, and to protect the world that they will inherit, and secondly, amongst these principles in tonight's discussion, we believe clean air, water and land are vital to the stability of life in our communities, and we will do everything we can to prevent destruction and erosion of our planet, and we will undertake all efforts to restore what may have been lost through past abuse and neglect.

Now, I'm not the biggest fan of nuclear energy and nuclear reactors and other things. This plant was put in place there for a specific purpose. That purpose is now ended, and what we would like to see is that the area be restored to the environment that was there previous to the installation of that operation.

I, too, have a very tremendous concern for the health and well-being of the working people there and also the community, and what I thought that I read in the report that was submitted is that there would be safeguards and guarantees. I will -- with the prompt removal of that particular reactor and all the associated waste and other things that are involved, I would want to hold you up to the highest standard of performance to guarantee that these people are adequately protected along with the community too, but on the other hand, the risk of leaving that filth there, the risk of the political will being lost to use the money to try to sustain those types of things, the risk that we have with a lot of other areas

and nuclear power plants and the like and other types of activities that are going on with the dismantling of other nuclear areas all being focused on the possibility of a concentrated area, I think it definitely is in our best interest at this point in time for the sake of the community and the working people involved that we go ahead and take action as soon as possible. Now, "as soon as possible" still means that it may not be five years until this task is complete, and that for me is even too long, but I'd like you to move as fast as possible. Our organization is behind it, and we hope that you consider what we had to say tonight.

I do have a written piece that I'll submit to you. Thank you.

MR. SEEPO: Thank you.

Ms. Jean Pottinger.

MS. POTTINGER: My name is Jean Pottinger. I'm a member of the Hartford Griffin Line Corridor Advisory Committee, although tonight I am strictly speaking for my own self.

One of the things that we deal with all the time is having to live right on the border of this. However, I am concerned that we talk about prompt dismantlement. Prompt dismantlement calls for shifting of the large pieces that will not fit on the truck to be shipped on the Griffin rail line. If this happens, what kind of time frame are we looking at? Are we looking at two years from now when this happens?

Also when this happens, I have to agree with Councilman Watkins to make it safely and swiftly as possible. Now, on November 29, 1995, when you moved the high-level radioactive garbage on the Griffin line you ran into a snafu on AMTRAK's line right across the street from the Bellevue Square when CONRAIL refused to trip the switch at this gate until the track was cleared both ways for two hours.

As a result, that high-level radioactive waste sat four hours across from Bellevue Square on the Griffin Line. I hope that in the future you get your act together and

ship it as safely and swiftly as possible and don't have it sitting across from our housing on that siding.

Thank you.

MR. SEEPO: Thank you. Next is Mr. Mark Sussman.

MR. SUSSMAN: My name is Mark Sussman. I'm the chairman of the Windsor Conservation Commission, which is an agency of the town. We're charged with advising the Town Council and other agencies on the environmental issues.

Last fall when you were scoping out the plan for this Draft EIS, the agency and also, I would add, the Windsor Air and Water Pollution Abatement Commission voted to strongly support the preferred alternative of prompt dismantlement. I understand you have to go through this process for NEPA and, frankly, it seems to me it's really a no-brainer of a decision. It's not only the cheapest alternative, but it also will allow the Town of Windsor to put this site back into beneficial

use.

I am concerned about the comment that was made with respect to the health of workers, but I'm sure that you will make sure that the workers are not exposed to unnecessary radiation, so in sum, our commission strongly supports prompt dismantlement.

Thank you.

MR. SEEPO: Thank you.

I want to deviate from the list sequence that I first announced. If Mary Mullen-Barnett is still here, she had requested to try to get --

VOICE: She had to leave, I'm sorry.

MR. SEEPO: She had to leave. Fine. Next then would be Mr. Harold Chase. Mr. Chase here?

MR. CHASE: There you go.

MR. SEEPO: How do you do, sir.

MR. CHASE: Hi. Harold Chase, Windsor resident, U.S. Navy Retired, and past instructor in SIC.

A comment was proposed for keeping the reactor there for 30 years, where it is in Windsor. To my knowledge, right now, there is no proposed use for that land; is that right? In a 30-year plan, if there is no proposed use now, you could stop it in ten years and then start dismantling. You could go in any time during that 30 years, but, as the people say, if you have less radioactivity when you dismantle it, you have a little safer job; but getting to the Goodwin Pond drainage brook, no matter what's down there, clean that up now, and talk to A.B.B. (Asea Brown Boveri) about maybe draining that portion and get the money from them because they're the problem. Why should we clean up their mess? That was private money. They made profit on that, the company, whatever. 12 13 14

I believe on my proposal you're going to maintain a permanent force there, even a 30-year plan. There will be a manned force, not the modern type security by some alarm company. Will it be man force? Well, O.K. 15

That's all I wanted to say. Thank you.

MR. SEEPO: Thank you, Mr. Chase.

Lillian Goldberg.

MS. GOLDBERG: I'm Lillian Goldberg, 38-year resident of Windsor. This shirt represents the National Survivors group my husband and I started many years ago.

MR. SEEPO: If you could speak just a little bit slower and maybe a little bit louder.

MS. GOLDBERG: My husband was in the service, in the Army, and received the radiation exposure that caused the cancer, and I sat right next to him and I watched him die over a three-year period nine years ago. When we moved to Windsor in 1959, he started working at Combustion Engineering and with the start-up, he was an electronic technician. Watching him die of that cancer was horrible.

I didn't move out, but I saw what that ground was like. That ground is not usable. I have grandchildren now that live in

town. I would like to see the grounds there be cleaned up completely, and soon if possible, and I know it can be done safely if you try to do that.

I've spoken to the Department of Energy, and there are ways of getting rid of it so that we can have a safe environment. We have a park, a Northwest Park that we established there, a big recreation area for the children, and it's not too far from the site at the present time. My recommendation is we clean it up as soon as possible and make our environment safe because I don't want to see more radiation exposure victims, because right now, we're at a point where there's the possibility of that.

MR. SEEPO: Thank you very much. Next up is Mr. Don Johnson.

MR. JOHNSON: My name is Don Johnson. I live at 908 Plymouth Street.

I'll keep it very short. I think if there are any considerations other than the immediate removal of this site, it's unconscionable. We've dealt with this site,

although in a fair amount of secrecy, for over 30 years. We've given our parks to the Navy. One of my friends trained there at the Site. It's time to get rid of it, and I think anything short of that is unfair to the Town of Windsor; it's unfair to my kids, and to the future kids of the community. That's all.

MR. SEEPO: Mr. Gary Johnson.

MR. JOHNSON: Gary Johnson, 248 Ethan Drive.

Just to reiterate on the past comments, I'd like to see a prompt clean-up. It's still the most cost-effective alternative, and also the complete clean-up of the sediment of the associated pond and stream regardless if it was this site or the neighboring site, that it get done at the same time and cleaned.

MR. SEEPO: Thank you.

Mr. Tom McCormick.

MR. McCORMICK: Good evening. I'd like to say I'm prejudiced against DOE. I don't believe anything you say because you have a history of lying. You have a history of the

worst kind of radiation research, the Hanford studies, Mancuso, Maxey Flats, the tri-state leukemia studies, and numerous other examples. You fund disposal facilities that leak and leak and leak and leak, West Valley, Savannah, Rocky Flats, let's go through the list. You guys do a bad, bad job.

You're the guys that have killed at least 100,000 people from fallout from nuclear bombs. You know who you are. So I'm prejudiced against you. I'll say it, I am, maybe a little worse than prejudiced; but I guess there's always a future and maybe in the future there will be some reason why I shouldn't be so prejudiced against you.

There's only one thing to do with that pressure vessel over there, and that's really what the issue is. Took a lot of other stuff, lot of other pieces, but the pressure vessel, that's really the thing involved in this whole story -- not a lot of old junk. Just one thing.

Put it in the biggest possible

16

17

E-115

pieces in the biggest possible stainless steel container. Put it in concrete, put it above the ground in a dry on-site area. That's what the whole story is about when you get to it. Don't bury it. Don't dig a trench like you've done so many times in the past. You dump it in the ground, and you take the bulldozer and bury it. That's what's done historically time and time again. And what do we have as a result? Migration of plutonium, Maxey Flats.

One of your other great disposal methods, tanks at Hanford leaking hundreds and hundreds of thousands of gallons of radioactive waste stuff in the soil headed toward the Columbia River, thanks to DOE.

West Valley, massive contamination. Now, you want to take something from Windsor, you want to take it to another one of your low level sites. What's going to happen there? Going to contaminate another site? That site going to leak? One thing -- just one thing: Put it in stainless steel, encase it, keep it dry. And we know why that's not done,

17

because of cost. We know it's the safest; you know it's the safest, and I think safety is really the big issue here.

We know from testimony of people like Karl Morgan, who was Assistant Health Director for the Department of Energy, Oak Ridge, a consistent, persistent pattern of firing people, of taking away their contracts when they said radiation was more dangerous than the government was saying previous.

I think he listed seven examples to Congress. Mancuso was the most outstanding one. Are you people going to change your story? Going to change your modus of operation? I doubt it. You see that the NRC is just like Northeast Utility, and there's some opinion out there that NRC is a little bit better than the Department of Energy. Gives cause for some concern.

And what about this stuff in the brook? What about this stuff in the pond? That's really a very difficult situation. The levels aren't outrageously high, but the stuff is in there. It's in there just the same, as a

18

result of the Department of Energy, I think it's safe to say that you're involved in it. And how bad, we don't know, so please get it cleaned up.

It's going to cost a lot of money, sure. Now, who's going to pay? The following issue, who is going to pay? Just one thing, the stockholders of the company that put it there, one thing. Not the taxpayers. And if maybe it can be proven that there were government officials involved in that sort of business, well maybe we can go after their pension. Maybe we'll have to make them sell their houses to pay for it. People that are responsible for poisoning have to be responsible for cleaning it up. I am not allowed to take a poison and throw it into the water, nor should DOE be allowed, nor any corporation be allowed. It's a criminal offense, and we know that the DOE is one of the major criminals on the face of this earth, having killed at least 100,000 people with the fallout from their bomb tests, and that they suppressed the dangers of that

fallout consistently, and that's not my -- my finding, but the finding of the United States Congress.

So we know who you are. We'll be watching. What else can I say? You push the limit too far, there'll be a consequence.

Now, what's that danger? What's that radiation sitting right over there in the pool? Tritium -- carcinogenic, mutagenic, generally considered a lot more dangerous than ever previously believed, and I think people should not only know what's over there, but low-level radiation does not mean low danger. In fact, there's some research coming out now, even some of it done by these guys at INEL up in Idaho, showing that extremely low levels of radiation spread out over time with chronic exposure, so to speak, at levels approaching background levels are even more hazardous than some higher levels, with the creation of free radicals in the cells. Radiation hits the cells, hits the water molecule, splits that water molecule; a radical migrates to the cell

18

19

19B

E-117

wall, destroys the cell wall and knocks down the immune system. If people get sick from Windsor one day, they may go to DOE or the corporation that dumped their poison saying, you may be sick, maybe not, because how do I prove that I have a major case, say that of a horrible virus, and the only event I can show if I'm being exposed to radiation that knocks down my immune system.

I think this lady here knows all about it. There are Congressional findings from studies that have been done with guinea pigs. The DOE and their predecessor, the Atomic Energy Commission, literally misled the American public and deliberately exposed us to radiation. The United States government tried to step in and expose the danger. The Atomic Energy Commission, the predecessor to these guys, went in with armed guards and seized the records, seized the information, and took it away, just seized it, took it away.

When other people around their facilities have shown there's danger from this

low-level radiation, they're attacked, they're criticized, and every attempt is made to drive them out of their office that they hold.

There's an outstanding case in Colorado around their plutonium trigger factory there. They had a county health director who was just harangued and harassed and harassed and lies told about, and it was proven that he was right and that these guys, you know what they were doing. So there is a danger.

People, please push for clean-up. One thing, clean up the sediment, get the stuff out of the water and, two, insist that the pressure vessel be encased in stainless steel because all you're doin', in a sense, like this lady mentioned before, is you're taking your poison from Windsor, and you're taking it and giving it to someone else, and I don't have an ethical question about that. There's no mind -- no question in my mind it's unethical, simply unethical, to take your trash and to dump it on someone else in one of their facilities which they monitor, that leaks at Hanford, leaks

18

17

20

at Mancuso, leaks at West Valley, leaks at Sheffield.

There's not an ethical question. The ethics really have been decided. Now it's really a matter of putting that stuff in the best container that can hold it.

Thank you.

MR. SEEPO: Thank you.

Mr. Graff?

MR. GRAFF: Randall Graff, Deputy Mayor of the Town of Windsor.

I, like Councilman Trinks before me, speak more as a citizen than anything else. I'm a lifelong resident of the Town of Windsor, have known for most of my life about the facility over there. In addition to that, my oldest son was trained at that facility and is still in the Navy serving in the submarines in Washington.

This Federal facility has been, to my knowledge, a relatively good citizen over these years. I know that the health risks and concerns everyone has in regard to exposure to

radiation, but as a resident and a member of the Town Council my position would be I would like it cleaned up totally as soon as possible, and I think this is a concern that is facing the town and it's not Windsor's trash. It's everybody in the country's trash, if we can look at it that way.

Who's going to pay for it? We all are. We're all taxpayers; we're all going to pay for the facility that belongs to us. The only suggestion I might have for those here, people say there's no plan for this property long range. As the Mayor and Town Councilman, just as we're saying if this site is totally cleaned up based on where it is, I'd like to see it given to the town or sold to the town in some way that would be in keeping with that area and would be, once it's determined it's useful and clean, that it would be, I think, a great gesture from the government.

Thank you.

MR. SEEPO: Thank you.

Now, ladies and gentlemen, at

this time, we have no further registrants. Is there anyone else that would like to speak?

(There was no response.)

As I indicated earlier, this meeting is not the only method for providing us input. Comments can be provided in writing. Written comments should be sent to Mr. Overton. The address, as we earlier stated, is available at the registration table. It's also on the first page of the Draft EIS document. The comment period remaine open until Auguet 19th.

On behalf of the U. S. Department of Energy, I would like to thank all of you for taking the time to participate in tonight'e meeting. We appreciate your input and we will make sure that all comments are addressed in the Final Environmental Impact Statement.

This meeting is now adjourned. Good night.

(Whereupon at 8:20 p.m., the meeting was adjourned.)

STATE OF NEW YORK)
COUNTY OF ALBANY)

Pauline E. Williman, being duly sworn, deposes and says:

That she is a Certified Shorthand Reporter licensed by the University of the State of New York under permanent Certificate Number 297 issued May 21, 1949; that she acted as the Official Reporter at the hearing herein on August 7, 1996; that the transcript to which this affidavit is annexed is an accurate transcript of said proceedings to the best of deponent'e knowledge and belief.

Pauline E. Williman

Sworn to before me this
21 day of August, 1996

Irma H. Davis

IRMA H. DAVIS
Notary Public, State of New York
No. 4811020
Commission Expires March 30, 1997

Public Hearing Commenters

Comment Responses:

Comment 1 (Mr. Wall).
The commenter correctly identifies that the land comprising the Windsor Site is not presently on the tax rolls of the Town of Windsor. If the property were to be transferred to a taxpaying entity, it is expected that the land would be added to the tax rolls. However, considering the small size of the Windsor Site, the impact on the tax base of the town is not expected to be significant. Sections 5.1.6, 5.2.6 and 5.3.6 have been revised in the Final Environmental Impact Statement to reflect the above.

Comment 2 (Mr. Wall).
A copy of the voluntary facility assessment report will be provided to the Town of Windsor for information when it is provided to the State of Connecticut and the Environmental Protection Agency - Region I.

Comment 3 (Mr. Wall).
The analysis of the deferred dismantlement alternative in the Draft Environmental Impact Statement is consistent with reasonably foreseeable radioactive waste disposal practices. In particular, there are no active discussions of closing the Savannah River Site in South Carolina, and an Environmental Impact Statement (Reference 5-2 of the Draft Environmental Impact Statement) analyzing future radioactive waste disposal operations at the Savannah River Site was recently issued.

Naval Reactors acknowledges that analysis of any action 30 years in the future brings with it uncertainties about how such an action would be executed. The relative certainty of the prompt dismantlement alternative is one of the favorable aspects of this alternative. In the Final Environmental Impact Statement, Naval Reactors has identified the prompt dismantlement alternative as the preferred alternative. Also, an acknowledgment of the greater degree of certainty associated with the prompt dismantlement alternative has been added to the Final Environmental Impact Statement Summary.

Comment 4 (Mr. Wall).
The following additional words have been added to Note 8 of Table S-1 in the Final Environmental Impact Statement: "Taking into consideration the eventual need for a permanent disposal decision, the no action alternative would ultimately result in a higher figure."

Comment 4B (Mr. Wall).
As discussed in Section 3.2.2 of the Draft Environmental Impact Statement, many of the materials from the S1C Prototype reactor plant would still be radioactive after a thirty year deferral period due to the presence of longer-lived radionuclides which would remain. However, the total amount of radioactivity present in the reactor plant would decrease with time due to radioactive decay. Therefore, the no action alternative would not result in a higher amount of radioactivity.

Public Hearing Commenters

Comment Responses:

Comment 5 (Mr. Watkins).
The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are very small.

All shipments of radioactive materials from the Windsor Site would be low-level radioactive waste or recyclable material. Low-level radioactive materials have been shipped safely from Naval Nuclear Propulsion Program facilities, including the Windsor Site during its operations, for over 35 years. All shipments have been accomplished in accordance with applicable transportation regulations.

Although there is no regulatory requirement for prenotification of such shipments from the Windsor Site in Connecticut or to escort these shipments, Naval Reactors has periodically interfaced with appropriate regulatory agencies regarding such shipments and will continue to do so. In the past, such as the November 1995 shipment of the spent nuclear fuel from the Windsor Site, overweight and oversize permits were required for the heavy hauler shipment leg to the Griffin Line. This required coordination with the State of Connecticut Department of Transportation. Additionally, a Town of Windsor police escort accompanied this part of the shipment to ensure traffic safety. Due to the very infrequent use of the Griffin Line, the rail shipment was coordinated with City of Hartford and Town of Bloomfield law enforcement officials to ensure traffic safety at places where the Griffin Line crosses roads. Similar coordination would occur for the one or two rail shipments that would result from the prompt and deferred dismantlement alternatives.

For further discussion of the spent nuclear fuel shipment which occurred in November 1995, please refer to the response to Public Hearing Comment 11.

Public Hearing Commenters

Comment Responses:

Comment 6 (Mr. Watkins).
Prior to leaving the Windsor Site, radiation levels for all packages of radioactive material are measured on contact with the package and at one meter from the package. These measurements assure that the loaded package complies with Department of Transportation requirements. Upon arrival at its destination, packages are rechecked by receiving personnel as part of their receipt procedure to confirm that the radiation levels still meet the Department of Transportation requirements. There is no need or requirement for additional monitoring during transit.

Comment 7 (Ms. Bassilakis).
The public hearing of August 7, 1996 was conducted in accordance with and fulfilled the requirements issued by the Council on Environmental Quality (40 CFR § 1506.6) and the requirements issued by the Department of Energy (10 CFR § 1021.313).

Comment 8 (Ms. Bassilakis).
Naval Reactors' practices for minimizing occupational radiation exposure are consistent with ALARA standards. As stated in Section 5.1.10.1.1 and Appendix B, Table B-6 of the Draft Environmental Impact Statement, under the prompt dismantlement alternative individual occupational radiation exposures would be limited to 2 rem per year even though Federal limits allow exposures of up to 5 rem per year. As stated on page S-3 of the Draft Environmental Impact Statement, the occupational radiation exposure associated with the prompt dismantlement alternative is comparable in magnitude to the radiation exposure routinely received during operation and maintenance of Naval prototype reactors. Table S-1 of the Draft Environmental Impact Statement shows that the risk of latent fatal cancers to workers is small for all the alternatives evaluated. There is no requirement in the National Environmental Policy Act or any other law or regulation to choose the alternative with the lowest occupational radiation exposure. The National Environmental Policy Act requires full disclosure of the impacts but does not require selection of any particular alternative. The occupational radiation exposure was fully considered in identifying the prompt dismantlement alternative as the preferred alternative in the Final Environmental Impact Statement. Similarly, the Final Environmental Impact Statement clearly lays out all of the advantages and disadvantages of each alternative for use by the Federal official who will make the final decision.

Comments 9 (Ms. Bassilakis) and 20 (Mr. McCormick).
The Draft Environmental Impact Statement fully discloses the fact that some of the alternatives (prompt dismantlement and deferred dismantlement) assume that waste would be removed from one location in the country and placed in another location. As analyzed in Section 5 and summarized in Section 6 of the Draft Environmental Impact Statement, there are no significant impacts to the public for any of the identified alternatives. The decision maker can take this into account in making the decision on the alternative selected for implementation. Please

Public Hearing Commenters

Comment Responses:

refer to Public Hearing Comment 17 (Mr. McCormick) for further discussion on disposal site options and impacts.

Comment 10 (Mrs. Pottinger).
Naval Reactors holds a 5 year lease from the State of Connecticut Department of Transportation for occasional use of the Griffin Line. This lease expires March 31, 2000 and can be terminated by the State of Connecticut Department of Transportation. The State of Connecticut Department of Transportation has not provided any indication that it intends to terminate this lease early.

If the preferred alternative of prompt dismantlement is selected, use of the Griffin Line by Naval Reactors should be complete by the end of 1998. In the event of any potential conflict, Naval Reactors would work with the Greater Hartford Transit District to minimize any inconvenience or delay.

Additional detailed engineering evaluation of dismantlement methods has indicated that it may be desirable to ship the S1C Prototype reactor plant primary shield tank in a single large package by rail rather than cutting it into smaller sections for truck shipment. In that case, there would be two rail shipments rather than one as discussed in the Draft Environmental Impact Statement. A discussion on the possibility of a second rail shipment has been added to the Final Environmental Impact Statement. Although radiological and nonradiological impacts from both truck and rail shipments are very small, rail shipments have lower impacts than truck shipments. Therefore, the transportation analysis in the Final Environmental Impact Statement continues to assume one rail shipment.

Comment 11 (Mrs. Pottinger).
Section 2.2 of the Draft Environmental Impact Statement explains that the removal of spent nuclear fuel from the S1C Prototype reactor plant was completed in February 1995. The shipment of a single package of spent nuclear fuel occurred on November 29, 1995. The dose rate at one meter from the package measured less than 0.1 millirem per hour which is 1 percent of the allowable Federal limit and is indistinguishable from naturally occurring background radiation levels.

During normal railroad track switching operations, the shipment waited at the Griffin and Conrail Line intersection for about 1½ hours. This was confirmed by a check of record logs maintained by couriers who accompanied the shipment. The time for the railroad track switching was within the range of routine stopping times during normal railroad transportation operations. Since the radiation levels from the package were indistinguishable from background radiation levels, the short stop during transit posed no additional risk to the public.

The Draft Environmental Impact Statement provides the assessment of the potential safety and health impacts to workers and the public from the transportation of low-level radioactive

Public Hearing Commenters

Comment Responses:

materials from the Windsor Site during the dismantlement of the Site facilities. The results of the analysis provided in Appendix C of the Draft Environmental Impact Statement show that the potential impacts to workers and to people living along the transportation routes would be very small from either the prompt dismantlement alternative or the deferred dismantlement alternative.

Appendix C of the Draft Environmental Impact Statement in Sections C.3, C.4, C.5 and C.7 describes the analysis input variables and the potential risks to the public. Variables used in the computer codes for the risk analysis include estimated stop times and radiation levels. Estimated risks to the public were based on exposure to persons living within about ½ mile of the length of the transportation route, exposure to persons sharing the transportation route (such as train passengers), and exposure to persons (such as residents along the transportation route) during stops longer than the one which occurred during the spent fuel shipment discussed above. All of the assumptions used in the analysis are conservative, and the results of the analysis indicate that the potential risks are small.

Comment 12 (Mr. Chase).
As stated on page S-2 of the Summary and in Chapter 3 of the Draft Environmental Impact Statement, three alternatives have been evaluated; prompt dismantlement, deferred dismantlement for 30 years, and no action. Impacts are described in detail in the Environmental Impact Statement for each of these alternatives. The commenter suggests another alternative; deferred dismantlement for about 10 years. The alternative suggested by the commenter is a variation between the prompt and deferred dismantlement alternatives. The environmental impacts of this variation would fall within the range between those of the prompt dismantlement and the deferred dismantlement. Section 1505.1 (e) of the Council on Environmental Quality guidelines allows the decision maker to consider alternatives that are encompassed by the range of alternatives evaluated in detail. Consequently, the Draft Environmental Impact Statement is sufficient to allow for consideration of variations of the type proposed by the commenter.

Comments 13 (Mr. Chase), 16 (Mr. G. Johnson) and 18 (Mr. McCormick).
As discussed in Section 4.5.4.2 of the Draft Environmental Impact Statement, the drainage brook is not on the Windsor Site property. Since the large majority of the radioactivity falls under the Formerly Utilized Sites Remedial Action Program authority or may be Combustion Engineering, Inc.'s responsibility (the drainage brook is on the Combustion Engineering, Inc.'s property), and the regulatory process for addressing the radioactivity in the brook is still in its early phases, remediation of the brook is not being addressed within the scope of this Environmental Impact Statement process. Any action taken as a result of the National Environmental Policy Act decision making process for the disposal of the S1C Prototype reactor plant would not affect future evaluation of the drainage brook or remedial action on the Combustion Engineering, Inc. site.

Public Hearing Commenters

Comment Responses:

Further details on the drainage brook are included in the response to the State of Connecticut Department of Environmental Protection Comment 3.

Although no radioactivity from Windsor Site operations is expected to be present in Goodwin Pond, confirmatory sampling for radioactivity will be performed. This sampling is further discussed in Appendix G which has been added to the Final Environmental Impact Statement.

Sampling for chemical residuals in Goodwin Pond will also be performed as described in Appendix F which has been added to the Final Environmental Impact Statement. This sampling will assist in determining if remediation or further investigative action concerning the pond is necessary.

Comments 14 (Mr. Chase) and 19 (Mr. McCormick).
Please refer to the State of Connecticut Department of Environmental Protection Comment 3 for additional information. Since the actions to be taken have not yet been determined, the financial liability of the various parties is not yet known. These liabilities will be defined as part of the ongoing Former Utilized Sites Remedial Action Program process.

Comment 15 (Mr. Chase).
During a caretaking period, access to fenced areas and buildings at the Windsor Site would be controlled by both a staffed security force and a remote alarm system. This additional information has been added to Section 3.2.1 of the Final Environmental Impact Statement.

Comment 16 (Mr. G. Johnson).
See response to Comment 13 above.

Comment 17 (Mr. McCormick).
On-site disposal of the S1C Prototype reactor plant or its component parts is discussed in Sections 3.4.2 and 3.4.3 of the Draft Environmental Impact Statement. Based on the small size of the Windsor Site property, the fact that it has no history as a radioactive waste disposal site, and land disposal restrictions for radioactive materials, on-site disposal was not considered to be a practical alternative.

With regard to the packaging of the reactor pressure vessel, the Draft Environmental Impact Statement discussed the robust nature of the packaging that would be employed for the reactor pressure vessel. As discussed in Section 3.1.3, the inherent nature of the reactor pressure vessel itself provides for long term containment of the radioactivity. Nearly all of the radioactive atoms are within the metal matrix of the thick reactor pressure vessel steel since these radioactive atoms were created by neutrons being absorbed by some of the metal atoms. This type of radioactivity can only be released by the slow process of corrosion, and even if

Public Hearing Commenters

Comment Responses:

there were no package at all, nearly all of this radioactivity would decay to stable atoms before it could be released. Nevertheless, Sections 3.1.3 and C.5.2 of the Draft Environmental Impact Statement discuss how the reactor pressure vessel would be packaged in a large shielded container for shipping and burial. This container would provide additional long term containment. This shipping container would meet all transportation and burial site requirements.

Section 5.1.13 of the Draft Environmental Impact Statement discusses how disposal of the radioactive waste that would be generated by the prompt dismantlement alternative has already been evaluated in the Savannah River Site Waste Management Final Environmental Impact Statement (Reference 5-2 of the Draft Environmental Impact Statement).

Comment 18 (Mr. McCormick).
See response to Comment 13 above.

Comment 19 (Mr. McCormick).
See response to Comment 14 above.

Comment 19B (Mr. McCormick).
As discussed in Appendix A, Section A.4 of the Draft Environmental Impact Statement, the risk estimates for radiation exposure used in the Environmental Impact Statement are based on the most recent risk estimates prepared by the United Nations Scientific Committee on the Effects of Atomic Radiation (Reference A-2), and the National Academy of Sciences - National Research Council Advisory Committee on the Biological Effects of Ionizing Radiations (Reference A-3).

Comment 20 (Mr. McCormick).
See response to Comment 9 above.

Comment 21 (Mr. Graff).
As discussed in Section 3.1.4 of the Draft Environmental Impact Statement, transfer of Windsor Site property ownership must follow prescribed processes defined in Federal, State, and local regulations, including the State of Connecticut Property Transfer Program and the Windsor Site property deed.

THIS PAGE IS INTENTIONALLY BLANK

ADDITIONAL LETTERS

THIS PAGE IS INTENTIONALLY BLANK

GROCERY, BAKERY, CONSTRUCTION DRIVERS AND HELPERS

LOCAL 559

Affiliated with the International Brotherhood of Teamsters
Teamsters Joint Council No. 64
400 CHAPEL ROAD • SOUTH WINDSOR, CONNECTICUT
(860) 528-9461 • FAX (860) 289-6568

ROBERT DUBIAN
Secretary-Treasurer

August 16, 1996

Mr. Christopher G. Overton, Chief
Windsor Field Office
Office of Naval Reactors
U.S. Dept. of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton:

Teamsters Local 559 has had four members working at the Knowles Lab site for sometime doing warehouse and relocated work.

The area monitor, Ed Daily, and Local 559 members have had no cases of any danger to them up to now. Local 559 feels that there has been minimum risk involved. The nuclear regulator agency has been monitoring all safety and health issues on site. Local 559 feels that the Reactor should be dismantled now while trained and qualified people are available. Letting the reactor sit to be dismantled at a later date or to never be dismantled will only endanger the public for years to come.

Local 559 is strongly in favor of dismantling the Knowles Lab Reactor immediately.

If I can be of any further service, don't hesitate to call.

Sincerely,

Robert A. Bell
Business Representative

RAB:mgm
cc: G. Harper, Electric Boat
G. Clark

WINDSOR Issues Forum

Information, education, activation, and participation for a progressive agenda

August 8, 1996

Mr. C.G. Overton
Chief, Windsor Field Office
Office of Naval Reactors, U.S. Dpt. of Energy
P.O. Box 393
Windsor CT, 06095

Dear Mr. Overton,

On behalf of the members of the Windsor Issues Forum, a community based organization in Windsor dedicated by its principles to the preservation of clean water, air, and environment, we wish to voice our overwhelming support for the option of immediate removal of the S1C Prototype Reactor and all associated nuclear components and waste located at the Knolls Atomic Power Lab and surrounding area. It is our belief that Windsor is a beautiful and pristine community and in no way do we wish to contaminate our environment with a waste site that could haunt us for many years.

Windsor is a caring and giving community. We have given our government the use of our land for reactor training and testing for over 30 years. We have endured the fear of hazards and suffered the scarring caused by the spills. The activity has ended at the lab and all that remains are the scraps of a program that served its purpose but is no longer wanted or needed. Windsor has given its air, water and land so our nation could foster world peace. The job is done here now it's time we are granted peace of mind and relieved of the burden of this waste site.

Housing the waste for 30 years for the Cobalt to decay and then removal is no option. Not making a decision is also out of the question. All indications I have seen are that immediate removal of the reactor, infrastructure, and all contamination is the best way to go. I don't need to make technical environmental arguments dealing with geological, meteorological or agricultural composition for the area, they are a factor but, the bottom line is that we had no radioactive storage or contamination in the area before 1959 and if the program is serving no purpose, we don't need it now.

For our current residents, and especially for our children who will soon inherit our beautiful town, we implore you to give back our land in the condition you found it. Windsor is Connecticut's first town. It is first in our hearts and first in our minds in the most positive of ways. We don't ever want Windsor to become the first town one thinks of when the topic of nuclear waste comes up, otherwise Windsor will end up being the last place anyone will want to go, and that will be a real waste of a lovely place.

Please consider our pleas. Do all you can to remove the reactor and clean the site as soon as you can.

Sincerely,

Leo Canty

Leo Canty, Board Member
Windsor Issues Forum
P.O. Box 14
Windsor CT, 06085

International Brotherhood of

BOILERMAKERS · IRON SHIP BUILDERS **BLACKSMITHS · FORGERS & HELPERS**

753 State Avenue

Kansas City, Kansas 66101

LOCAL LODGE NO. 237

ADDRESS OF WRITER BELOW

DATE August 15, 19 96

Anthony DeFrancesco, Jr.
297 Burnside Avenue
East Hartford, CT 06108

Mr. Christopher G. Overton, Chief
Windsor Field Office,
Office of Naval Reactors
U.S. Department of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton,

I would like to express my views on the full completion of the Knolls Atomic Power Laboratory dismantlement project.

This project was awarded to General Dynamics Electric Boat Division and with good reason, they possess a knowledgeable engineering staff experienced in the nuclear industry.

Having worked on this project for two (2) years, I speak from experience when saying that I recognize the effectiveness of their well planned procedures to minimize radiation exposure and to provide a safe working environment. This site is under the guidelines of N.A.V.S.E.A. in regards to personal radiation exposure. These exposure limits are far lower than the exposure limits accepted at commercial power plants throughout the state. Through engineered procedures and the exclusive training of the work force, I view this project as one of the safest I've ever seen.

It should be of great comfort to the Windsor area citizens, to witness a nuclear reactor, including all support facilities, being decommissioned in such a safe and controlled manner.

With completion of this project comes an additional reward; An atomic reactor site that has been restored to it's original environmental condition.

This is the goal of everyone involved and we are looking forward to seeing it's completion.

Sincerely,

Anthony DeFrancesco, Jr.

Anthony DeFrancesco, Jr.
Business Manager

AD:jl

Kenneth Lawhorn
205 West Street
Windsor, CT 06095
August 16, 1996

Mr. Christopher G. Overton, Chief
Windsor Field Office,
Office of Naval Reactors
U.S. Department of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton,

As a resident of the town of Windsor and an employee of a contractor currently working at the Knolls Atomic Laboratory site, I feel that the appropriate decision for the Department of Energy would be to, immediately, dismantle the SIC Prototype Reactor. The environment and the citizens of Windsor would benefit greatly if this site were restored to it's natural state. This would also be the most cost effective way to manage this facility in the future.

I have worked in the construction industry for approximately twenty-five (25) years. Although the death and injury rate is higher among construction workers in comparison to other industries, this rate, at nuclear facilities, is much lower than the normal rate. As I have worked at numerous site's, both nuclear and commercial, the safety guidelines and procedures set forth by the D.O.E., Office of Naval Reactors, are the safest that I have seen in my line of work. The levels of exposure to radiation and contamination are also much lower on this site than the levels allowed by the N.R.C. at other nuclear sites. Having been involved in the de-fueling of the SIC, I feel confident that the Office of Naval Reactors will be competent enough to oversee the dismantlement and will ensure the highest priority being towards the health & safety of the workers. All workers at the SIC site have been trained to follow specific procedures as to minimize their exposure to radiation. Using the right technology and proper planning, the dismantlement can be performed with a minimal amount of exposure to the workers.

As I stated previously, I currently live in the town of Windsor with my family and live within two (2) miles of the site. If I thought that this project would jeopardize my health and well being, I would not be in favor of dismantling and disposing of the SIC Reactor.

Sincerely,

Kenneth Lawhorn

125 Duncaster Road, Bloomfield, Ct. 06002

August 18, 1996

Mr. Christopher G. Overton, Chief
Windsor Field Office, Office of Naval Reactors
U.S. Department of Energy
PO Box 393
Windsor. CT 06095

Dear Mr. Overton:

As a resident of Bloomfield, CT living within the three mile radius of the Windsor Site, I wish to urge you to proceed with the Prompt Dismantlement Alternative outlined in your June 1996 Draft Environmental Impact Statement, leading to unrestricted release of the site. This option certainly appeared to be preferred by the public and public officials at your public meeting to receive comments. Now would seem to be the moment when this nation has the political will to see this task completed. Delaying the task for a later generation and at higher estimated total cost does not appear to be an attractive alternative.

Thank you for the opportunity to read and comment on this Draft Environmental Impact Document. Please keep me on your mailing list for any further public information releases as this decommissioning project proceeds. I am a most interested nearby resident.

Yours truly,

Jack Moulton

August 14, 1996

Mark Pinard
650 Stone Road
Windsor, CT 06095

Mr. Christopher G. Overton, Chief
Windsor Field Office
Office of Naval Reactors
U.S. Dept. of Energy
P.O. Box 393
Windsor, CT 06095

Dear Mr. Overton,

As a lifelong resident of the town of Windsor and an employee of a contractor, currently working at the Knolls Laboratory site, I feel that the proper decision for the Department of Energy should be to immediately dismantle the SIC Prototype Reactor. The environment and the citizens of Windsor would benefit if this site were to be restored to it's natural state as soon as possible. The immediate dismantlement is also the most cost effective way to manage this facility in the future.

I have worked in the construction field for approximately fifteen (15) years. And, although the death and injury rate for construction workers is higher than other industries. The death and injury rate for construction workers at nuclear facilities is lower than the normal rate. Having worked at numerous site's, both nuclear and conventional, the safety guidelines and procedures set forth by the D.O.E. Office of Naval Reactors are the safest that I have seen in my line of work. The levels of exposure to radiation and contamination are also much lower on sites overseen by the office of Naval Reactors than the N.R.C. allows on commercial nuclear sites. Having been involved first hand in the de-fueling of the SIC, I feel confident that the Office of Naval Reactors will be competent enough to oversee the dismantlement of the SIC reactor, ensuring the highest priority be towards the health & safety of the workers. All the workers at the SIC site have been trained in procedures to minimize their exposure to radiation. They are also made aware of the minimal risks involved in working with radiation. Using the right technology and proper planning the dismantlement could be performed with a minimal amount of exposure to the workers.

As I stated previously I have lived in the town of Windsor all my life. I currently reside, with my family, within three (3) miles of the site. If I thought that this project would, in any way, jeopardize my children's health and well being I would not be in favor of dismantling and disposing of the SIC Reactor.

Thank You,

Mark Pinard

APPENDIX F

DESCRIPTION OF THE NAVAL REACTORS VOLUNTARY FACILITY ASSESSMENT PROGRAM FOR THE WINDSOR SITE

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

LIST OF TABLES

TARGET PARAMETERS LISTS

LIST OF FIGURES

THIS PAGE IS INTENTIONALLY BLANK

F.1 Purpose

This Appendix has been added to the Final Environmental Impact Statement to provide additional information on the Naval Reactors Voluntary Facility Assessment Program for the Windsor Site. It did not appear in the Draft Environmental Impact Statement.

F.2 Background

In support of the inactivation activities at the Windsor Site, Naval Reactors initiated a Voluntary Facility Assessment Program under the authority of the United States Environmental Protection Agency. The Voluntary Facility Assessment is being conducted within the framework of the Federal Resource Conservation and Recovery Act (RCRA) Corrective Action Program. The State of Connecticut Department of Environmental Protection has been invited to participate in all aspects of this work to provide an opportunity for their concerns to be properly addressed. The first step of this assessment is to determine whether chemical releases exist which would require further characterization to assess human health or environmental impacts.

The major aspects of the Windsor Site Voluntary Facility Assessment Program are described below:

1. Review historical Windsor Site operations to identify areas at the Windsor Site that require further investigation (See Section F.3). Naval Reactors completed this review and provided a summary of historical Windsor Site operations to the Environmental Protection Agency - Region I and the Connecticut Department of Environmental Protection in 1995.

2. Design a sampling plan to investigate the areas identified from the historical operations review (See Section F.4). The Windsor Site Voluntary Facility Assessment sampling plan was developed by Naval Reactors and transmitted to the Environmental Protection Agency - Region I and the Connecticut Department of Environmental Protection for review and comment in 1995. In July 1996, Naval Reactors met with personnel from the Environmental Protection Agency - Region I and the Connecticut Department of Environmental Protection to finalize the sampling plan.

3. Implement the sampling plan by collecting samples and performing laboratory analyses (See Sections F.5 and F.6). Following completion of the sampling plan, a report will be prepared and provided to regulatory agencies. The report will provide the basis for discussions among the Environmental Protection Agency - Region I, the Connecticut Department of Environmental Protection, and Naval Reactors on the need for any additional investigation or cleanup.

The assessment process described above is supplemented by inspections and sampling which routinely occur during the removal of site systems. As stated in Sections 3.1.4 and 5.1.5.2 of this Environmental Impact Statement, Windsor Site dismantlement activities will include removal of all site systems. Inspections will be performed for evidence of potential releases (e.g., odors, soil staining, loss of integrity) during the removal of systems. In the event potential releases to the environment are indicated by these inspections, additional samples will be collected. Such sampling activities would be conducted consistent with the sampling plan. Any release indications would be discussed with the Environmental Protection Agency - Region I and the Connecticut Department of Environmental Protection and evaluated for addition to the Voluntary Facility Assessment Program for further action.

F.3 Review of Windsor Site Operations

A detailed review of historical operations was performed to identify areas where chemical releases did or may have occurred at the Windsor Site. The review process followed the guidance contained in the Environmental Protection Agency document EPA/530-86-053, *RCRA Facility Assessment Guidance*, October 1986, as well as other Environmental Protection Agency - Region I guidance. This process included a detailed review of Windsor Site records, interviews with personnel knowledgeable of Windsor Site operations, and an inspection of the site facilities. The review focused on operations and equipment that could have had a potential environmental impact, such as in-ground tanks, heating boilers, cooling tower, industrial drainage, waste management, and known chemical releases no matter how minor.

Results of the detailed review were compiled in a summary which was provided to the Environmental Protection Agency - Region I and the Connecticut Department of Environmental Protection. The summary provides a detailed description of Windsor Site operations and establishes that burial of discarded chemicals did not occur on the Windsor Site. However, the summary identified a few areas where minor releases of chemicals to the environment did or may have occurred from past operations.

F.4 Sampling Plan Description

A sampling plan was prepared consistent with the guidance contained in the Environmental Protection Agency document EPA/530-86-053, *RCRA Facility Assessment Guidance*, October 1986 as well as other Environmental Protection Agency - Region I guidance documents. The plan is designed to develop high quality environmental data to be used in the decision making process for additional action ultimately leading to the goal of unrestricted release of the Windsor Site.

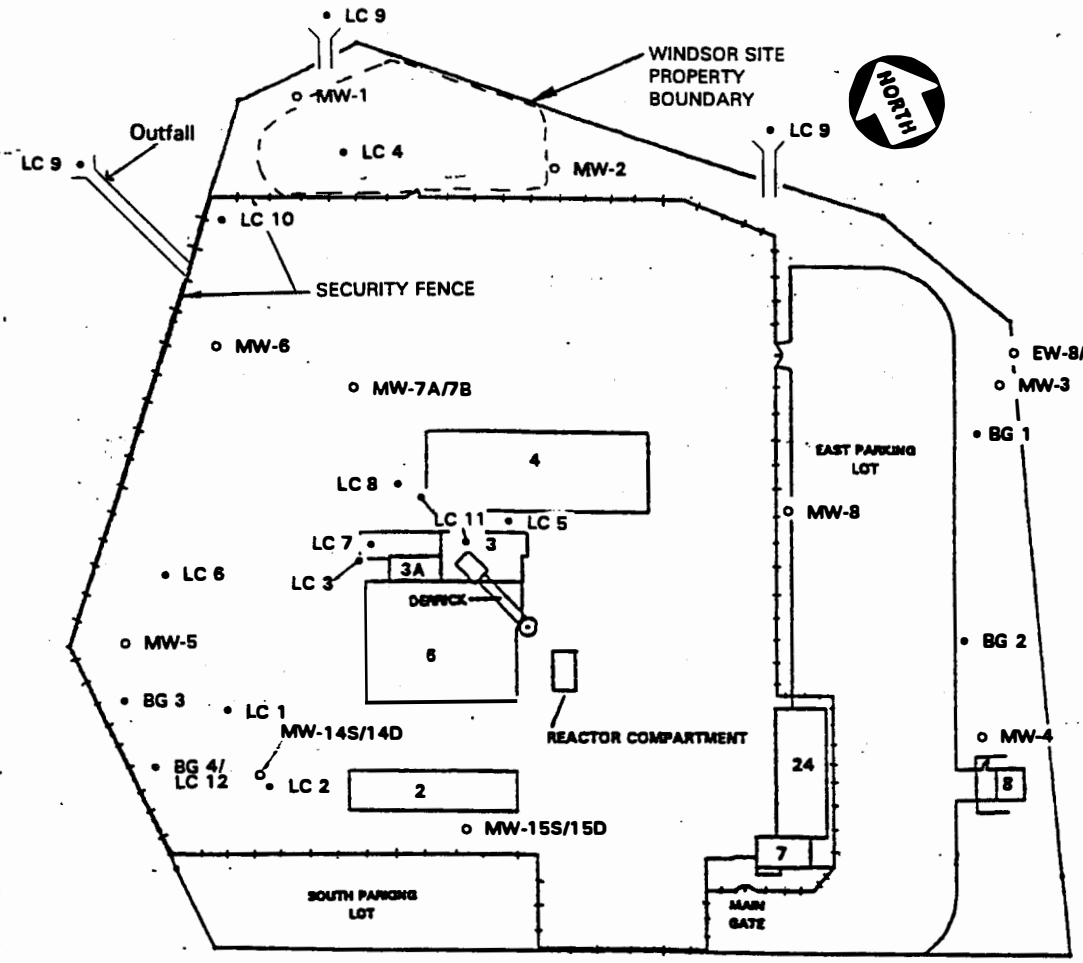
F.4.1 Sampling Plan Objectives

The primary objective of the sampling plan is to determine if chemical releases occurred on the Windsor Site or adjacent areas which require further investigation or cleanup. A second objective is to confirm the current understanding of the environmental setting in which

chemical releases attributable to Windsor Site operations may have occurred. Adjacent areas include the Goodwin Pond and the drainage brook located on Combustion Engineering, Inc. property.

F.4.2 Sampling Plan Summary

The areas subject to investigation under the plan include the specific Windsor Site locations where chemical releases did or may have occurred as well as areas where contaminants may have migrated from the potential release points. Undeveloped areas of the site are also investigated to evaluate background conditions. The samples include surface soils, subsurface soils, sediment, groundwater, and surface water. Figures F-1 and F-2 show the various sampling locations relative to the Windsor Site. Table F-1 provides detailed information for twelve target locations and related environmental media. Table F-1 also identifies target parameters and provides the sampling rationale. The specific target parameters are provided in Lists A through H (included at the end of this appendix).



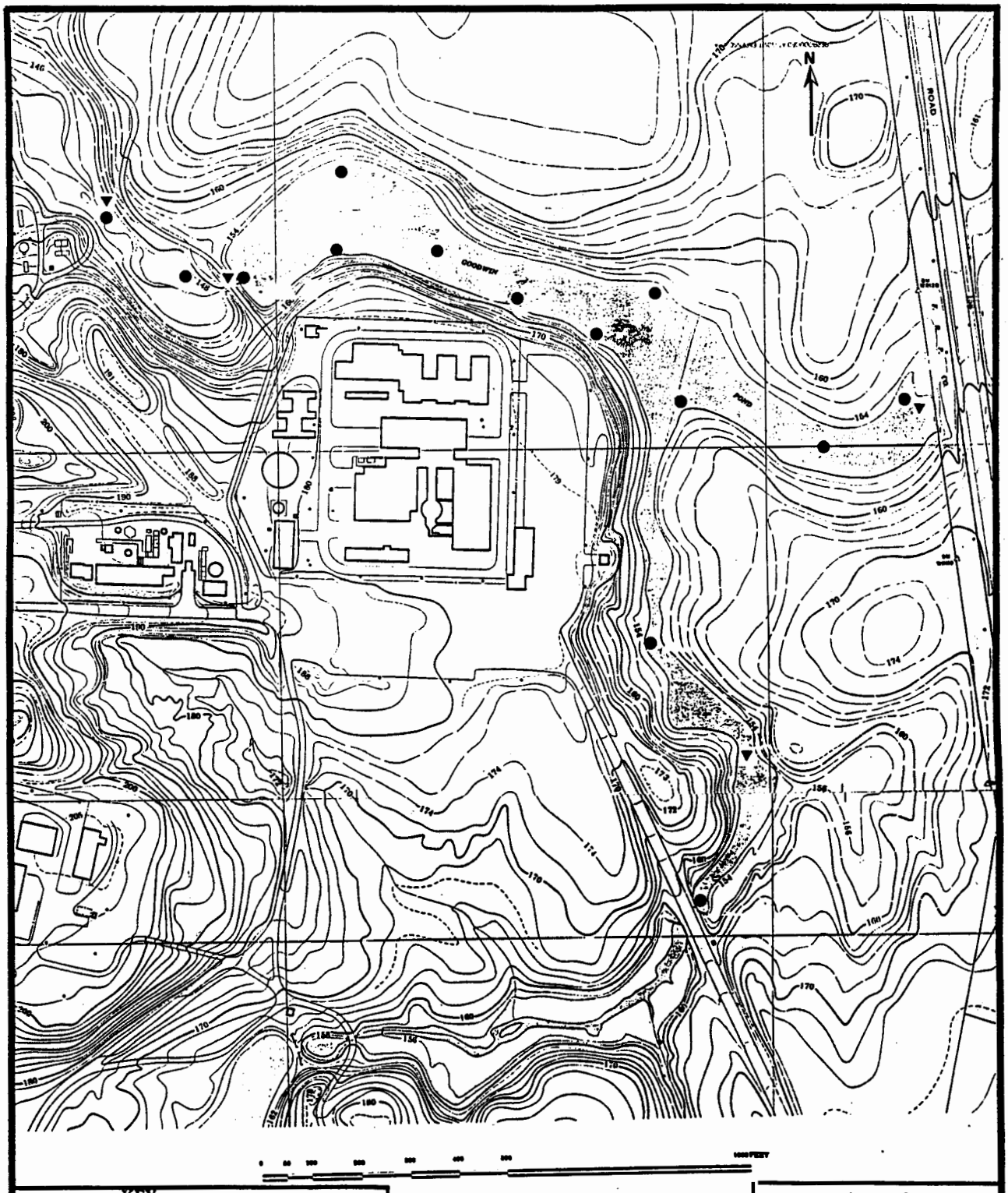
2	Auxiliary Shops	6	Operations Building
3	Power Plant Building	7	Guard House
3A	Battery Room	8	Well Pump House
4	Warehouse	24	Offices

o MW-1 Monitoring Well (14S/14D and 15S/15D existing wells)
o EW-8/9 Exploratory Water Supply Wells (Historic)
• LC 1 Sampling Plan Investigation Areas
LC = Location
BG = Background Surface Soil

Figure F-1

Sampling Plan
Investigation Map

Windsor Site Operations
Knolls Atomic Power Laboratory



KEY

● Sediment Sampling Location
▼ Surface Water Sampling Location

Source: The Metropolitan District, Geodetic and Topographic Survey, Sheets 543 & 640, March 1977

Figure F-2

Surface Water and Sediment Sampling Location Map

Windsor Site Operations
Knolls Atomic Power Laboratory

Table F-1 Windsor Site Locations Identified for Sampling

Location 1 - Former Container Storage Area - From 1980 to 1984, this 20 by 40-foot outdoor area was used to stage containerized non-liquid solid waste for off-site disposal. No specific waste releases are known to have occurred at this location. However, a historic composite sample collected as part of closure, which mixed soil from this location with debris (sweepings) from indoor container storage areas in an adjacent building, contained low levels of lead and cadmium. An evaluation determined that there were no concerns for releases from the indoor areas.

Affected Media: Surface Soil

Target Parameters: List E

Number of Samples/Rationale: Two composite samples were collected at this location. Each composite sample consisted of five grab samples collected from a 20 by 20-foot area, resulting in ten samples from this 20 by 40- foot location. Each grab sample included soil from the top 12 inches of the soil profile.

Location 2 - In-ground Tank - From approximately 1958 to 1990, this concrete tank received deionized water from equipment cleaning operations as well as floor wash water from a quality control clean room. The tank is 4 feet wide and 8.5 feet long and extends from the ground surface to depth of approximately 15 feet. Tank construction details indicate the inside walls and floor of the tank were covered with a black bituminous coating. Remnants of the coating were evident on the tank walls and floor, and in the slurry found in the bottom of the tank during a 1990 inspection. Samples of the tank coating and concrete walls contained low levels of Polychlorinated Biphenyls (PCBs) ranging from 1.1 to 6 ppm. Visual inspection of the tank did not reveal any outlet from the tank or obvious integrity problems; however, water appears to infiltrate the tank. The source of the water may be percolating rainwater, as groundwater is typically 10 feet below the tank bottom.

Affected Media: Subsurface Soil

Target Parameters: List A, List B, List C, and List D [Initial Round]
List C, List D, List G, and List H [Follow-up Round]

Number of Samples/Rationale: Groundwater-level data suggest groundwater under this location moves to the northeast. For the initial round of sampling, one test boring was drilled approximately 5-feet off the northeast end of the tank. Three soil samples were collected from the boring - one each at the bottom of the tank, between the bottom of the tank and the water table, and at the water table. Based on the results of the initial sampling, a follow-up sampling round will be performed to collect additional soil samples for analysis to further assess the significance of the low level PCBs and organic compounds detected in the sample from the boring (See section F.5.1.2).

Table F-1 Windsor Site Locations Identified for Sampling

Location 3 - Dry Well - The dry well is an in-ground well approximately 4 feet deep filled with crushed stone. From approximately 1959 to 1991, it received rinse water from battery testing equipment such as battery water-level devices and hydrometers as well as drainage from the battery room floor drain. Samples of rinse water collected since 1991 contained very dilute sulfuric acid and low levels of lead and cadmium.

Affected Media: Subsurface Soil

Target Parameters: List C and pH

Number of Samples/Rationale: One test boring was drilled directly through the dry well. Four soil samples were collected from the boring, spaced from just below the dry well to the water table. Drilling through the dry well allowed direct assessment of any effects at this location from discharges to the dry well. The sample spacing should detect any releases and will allow a preliminary assessment of the potential migration of contaminants from the dry well to the water table.

Location 4 - Septic System and Leach Field (SSLF) - The SSLF is similar, except for size, to an ordinary household septic system. The septic system has been operational from approximately 1962 to present. Until 1978 small quantities of expired acids and oxidizing agents were discharged to the SSLF. Minute quantities of a variety of laboratory chemicals (residuals from laboratory analysis) have also been included in drain water from two analytical laboratories that discharge to the SSLF. The general types of chemicals disposed of included acids and caustics, such as nitric acid, sulfuric acid and sodium hydroxide; salts, such as potassium chloride; sulfites, such as sodium sulfite; phosphates, such as sodium phosphate; and organics, such as acetone and Freon 113. Only small quantities of dilute nonhazardous pH buffer solutions are currently disposed of via the SSLF. These discharges have been consistent with the established applicable regulations. In addition, there was a one-time accidental discharge of 15 gallons of solution containing 7 ppm cadmium in late 1991.

Affected Media: Subsurface Soil

Target Parameters: List A, List B, List C, List D

Number of Samples/Rationale: One boring was drilled in the central portion of the western side of the leach field. Two samples were collected from the boring: one just below the bottom of the leach field and one at the water table. Until 1986, the west side of the leach field received the majority of the discharges to the septic system. Maintenance performed in 1986 corrected this problem resulting in an even flow distribution in the leach field. Therefore, if a release occurred, these samples should detect the release and allow a preliminary assessment of the migration of contaminants to the water table. In addition, nearby monitoring wells (see Figure F-1) provide groundwater information to assist in evaluating the impacts, if any, of this location on groundwater quality.

Table F-1 Windsor Site Locations Identified for Sampling

Location 5 - Former Chemical Products Storage Racks - These fascilon (reinforced polyvinyl chloride) covered racks were located outside on asphalt pavement and were revetted to contain any liquids. The racks were used from approximately 1959 to 1989 to store solvents and petroleum products. Minor spillage or dripping of chemicals to the pavement occurred during dispensing of the chemicals.

Affected Media: Surface Soil

Target Parameters: List F, List G, and Total Petroleum Hydrocarbons

Number of Samples/Rationale: Two samples were collected from the surface soil underlying the revetted portion of the asphalt pavement. Initial visual inspection and organic vapor survey of the underlying soil did not indicate any release to the soil. Additional soil samples will be collected for laboratory analysis from the 12 to 24-inch interval below the bottom of the pavement to confirm the initial results. This sampling interval will allow appropriate separation from the pavement and associated pavement-related petroleum interferences.

Location 6 - Process Cooling Water - The site utilized a process cooling water system which included a cooling tower situated over an 80-foot diameter concrete basin. The basin also served as water storage to charge the fire main header. The system was operational from approximately 1959 to 1993. Until approximately 1980, chromium-containing chemicals were added to the cooling water system for corrosion and biological control. Cooling water was periodically discharged via the site's former National Pollutant Discharge Elimination System outfall in accordance with the site's discharge limits. Sediment samples collected in the drainage brook in 1978 indicated elevated concentrations of chromium downstream of the Windsor Site outfall. The maximum chromium level detected was 70 parts per million, which is below the most conservative Connecticut Department of Environmental Protection Remediation Standard Regulation chromium (100 ppm) for direct exposure to residential soils.

Affected Media: Surface soil beneath basin; subsurface soil next to system piping; sediment

Target Parameters: Chromium

Number of Samples/Rationale: Surface soil sampling was conducted subsequent to the removal of the concrete basin in 1995. There was no evidence of cracks in the basin floor prior to its removal. Subsequent to removal, there was no visual evidence of leakage from the basin to the underlying soil. Four composite samples were collected over the footprint of the concrete basin. One composite was collected from a 40 by 40-foot area over each quadrant of the basin. Each composite sample consisted of five grab samples, resulting in 20 samples from this location. Each grab sample included soil from the top 12 inches of the soil profile. Based on the results of the composite samples, additional soil samples are planned for the western portion of the basin footprint.

Subsurface soil sampling will be conducted as system piping is removed. Samples will be taken at selected piping joints, at locations where piping integrity has been lost, and at locations with visual evidence of leakage.

Sediment sampling is discussed on page F-15.

Table F-1 Windsor Site Locations Identified for Sampling

Location 7 - Transformer Pad - Transformers containing oil with approximately 100 ppm PCB were used on site until 1993. Records review indicated low levels of PCBs were detected on two concrete pads beneath the transformers. Both pads were cleaned in 1993 in accordance with an Environmental Protection Agency PCB decontamination protocol.

Affected Media: Surface Soil

Target Parameters: List D

Number of Samples/Rationale: The sampling focused on the soil likely to receive run-off from the pad locations that had the highest PCB concentration prior to cleaning. Two soil samples were collected immediately adjacent to the pad. Each soil sample included soil from the top 12 inches of the soil profile. Based on the result of those samples, additional samples in this area are planned.

Location 8 - Former Fuel Oil/Diesel Fuel Underground Storage Tanks - Until 1988, fuel oil and diesel fuel were stored in three underground storage tanks. Tightness tests of the tanks while in place did not indicate any integrity problems with the tanks. These tanks were removed in 1988. At that time, approximately two cubic yards of soil in the vicinity of the tanks stained by fuel oil were removed. The staining was reportedly from a leak in the fill line. Additional soil samples following removal of the stained soil did not contain detectable concentrations of petroleum-related volatile organic compounds.

Affected Media: Subsurface Soil

Target Parameters: List F

Number of Samples/Rationale: One test boring was drilled through the previously identified area of fuel oil staining to directly assess the effectiveness of the cleanup. Three samples were collected from the boring, spaced from just below the area of fuel oil staining to the groundwater table. These samples will confirm the adequacy of the prior cleanup and check for migration of petroleum-related contaminant to the water table.

Location 9 - Industrial Discharge Piping - The industrial discharge piping has evolved over the history of the site. The industrial discharge piping has included discharges via now inactive outfalls to Goodwin Pond and the Windsor Site's former National Pollutant Discharge Elimination System outfall. Records review revealed liquid wastes from the Windsor Site's support systems and laboratories were discharged via the industrial drain in accordance with the site's discharge limits.

Affected Media: Sediment

Target Parameters: List A, List B, List C, and List D

Number of Samples/Rationale: See sediment sampling, page F-15.

Table F-1 Windsor Site Locations Identified for Sampling

Location 10 - Material Laydown Area - This area is an 85-foot by 35-foot concrete pad located in the northwest corner of the Windsor Site. A variety of material has been staged on this pad including lead shielding, refueling support equipment, batteries, scaffolding, and excess office equipment. The potential existed for release of metals associated with these materials to stormwater. Stormwater drainage from the pad runs across a paved area to a storm sewer, which discharges to the Windsor Site's former National Pollutant Discharge Elimination System outfall.

Affected Media: Sediment

Target Parameters: List C

Number of Samples/Rationale: See sediment sampling, page F-15.

Location 11- Underground Fuel Oil Storage Vault and Building 3 Pipe Trench - This concrete vault contained piping and valves for supplying fuel oil from the underground fuel oil storage tanks to the heating boiler in Building 3. Limited spillage from this piping to the floor of the vault occurred when the piping was modified to remove the in ground storage tanks and place the above ground storage tanks in service. The spill was cleaned up, though staining is evident on the vault floor. Fuel oil staining also is present in Building 3 along the concrete trench used to route fuel oil pipes to the various boiler components. Both the vault and trench are in good condition with no evidence of cracks or holes.

Affected Media: Surface Soil beneath vault and pipe trench

Target Parameters: List F and List G, and Total Petroleum Hydrocarbons

Number of Samples/Rationale: Four samples will be collected from the soil underlying the concrete floor of the vault, and two samples will be collected from the soil underlying the Building 3 pipe concrete trench. Holes will be cut through the concrete in areas of staining. The soil samples will be collected from the first 12 inches of soil underlying the concrete where oil would most likely be encountered.

Location 12- Surficial Black Material - During implementation of the sampling plan, an area (approximately 20 by 30 feet) of black ash-like material was discovered beneath a crushed stone surface layer at background surface soil location number 4, near the western property boundary of the Windsor Site. The black material formed a layer approximately 2 inches thick. The source of the material is a spill from a former coal degasification operation (unrelated to Windsor site operations) on neighboring property.

Affected Media: Surface Soil

Target Parameters: List C, List D, List G, and List H

Number of Samples/Rationale: A composite sample was taken from this location consisting of 5 grab samples from a 20 by 20-foot area. Each grab sample consisted of soil from the top 12 inches of the soil profile. In addition, a sample of the roughly 2-inch thick black material layer was obtained and analyzed.

Table F-1 Windsor Site Locations Identified for Sampling

Background Soil

Affected Media: Surface Soil

Target Parameters: List E

Number of Samples/Rationale: Three composite surface soil samples were collected - two samples from the eastern side of the site and one from the western side of the site, currently the only unpaved indigenous soil areas on the site. These areas are also in locations with low potential for impacts from site operations. Each composite sample consisted of 5 grab samples, resulting in 15 samples of surface soil. Each grab sample included soil from the top 12 inches of the soil profile. The background surface soil sampling was designed to provide information on background concentrations of metals in the soils for comparison with location-specific metals results. The composite sampling scheme inherently decreases the range and variability of concentrations, thereby providing conservative concentrations for assessment purposes.

Sediment Sampling

Affected Media: Sediment

Target Parameters:

Preliminary:	List A, List B, and List D
Principal:	List C, List D, List G, and List H

Number of Samples/Rationale: The overall sediment sampling program was designed in two phases - a preliminary phase and a principal phase. The preliminary phase was designed to assess the presence of organic compounds in the sediment potentially associated with the Windsor Site and provide data to refine the principal phase. Sediment from the bottom of Goodwin Pond (3 locations) and the drainage brook (2 locations) was collected to a depth of two feet. This depth is adequate to penetrate sediments potentially affected by Windsor Site operations. This is based on the low-flow conditions and limited sediment load in the Goodwin Pond and drainage brook. The locations in Goodwin pond are at the former industrial outfalls and just upstream of the spillway. The drainage brook locations were in areas of sediment deposition (e.g., meander bends) located between the Windsor Site's former National Pollutant Discharge Elimination System outfall, and the nearest Combustion Engineering, Inc. outfall.

These results will be incorporated into the more comprehensive principal sampling and analysis program, which will be implemented over the entire pond and the portion of the brook upstream of the nearest Combustion Engineering, Inc. outfall. Samples will be collected from the locations depicted in Figure F-2. The planned sampling locations were selected to assess any contribution from the Windsor Site as well as from non-Site related sources.

Monitoring Wells - Subsurface Soil Sampling

Affected Media: Subsurface Soil

Target Parameters: List C

Number of Samples/Rationale: To provide confirmation of the present understanding of site hydrogeologic characteristics, nine new monitoring wells were installed on site concurrent with the sampling program. One test boring was drilled and continuously sampled for organic vapors and visual staining at each new monitoring well location. One soil sample was collected from each boring at the water table interface. These samples were analyzed for List C constituents to aid in the interpretation of inorganic constituents in groundwater samples and establish background subsurface soil data.

Table F-1 Windsor Site Locations Identified for Sampling

Monitoring wells - Groundwater Sampling

Affected Media: Groundwater

Target Parameters: List A, List B, List C, and List D [Initial Round]
List C, List D, List G, and List H [Follow-up Round]

Number of Samples/Rationale: To provide confirmation of the present understanding of site hydrogeologic characteristics, nine new water table monitoring wells were installed on site concurrent with the sampling program. The nine new wells supplement two preexisting monitoring wells, located near the water table, bringing the total number of water table monitoring wells to eleven. Field parameters pH, temperature, specific conductivity, and turbidity were measured at the time of sample collection. Water levels were measured in all wells during well purging and groundwater sampling activities to support groundwater mapping and assessment of flow direction.

Based on the results of the initial samples (discussed in Section F.5.1.14.2), a follow-up round of samples will be collected. The follow-up round will also include the two remaining preexisting wells, which are located approximately forty and seventy feet below the water table, bringing the total number of groundwater monitoring wells to thirteen. The purpose of the follow-up round is to verify the presence of the organic parameters and attempt to eliminate apparent turbidity interferences on groundwater quality analytical results. The purpose of sampling at the two deep wells is to assess potential off-site up gradient impacts to deeper groundwater quality.

Surface Water Sampling

Affected Media: Surface Water

Target Parameters: List C, List D, List G, and List H

Number of Samples/Rationale: The surface water sampling and analysis program was designed to detect target parameters identified in the groundwater or sediment which potentially could be transferred to and be migrating with the surface water. Samples from four locations will be collected. Field parameters pH, temperature, specific conductivity, and turbidity will be measured at the time of sample collection. The planned sampling locations have been selected to assess potential contributions from the Windsor Site and to assess for background or non-Windsor Site related concentrations of targeted parameters.

F.4.2 Sampling Plan Summary, Continued

The sampling plan for surface soils, groundwater, sediment, and surface water is designed to be implemented in a phased approach. This approach allows for collection and evaluation of data to ensure that the next phase is effectively designed to obtain the necessary information. A further description of this approach for each media follows:

Surface Soils - Surface soil sampling was performed early in the sampling program. This permitted release assessment at specific locations, evaluation of potential impacts associated with offsite operations, and also will allow follow-on sampling to assess the extent and significance of any detected releases.

Groundwater - Groundwater sampling was conducted in advance of the principal sediment and surface water sampling so that the analytical results could be evaluated for constituents potentially migrating to the sediments or surface water and therefore assist in refining those sampling and analysis programs. Environmental setting information (e.g., groundwater and surface water elevations; stratigraphy) generated during these activities was also considered in the evaluation of potential migration of constituents to sediment and surface water.

Sediment - The overall sediment sampling and analysis program is designed to assess the presence of both organic and inorganic constituents. To focus analytical efforts, the sediment sampling and analysis program was divided into preliminary and principal stages.

The preliminary sediment sampling and analysis program looks for a wide spectrum of organic compounds, which, if detected, would be indicative of an anthropogenic (i.e., human) source. The preliminary sampling effort focuses on sediments most likely to have received, or accumulated, potential contaminants in historic discharges from the Windsor Site.

The principal sediment sampling and analysis program covers a broader area of sediments but focuses analyses on organic compounds identified in the preliminary sediment sampling and analysis program. It also looks for inorganic parameters potentially associated with the Windsor site. As inorganic parameters can be naturally present, the sampling plan includes evaluation of background or non-Windsor Site related concentrations of inorganic parameters. These background locations will also be utilized to evaluate background concentrations of any organic compounds detected in the preliminary sediment sampling.

Surface water - The surface water does not currently receive any known direct discharges of chemicals from the Windsor Site. Therefore, surface water sampling and analysis will be conducted near the end of the sampling program, so that analytical parameters potentially present in the surface water can be appropriately defined based on preliminary sediment and groundwater data.

As of June 1996, approximately 70 percent of the plan was completed. The remainder of the plan is scheduled for completion by mid-1997. Remaining sampling work includes principal sediment and surface water as well as follow-up groundwater and soils.

F.4.3 Data Quality Objectives

Inorganic and organic analyses are performed by State certified analytical laboratories in accordance with procedures specified in the Environmental Protection Agency's Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846 (Third Edition). Such testing is performed to fulfill the Quality Control/Quality Assurance and deliverable requirements specified in the Environmental Protection Agency's Contract Laboratory Program (CLP) Statements of Work (SOW) for Inorganic Analysis, Multi-Media, Multi-Concentration, December 1994; and Organic Analysis, Multi-Media, Multi-Concentration, July 1993. The analytical laboratory data packages include full analytical and Quality Control documentation consistent with the appropriate Statements of Work.

An independent validation of each data package is performed in accordance with the latest revisions and updates of the following documents:

- USEPA - Region I, February 1, 1988. Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses.
- USEPA - Region I, June 13, 1988. Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses.
- USEPA - Region I, July 1, 1993. Tiered Organic and Inorganic Data Validation Guidelines.
- USEPA - Region I, July 3, 1991. CSF Completeness Evidence Audit Program.

F.5 Sample Collection and Analysis - Results to Date

This discussion provides field observations, analytical results and conclusions based on sampling and analyses completed as of June 1996. This represents approximately 70 percent of the sampling plan.

Naval Reactors has not proposed, nor has the Environmental Protection Agency approved under the corrective action provisions of the Resource Conservation and Recovery Act, criteria for cleanup of chemical residuals associated with Windsor Site operations. These criteria will be established in discussions among Naval Reactors, the Environmental Protection Agency, and the Connecticut Department of Environmental Protection after completion of the current sampling plan to ensure that the objective of unrestricted release of the site will be met. However, to provide perspective on the analysis results, the following discussion uses as benchmarks the Connecticut Department of Environmental Protection Remediation Standard

Regulations, contained in Section 22a-133k of the Regulation of Connecticut State Agencies. These regulations establish remediation standards for soil, groundwater, and surface water, based on future use (e.g., residential criteria, industrial/commercial criteria) and groundwater classification. In each case, the results have been compared to the most restrictive applicable Connecticut Department of Environmental Protection Remediation Standard Regulation criterion.

F.5.1 Location Specific Results

F.5.1.1 Location 1 - Former Container Storage Area

All sampling and analysis has been completed. The sample results do not suggest a release from this location. Detected metal concentrations in the surface soil are consistent with background soil concentrations.

F.5.1.2 Location 2 - In-ground Tank

The initial round of sampling and analyses has been completed. The sample results suggest a minor release has occurred from this location. Very low levels of polychlorinated biphenyls (PCBs), specifically Aroclor 1254 (43 ppb), were detected approximately five feet below the base of the tank, in the 20-22 feet sample interval. This aroclor is consistent with historical analyses of the slurry found in the tank in 1990. A trace of Aroclor 1260 (2.8 ppb) was detected in the 16-18 feet sample interval. These levels are well below the 1000 ppb Remediation Standard Regulations criteria for direct exposure to residential soils. PCBs were not detected below the 20-22 feet sample interval. Trace levels of methylene chloride (2-3 ppb) or chloroform (3 ppb) were detected in two and one of the samples, respectively. The detected organic compound concentrations are below the applicable Remediation Standard Regulations; methylene chloride (100 ppb) and chloroform (120 ppb). In addition, no PCBs, methylene chloride, or chloroform were detected in any of the eleven groundwater monitoring wells.

Based on the results of the initial sampling, a follow-up sampling round will be performed to collect additional soil samples for analysis to further assess the significance of the PCBs and detected organic compounds.

F.5.1.3 Location 3 - Dry Well

All sampling and analyses have been completed. There were no indications of a release in the sample results. Detected concentrations of parameters of concern (i.e., metals) in the boring are consistent with subsurface soil concentrations of similar geologic composition. In particular, there is no indication of elevated levels of lead or cadmium or depressed soil pH attributable to the dry well.

F.5.1.4 Location 4 - Septic System and Leach Field

All sampling and analysis is complete. The sample results suggest the presence of a minor release from this location. Trace levels of methylene chloride (4 ppb) and chloroform (3 ppb) were detected in the test boring samples just below the leach field and at the water table interface. These concentrations are below the applicable Remediation Standard Regulations for methylene chloride (100 ppb), and chloroform (120 ppb). Low levels (28-410 ppb) of nine polynuclear aromatic hydrocarbons were detected in the soil sample just below the leach field, but not in the soil sample at the water table. These concentrations are all below the applicable Remediation Standard Regulations, the lowest of which is 1000 ppb. None of the detected compounds were detected in groundwater samples from nearby wells (MW-1 and MW-2). However, similar levels of methylene chloride (5 ppb) and chloroform (3 ppb) were present at approximately 20 feet below the surface in the boring for monitoring well MW-1. Toluene (1 ppb) was also present at this elevation in the boring for monitoring well MW-1 at levels far below the applicable Remediation Standard Regulations (20,000 ppb).

F.5.1.5 Location 5 - Former Chemical Products Storage Racks

As discussed in Table F-1, visual inspection and organic vapor screening of the soil underlying this location did not indicate the presence of any release from this location. Sampling activities at this location are scheduled for completion by mid-1997.

F.5.1.6 Location 6 - Process Cooling Water

The composite surface soil sampling and analysis beneath the basin is complete. The composite sample results indicated that total chromium concentrations were slightly elevated in the western half of the footprint of the former cooling tower basin (24 ppm). Concentrations found in the eastern half were comparable to background (9-10 ppm). The elevated concentrations are well below the Remediation Standard Regulations of 100 ppm for direct exposure to residential soils. Additional soil sampling is planned in the western half to further assess the extent and significance of the elevated chromium found in the composite sample.

Sampling activities near system piping will be completed as the piping is removed. Samples will be taken at selected piping joints, at locations where piping integrity has been lost, and at locations with visual evidence of leakage.

Sediment sampling is discussed in Section F.5.1.16.

F.5.1.7 Location 7 - Transformer Pad

Sampling and analysis of the two surface soil samples collected immediately adjacent to the transformer pad is complete. The sample results suggest the presence of a minor release at this location. Trace concentrations (3-8 ppb) of PCBs, specifically Aroclor 1260, were detected at this location. The levels are well below the 1000 ppb Remediation Standard Regulations for

direct exposure to residential soils. Additional samples will be collected to verify the presence and to further assess the extent and significance of the PCBs.

F.5.1.8 Location 8 - Former Fuel Oil/Diesel Fuel Underground Storage Tanks

All sampling and analysis is complete. The sample results do not suggest a release. No polynuclear aromatic hydrocarbons were detected.

F.5.1.9 Location 9 - Industrial Discharge Piping

See sediment discussion, Section F.5.1.16.

F.5.1.10 Location 10 - Material Laydown Area

See sediment discussion, Section F.5.1.16.

F.5.1.11 Location 11 - Underground Fuel Oil Storage Vault and Building 3 Pipe Trench

Sampling activities at this location are scheduled for completion by mid-1997.

F.5.1.12 Location 12 - Surficial Black Material

All sampling and analyses are complete. The results are summarized in Table F-2. Results of the single grab sample of the black material layer revealed metal concentrations at levels above applicable Remediation Standard Regulations and background levels. The composite sample of the top 12 inches of the soil profile showed significantly reduced concentrations to levels below the applicable Remediation Standard Regulations, though still elevated above background. The results suggest that the extent of the chemical impact associated with the black material is likely limited to the near surface.

Table F-2 Summary of Location 12 Results

Constituent	Results of grab sample	Results of composite sample of top 12 inches of soil profile	Remediation Standard Regulations [Residential Direct Exposure Criteria for Soil]
Lead	3950 ppm	40.2 ppm	500 ppm
Chromium	680 ppm	21.2 ppm	100 ppm
Beryllium	114 ppm	1.6 ppm	2 ppm
Copper	2500 ppm	38.6 ppm	2500 ppm

F.5.1.13 Background Soil Results

All sampling and analyses are complete. Background soil results reveal no significant anthropogenic effects on soil chemistry. All results, are generally consistent and below any applicable Remediation Standard Regulations.

F.5.1.14 Monitoring Wells

F.5.1.14.1 Subsurface Soil Results

Results of soil samples from monitoring well borings revealed metal chemistry consistent with the site geology. The results do not indicate any significant anthropogenic effects on metal chemistry. Additional samples for organic analyses were collected from the borings for MW-1 and MW-3 in response to field observations of minor odors or organic vapors. The results for MW-1 are included in the discussion of the septic system and leach field in Section F.5.1.4. The MW-3 results revealed trace levels of methylene chloride (2 ppb) and polynuclear aromatic hydrocarbons (6-28 ppb) in two samples (0-2 and 2-4 feet). The detected concentrations are well below applicable Remediation Standard Regulations for methylene chloride (100 ppb), and polynuclear aromatic hydrocarbons (lowest Remediation Standard Regulations is 1000 ppb).

F.5.1.14.2 Groundwater Results

The groundwater table was encountered at a general depth of 25 feet. Groundwater results are generally unremarkable.

Metal concentrations in groundwater samples are apparently influenced by particulates associated with the site geology. Lead was detected in MW-1 (15.1 ppb), MW-4 (23.6 ppb), and MW-7B (32.9 ppb) at levels above the applicable Remediation Standard Regulations (15 ppb). Vanadium was detected in MW-7B (55.1 ppb) at a level above the applicable Remediation Standard Regulations (50 ppb). These results are coincident with those samples having the highest turbidity.

Trace concentrations of 1,1,1 trichloroethane (0.8-4 ppb), tetrachloroethylene (1-2 ppb), acetone (1-7 ppb), and carbon disulfide (0.3-4 ppb) were detected in a number of groundwater samples. The detected concentrations are below applicable Remediation Standard Regulations for 1,1,1-trichloroethane (200 ppb), tetrachloroethylene (5 ppb), and acetone (700 ppb). Carbon disulfide does not have an established Remediation Standard Regulation. The initial results do not indicate any specific, on-site source for the detected parameters. In addition, none of the organic parameters detected in the subsurface soil samples from monitoring well borings or location-specific borings were detected in the groundwater samples. This suggests no migration of the detectable parameters to the groundwater and no releases of concern from the specific locations.

Additional samples will be collected using a low flow sampling methodology (the initial round of samples was collected via an inertial pump system) in an attempt to eliminate turbidity interferences on groundwater quality analytical results for metals and to further assess the significance of organic parameters detected at low levels.

F.5.1.15 Surface Water Results

Sampling activities for surface water are scheduled for completion by mid-1997.

F.5.1.16 Sediment Results

The preliminary phase of sediment sampling and analysis has been completed. These results are summarized in Table F-3. Low levels of several organic parameters were detected in the sediments, the distribution of which is generally consistent with layering in the sediment. Remediation Standard Regulations have not been established for sediment. However, for comparison, the levels detected are below the Remediation Standard Regulations for direct exposure to residential soils.

Inspection of the preliminary sediment samples revealed a layer of decayed vegetation and silt (muck/peat) over sand. Occasionally, pockets of more recently deposited sand are found to overlie the muck/peat. Preliminary results revealed low levels of polynuclear aromatic hydrocarbons, PCBs, acetone and 2-Butanone. The acetone concentrations were deemed suspect based on the concentrations detected and the fate and mobility of acetone in the environment. A possible source of the acetone was contamination from the isopropyl alcohol used in the sampling equipment cleaning procedure.

A second round of preliminary samples was collected to address the presence of acetone by omitting the isopropyl rinse and to assess the distribution of organic parameters in the layered sediment. These samples were collected in the vicinity of the locations exhibiting the highest concentrations of detected organic compounds during the first sampling round. The results confirmed the presence of the organic parameters and revealed that they typically are confined to the muck/peat layer. Acetone concentrations were markedly reduced, though acetone was detected within and below the muck/peat layer.

Table F-3 Summary of Sediment Results

Constituent	1st preliminary round	2nd preliminary round	Remediation Standard Regulations [Residential Direct Exposure Criteria for Soil]
Polynuclear aromatic hydrocarbons:			
Acenaphthene	17-52 ppb	Not Detected	Not Established
Acenaphthylene	9 ppb	Not Detected	1,000,000 ppb
Anthracene	19-110 ppb	Not Detected	1,000,000 ppb
Benzo(a)anthracene	56-380 ppb	Not Detected	1,000 ppb
Benzo(b)fluoranthene	67-600 ppb	Not Detected	1,000 ppb
Benzo(k)fluoranthene	47-590 ppb	Not Detected	8,400 ppb
Benzo(a)pyrene	53-410 ppb	Not Detected	1,000 ppb
Chrysene	58-500 ppb	Not Detected	Not Established
Fluoranthene	9-1000 ppb	33-94 ppb	1,000,000 ppb
Flourene	12-58 ppb	Not Detected	1,000,000 ppb
Naphthalene	8-12 ppb	Not Detected	1,000,000 ppb
Phenanthrene	6-650 ppb	19 ppb	1,000,000 ppb
Pyrene	7-100 ppb	37-80 ppb	1,000,000 ppb
PCBs	7.8-53 ppb	57 ppb	1,000 ppb
2-Butanone	9-21ppb	95 ppb	500,000 ppb
Acetone	350-39,000 ppb	23-310 ppb	500,000 ppb

The principal phase of the sediment sampling program will be completed by mid-1997. Data derived from the principal sediment sampling will allow assessment of the distribution of inorganic and organic parameters in the Goodwin Pond and drainage brook and evaluate the potential contribution by the Windsor Site to parameters detected in the preliminary phase.

F.5.2 Media Summary

Surface soil results are mostly unremarkable, with the exception of Location 12 which resulted from off-site operations and not Windsor Site operations. Only two other locations have indicated the presence of slightly elevated target parameters thus far. With the exception of Location 12, all surface soil results are below applicable Remediation Standard Regulations.

Subsurface soil results do not indicate any significant releases at the Windsor Site. Metals results varied consistent with the variable site geology. Trace levels of several organic compounds were detected at several locations above the groundwater table. The concentrations were below applicable Remediation Standard Regulations, and none of the organic compounds detected in the soil were detected in any groundwater samples.

Groundwater results do not indicate any releases of concern at the Windsor Site. Metals results appear to be influenced by soil particles in the groundwater samples, a condition which will be addressed in subsequent sampling. Trace levels of several volatile organic parameters were detected in wells across the Windsor Site, the results of which are below applicable Remediation Standard Regulations. The initial results do not indicate any specific, on-site source of the detected organic parameters. The presence of the detected organic parameters will be verified in subsequent sampling.

The preliminary sediment sampling revealed the presence of low concentrations of several organic parameters. The distribution of the parameters is controlled, in part, by layering observed in the sediment profile. These preliminary findings will assist the principal sediment sampling to assess the pervasiveness of the detected compounds and any potential contribution from the Windsor Site.

F.6 Overall Conclusions and Projection of Future Remedial Work

The Voluntary Facility Assessment Program sampling plan to date has identified no issues which would be expected to substantially affect the goal of achieving unrestricted release of the Windsor Site. Approximately 70% of the sampling plan has been completed, with only a very limited number of target parameters detected, which in most cases were well below the applicable Connecticut Department of Environmental Protection Remediation Standard Regulation. These results do not, at this time, indicate the need for specific remedial actions. The one the exception is Location 12, which resulted from off-site operations and not Windsor Site operations. The extent of the black material layer at this location is limited and well defined. Based on the size and depth of the black material layer, it is estimated cleanup of this area will require removal of approximately 10 to 15 cubic yards [1 truckload] of soil. The Environmental Protection Agency and Connecticut Department of Environmental Protection agreement with the future actions for this location will be obtained.

Target Parameters List A

Volatile Organic Compounds

Acetone
Acetonitrile
Acrolein
Acrylonitrile
Allyl chloride
Benzene
Bromodichloromethane
Bromoform
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloroprene
Dibromochloromethane
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
trans-1,2-Dichloroethylene
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
1,4-Dioxane
Ethylbenzene
Ethyl methacrylate
2-Hexanone
Isobutyl alcohol
Methylacrylonitrile
Methyl Bromide (Bromomethane)
Methyl Chloride (Chloromethane)
Methylene Bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (2-Butanone)
Methyl Iodide (Iodomethane)
Methyl methacrylate
4-Methyl-2-pentanone (methyl isobutyl ketone)
Propionitrile (Ethyl cyanide)
Pyridine
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes (total)

Source: Title 40 Code of Federal Regulations Part 264 Appendix IX

Target Parameters List B

Semi-Volatile Organic Compounds

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene
4-Aminobiphenyl
Aniline
Anthracene
Aramite
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benzo(a)pyrene
Benzyl alcohol
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
Bis(2-chloro-1-methylethyl)ether
Bis(2-ethylhexyl)phthalate
4-Bromophenyl phenyl ether
Butyl benzyl phthalate
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
m-Cresol
o-Cresol
p-Cresol
Diallate
Dibenzo(a,h)anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene
m-Dichlorobenzene
Diethyl phthalate
p-Dichlorobenzene
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
0,0 Diethyl 0-2-pyrazinyl
phosphorothioate
Dimethoate
p-(Dimethylamino)azobenzene
7,12-Dimethyl-benzo(a)anthracene
3,3'-Dimethylbenzidine
alpha, alpha-Dimethylphenethylamine
2,4-Dimethylphenol
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Disulfoton
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachlorophene
Hexachloropropene
Indeno(1,2,3-cd)pyrene
Isodrin
Isophorone

Target Parameters List B (continued)

Semi-Volatile Organic Compounds

Isosafrole
Kepone
Methapyrilene
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Methyl Parathion
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline
m-Nitroaniline
p-Nitroaniline
Nitrobenzene
o-Nitrophenol
p-Nitrophenol
4-Nitroquinoline 1-oxide
N-Nitrosodi-n-butylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosodipropylamine
N-Nitrosomethylethylamine
N-Nitrosomorpholine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Parathion
Pentachlorobenzene
Pentachloroethane
Pentachloronitrobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Phorate
2-Picoline
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
Tetraethyl dithiopyrophosphate (Sulfotepp)
o-Toluidine
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
0,0,0-Triethylphosphorothioate
sym-Trinitrobenzene

Source: Title 40 Code of Federal Regulations Part 264 Appendix IX

Target Parameters List C

Inorganics

Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	Cyanide

Source: Target Analyte List (TAL) from Environmental Protection Agency Contract Laboratory Statement of Work for Inorganics Analysis, document number ILM02.0, September, 1991

Target Parameters List D

Polychlorinated Biphenyls (Aroclors)

Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

Source: Target Compound List (TCL) from Environmental Protection Agency Contract Laboratory Statement of Work for Organics Analysis, document number ILM01.0, August, 1991

Target Parameters List E

Metals

Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	

Source: Target Analyte List (TAL) from Environmental Protection Agency Contract Laboratory Statement of Work for Inorganics Analysis, document number ILM02.0, September, 1991

Target Parameters List F

Polynuclear Aromatic Hydrocarbons

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benzo(a)pyrene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

Environmental Protection Agency Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846, 3rd Edition with updates

Target Parameters List G

Volatile Organic Compounds

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene (Total)
Dichloromethane
(Methylene chloride)
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethyl benzene
2-Hexanone
Methyl ethyl ketone (2-Butanone)
4-Methyl-2-pentanone
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl chloride
Xylenes (total)

Source: Target Compound List (TCL) from Environmental Protection Agency Contract Laboratory Statement of Work for Organics Analysis, document number ILM01.0, August, 1991

Target Parameters List H

Semi-Volatile Organic Compounds

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i,)perylene
Benzo(a)pyrene
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
2,2'-oxybis
(Bis(2-chloroisopropyl) ether)
Bis(2-ethylhexyl)phthalate
4-Bromophenyl phenyl ether
Butyl benzyl phthalate
Carbazole
4-Chloroaniline
4-Chloro-3-methylphenol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
2-Methylphenol
4-Methylphenol
Dibenzo(a,h)anthracene
Dibenzofuran
Di-n-butyl phthalate
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
Diethyl phthalate
2,4-Dimethylphenol
Dimethyl phthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotroluene
Di-n-octyl phthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
2-Methylnaphthalene
Naphthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
2-Nitrophenol
4-Nitrophenol
N-Nitrosodiphenylamine
N-Nitroso-di-n-propylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

Source: Target Compound List (TCL) from Environmental Protection Agency Contract Laboratory Statement of Work for Organics Analysis, document number ILM01.0, August, 1991

APPENDIX G

DESCRIPTION OF THE NAVAL REACTORS RADIOLOGICAL SURVEY PLAN FOR THE WINDSOR SITE

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK

Introduction

This Appendix did not appear in the Draft Environmental Impact Statement. It has been added to the Final Environmental Impact Statement to provide additional information on the Naval Reactors Radiological Survey Plan to support unrestricted release of the Windsor Site. All Windsor Site buildings, structures, miscellaneous areas and the land, including adjacent properties (as discussed in Section G.5), are covered under the Radiological Survey Plan. The plan may be revised if radiological conditions change in any specific area or if additional historical information is found.

G.1 Brief History of Work Associated with Windsor Site Operations

From 1959 to 1993, Windsor Site was engaged in the testing, maintenance and operation of the S1C Naval nuclear prototype. The Windsor Site has been operated for the US Government by contracted companies: Combustion Engineering, Inc. (now a part of Asea Brown Boveri, Inc.) from 1959 to 1971, followed by the Knolls Atomic Power Laboratory under General Electric from 1971 to 1993 and Knolls Atomic Power Laboratory, Inc. (a Lockheed Martin company) from 1993 to present.

In March 1993, the S1C Prototype reactor plant was permanently shut down. Operations to inactivate the Windsor Site and defuel the S1C Prototype reactor plant commenced. Plans for inactivation were developed to place the Windsor Site in a benign condition for a possible extended caretaking period. As discussed in Chapter 3 of the Environmental Impact Statement, the objective of the prompt dismantlement alternative and deferred dismantlement alternative is to remove the S1C Prototype reactor plant and to establish final Windsor Site conditions that would support unrestricted release of the property.

G.2 Sources of Radioactivity Attributable to Windsor Site Operations

Due to the design of Naval nuclear propulsion plants, there are only a few radionuclides that must be considered in the radiological survey plan. Fission products and uranium are not a concern because the Naval Nuclear Propulsion Program has utilized high integrity rugged fuel design and construction. Uranium and all its fission products are retained in the reactor fuel. Sensitive measurements were made frequently to verify the integrity of reactor fuel during operation. Consequently, fission products and uranium do not require consideration on Windsor Site property.

As discussed in Appendix A of this Environmental Impact Statement, materials exposed to a neutron flux become radioactive materials. The principal source of radioactivity associated with reactor plant maintenance and support at the Windsor Site is from trace amounts of activated corrosion and wear products from materials exposed to a neutron flux during reactor plant operations. As discussed in Section 2.3 of this Environmental Impact Statement, cobalt-60 is the predominant radionuclide in activated corrosion and wear products. Cobalt-60 has a 5.27-year half-life. Cobalt-60 emits gamma radiation having two energy levels

(1.17 MeV and 1.33 MeV) and beta radiation (with a maximum energy level of 0.318 MeV). All Naval Nuclear Propulsion Program standards are based on cobalt-60, and it is the limiting radionuclide for releasing the Windsor Site from radiological controls. Essentially, cobalt-60 is a "tag" for Program radioactivity; if cobalt-60 concentration is acceptably low, other radionuclides will not be of concern.

Tritium is an activation product in the primary coolant of Naval reactor plants. For several reasons, tritium does not pose a significant concern for Windsor Site release. In 1979, Windsor Site terminated discharge of all radioactive liquid effluents and commenced recycling all primary coolant. Tritium is an isotope of hydrogen in water and also occurs naturally in the environment. Chemically, tritium is the same as hydrogen, therefore, it does not concentrate. Rather, it diffuses in the environment commingling with naturally occurring hydrogen (including naturally occurring tritium). Tritium emits only very low-level beta radiation with consequently low impact on human health and the environment. As a result, the radioactivity concentration limit for tritium is at least one hundred times higher than for cobalt-60 (Reference G-1). For these reasons, tritium is not judged to be a remediation concern.

Carbon-14 is also formed in small quantities in reactor coolant systems as a result of neutron interactions with nitrogen and oxygen. This carbon is in the form of a gas, primarily methane and ethane as well as carbon dioxide, although some insoluble carbonates may be present. Carbon-14 is chemically indistinguishable from other isotopes of carbon and also occurs naturally (carbon-14 permits "carbon dating" of deceased organisms, since carbon-14 in dead matter decays and is not replenished). Gaseous releases are dispersed in the atmosphere and are not concentrated in the environment. Also, carbon-14 emits only low-level beta radiation with consequently low impact on human health and the environment. As a result, the radioactivity concentration limit for carbon-14 in its chemical form in air is sixty times higher than for cobalt-60 (Reference G-1). Furthermore, a study around a large civilian nuclear power plant showed no measurable carbon-14 in downwind foliage (Reference G-2). For these reasons, carbon-14 is not judged to be a remediation concern.

In addition to radioactive materials resulting from reactor plant operations and maintenance, other types of radioactive materials are also attributable to Windsor Site operations. These materials include very small radioactive sources used to check measuring equipment, and other radioactive sources used for nondestructive testing of reactor plant equipment; such materials will be removed. Finally, common commercial items containing Nuclear Regulatory Commission-exempt quantities of radioactive material, such as thoriated tungsten welding electrodes and smoke detectors, will be removed when their associated facilities are removed.

G.3 Summary of Radiological Controls Used While Performing Radiological Work

Stringent Naval Nuclear Propulsion Program radiological controls are invoked by trained personnel during all aspects of Program radiological work. Detailed radiological training is conducted for all personnel involved in radiological work document preparation, operations, maintenance, and management. Personnel responsible for monitoring radiologically controlled

work undergo the most extensive radiological training. Training for all personnel generally includes lectures and mock-up training, followed by written tests, performance tests and, for some, oral examinations. Training and formal requalification programs are repeated regularly. Training emphasizes the concept that personnel responsible for monitoring the conduct of radiologically controlled work cannot ensure correct performance alone; everyone involved in radiological work must understand and adhere to the requirements. Lessons learned from Windsor Site experience were continuously incorporated into training plans and local instructions. To the maximum extent practical, Windsor Site also adopted radiological control improvements developed at other Naval Nuclear Propulsion Program sites and shipyards.

Radioactive materials at the Windsor Site are subject to stringent handling, inventory, and storage controls. Throughout Windsor Site history, selected site facilities were utilized for radiological work or controlled storage of radioactive materials in support of routine maintenance, overhauls and refueling work. Radioactive material storage areas at the Windsor Site are controlled to prevent the loss or misuse of radioactive materials. To prevent the spread of loose radioactive contamination, radioactive materials are packaged in yellow wrappings and labeled to clearly identify the item as radioactive. A radioactive material accountability system has been in effect at the Windsor Site since initial construction. The accountability system includes a formal logging system and regular inventory checks.

Extensive radiological surveys are conducted with the use of sensitive instruments designed to measure radioactivity. Radiological monitoring surveys associated with specific work activities are performed to identify radiological conditions before, during, and after execution of each related task. If unplanned conditions are encountered, the work is stopped. If needed, a cleanup is performed and engineering personnel make appropriate changes to work documents before the work resumes. Other radiological monitoring surveys are routinely performed in areas not associated with a specific task to confirm radiological conditions are as expected. These routine radiological monitoring surveys are performed most frequently in or near radiologically controlled areas. On the rare occasions when unexpected radiological conditions are encountered, affected areas are placed under additional controls until a cleanup is completed and the cause of any problem is corrected. Routine surveys of the environment are conducted and all Windsor Site facilities and work areas, including non-radiological areas, are surveyed at least annually. The results of environmental surveys and general surveys of the Windsor Site have demonstrated the success of the stringent Naval Reactors radiological control policies.

Written procedures, which include detailed instructions to prevent the uncontrolled spread of radioactive contamination, are prepared for all radiological work conducted at the Windsor Site. Verbatim compliance with work procedures is enforced during work performance by trained radiological control monitoring personnel. Any deviation from the written requirements requires documentation and implementation of appropriate corrective actions before work resumes.

Work at the Windsor Site on radiologically controlled equipment or systems with loose surface contamination has been performed contained at the work site using devices such as glovebag-type containments. This approach ensured that radioactivity was controlled within designated areas and was not free to spread to the environment. Packaged items are opened and worked within designated areas referred to as Controlled Surface Contamination Areas. A Controlled Surface Contamination Area is an area that surrounds a surface or contains loose beta-gamma contamination in excess of 450 picocuries per 100 square centimeters per swipe, as measured by a beta-gamma survey instrument. All Controlled Surface Contamination Areas are clearly designated with barriers and postings. Strict entry and exit controls are enforced to prevent the spread of contamination. Controlled Surface Contamination Areas are normally surrounded and bounded by a Radiologically Controlled Area, which is also posted. Entry to and exit from a controlled area is made through a designated location called a Control Point Area. A Control Point Area also provides a location for personnel monitoring (frisking). Monitoring is performed to ensure beta-gamma contamination is not affixed to personnel leaving the area. When a Controlled Surface Contamination Area is not bounded by a Radiologically Controlled Area, additional controls are implemented to ensure no spread of radioactivity from the Controlled Surface Contamination Area to personnel or surrounding areas.

Radiological control personnel make frequent checks of radiological work areas to ensure that all requirements are being met. In addition to checks by radiological control personnel, a knowledgeable individual from a separate and independent auditing organization periodically monitors various aspects of radiological work. This individual's responsibility includes surveillance of radiological work in progress. The findings recorded by this individual are regularly reported to senior site managers.

Radiological controls at the Windsor Site are overseen by Naval Nuclear Propulsion Program headquarters. Naval Nuclear Propulsion Program headquarters performs on-site biennial audits of Windsor nuclear work practices, including radiological controls, worker training, quality control, and compliance with work procedures and headquarters requirements. The Naval Nuclear Propulsion Program also maintains a field office at the Windsor Site, to oversee day-to-day activities.

Besides enforcing strict radiological controls during applicable work activities, Naval Reactors has placed emphasis on minimizing the generation of low-level radioactive waste and mixed waste. Naval Reactors has been successful at minimizing waste generation, as exemplified by Windsor Site's long history of small waste volumes. Techniques used include reuse of radioactively contaminated tools, a prohibition on unnecessary commingling of clean and contaminated materials, minimizing the amount of clean materials needed to perform work in a radiologically controlled area, and routine decontamination efforts while work is in progress.

G.4 Radiological Release Strategy

The following points summarize the overall strategy to confirm all radioactivity attributable to Windsor Site operations is removed to levels that support future unrestricted use:

- Conduct a detailed review of the use and radiological history of all facilities and areas at the Windsor Site. This review will include radiological survey records, operational records and problem reports, and interviews with senior employees familiar with former operations. Categorize Windsor Site facilities and areas to identify the necessary measurements and solid samples needed to confirm final radiological conditions. (See Section G.5 for further detail)

Execution of the following steps would be completed if the prompt dismantlement alternative is selected. If the deferred dismantlement alternative is selected, this process would also be deferred for 30 years.

- Remove all radioactive material from individual areas prior to performing the release survey for that area. In order to dispose of all radioactive equipment and material at Windsor Site and at the same time minimize the generation of radioactive waste, radioactively contaminated or potentially contaminated material and equipment will be made available at no cost to other organizations engaged in Naval nuclear propulsion work. Examples of these items are vacuum cleaners, test equipment, radioactive liquid processing tanks and hoses, and portable ventilation systems. Some equipment may be suitable for decontamination and surveyed for release per Naval Reactors radiological criteria. This will be done when appropriate to minimize radioactive waste. When possible, radioactive metals will be recycled for use in appropriate applications. Those items which are identified as radioactively contaminated waste which are not decontaminated and released, or recycled, will be packaged and shipped to a Department of Energy radioactive waste disposal site.

- After removal of all radioactive materials, perform radiological survey measurements and solid samples of buildings and areas. General technique details are provided in Section G.6. All results will be documented.

- If any areas are discovered that exceed Naval Reactors radiological release criteria, execute additional measurements and sampling to determine the extent of the contamination.

    - Remediate any radiologically contaminated areas to meet Naval Reactors radiological release criteria.

  - Reperform the required measurements and sampling to confirm the area does not exceed Naval Reactors radiological release criteria. All results will be documented.

- Where buildings that have a history of use for radioactive material storage or radiological work have been completely demolished, perform radiological survey measurements and sampling within the building footprint in accordance with the Radiological Survey Plan. In addition, surveys in accordance with the Radiological Survey Plan will be conducted upon removal of pavement in areas that had been used for storage of radioactive material.

  - If any areas are discovered that exceed Naval Reactors radiological release criteria, execute additional measurements and sampling to determine the extent of the contamination.

  - Remediate any radiologically contaminated areas to meet Naval Reactors radiological release criteria.

  - Reperform the required measurements and sampling to confirm the areas do not exceed Naval Reactors radiological release criteria. All results will be documented.

  - The State of Connecticut Department of Environmental Protection and the Environmental Protection Agency - Region I will be invited to comment on the building footprint surveys or surveys of building materials that remain.

- When removal of buildings and radioactive materials from the site is complete, execute a final set of radiological measurements and sampling to cover the entire Windsor Site. This survey will verify that no radioactive materials above release criteria remain on Windsor Site property. In addition to surveys of soil, this survey will confirm that ground water remains in a condition that supports the final unrestricted radiological release of the Windsor Site.

- The results of the Windsor Site's building footprint surveys and final Windsor Site verification surveys, including sample analyses, will be compiled in a report to document the final radiological conditions at the Windsor Site (see Section G.10 for further detail).

- The State of Connecticut Department of Environmental Protection and the Environmental Protection Agency - Region I will be invited to comment on the release report and perform their own independent confirmatory surveys.

G.5 Categorization of Windsor Site Facilities and Areas

Windsor Site areas and facilities have been categorized according to the potential for residual radioactivity based on radiological work history. The radiological work history of the Windsor Site is extensively detailed. Facility categorization took into consideration the past and present use of every Windsor Site area, reviews of past radiological surveys and operating records, and interviews with long-time employees. There are no known areas of radioactively contaminated soil or ground coverings on the Windsor Site. Surveys have been performed after infrequent spills of radioactive material to ensure cleanups have been thorough and complete. At least annually, searches for unidentified radioactive material are performed using sensitive survey instruments. These searches have always demonstrated the lack of unidentified contaminated areas at the Windsor Site. Additionally, an aerial survey (shown in Section 4.5.5.2 of this Environmental Impact Statement) performed in 1982 identified no unknown areas of radioactivity on or adjacent to the Windsor Site.

All areas of the Windsor Site, including the east and south paved parking lots and adjacent areas, will be surveyed and sampled prior to unrestricted release. Areas currently in use or previously used for radioactive work or radioactive material storage are listed and categorized according to their potential for having residual radioactivity. Areas with a higher potential for contamination will be surveyed more extensively than areas with a low potential for contamination.

Besides radioactive materials attributable to S1C Prototype reactor plant operations, the Windsor Site has used and stored other general radioactive materials such as radiographic sources used for nondestructive testing, and naturally occurring radioactive materials such as thorium in welding electrodes. Windsor Site radiological control requirements have included a long standing program for ensuring the integrity of radioactive sources. Historical records indicate there has been no detectable spread of radioactivity from any radioactive sources used at the Windsor Site. Areas which have a potential for residual radioactivity from the grinding of welding electrodes, which contain naturally occurring radioactive thorium, will be surveyed consistent with the strategy outlined in Section G.4.

Windsor Site facilities and areas have been categorized into six general groups as follows:

> Group 1 areas have no history of radiological work, radiological systems or radiological material transfers. General area surveys will be conducted to provide assurance that such areas contain no radiological materials.
>
> Group 2 areas have no history of radiological work and never contained radiological systems. However, Group 2 areas may have been utilized for transfers of contained radiological materials or may be located adjacent to higher risk areas (Groups 3 - 5). The highest probability of encountering radioactive contamination in Group 2 areas is on the floor or ground. Grid patterns will be established on floor or ground surfaces and detailed surveys performed.

Group 3 areas have a potential for having been contaminated to low levels of beta-gamma radioactivity (less than 1000 picocuries per 100 square centimeters). Particular attention will be paid to potential areas of contamination, such as walls below shoulder height, floors, and work areas. A complete survey of the floors and walls up to 6 feet will be performed. Group 3 areas include corridors and radiologically controlled areas in which contained contaminated materials were handled or stored.

Group 4 areas have a potential for having been contaminated to levels of loose beta-gamma contamination between 1000 - 10,000 picocuries per 100 square centimeters. A thorough survey will be made over all floor areas and all walls up to 12 feet vertically. For walls and ceiling more than 12 feet in height, representative surveys will be made. Selected floor covering will be removed, and selected wall joints will be opened for a survey along heavy traffic routes and previous work areas. Particular attention will be paid to areas with higher potential for contamination, such as walls and floors.

Group 5 areas, have a potential for having been contaminated to levels of loose beta-gamma contamination greater than 10,000 picocuries per 100 square centimeters. A thorough survey will be made of all floor areas and all walls up to 12 feet vertically. For walls and ceiling more than 12 feet in height, representative surveys will be made. Floor covering will be removed, and all wall joints will be opened for a survey.

Groups 4 and 5 compose less than 10% of the area to be surveyed at the Windsor Site.

Group 6 areas have a potential for having been contaminated to alpha contamination. Certain areas of the Windsor Site were used to store alpha emitting radioactive sources and materials with naturally occurring radioactivity (welding rods). A location-specific survey of the work surfaces used for storage of these materials will be performed. This classification is in addition to the classification for potential beta-gamma contamination.

Building surveys are designed to identify residual radioactivity in the building and define the bounds of any identified contamination so a complete cleanup can be accomplished. Additionally, sampling of the soil beneath buildings associated with radiological work (Groups 3 and above) and that have their foundations completely removed, will be performed after removal of the building foundation.

Ground water samples will be taken from beneath the Windsor Site, surface water and sediment samples will be taken adjacent to the site (Goodwin Pond), and soil samples will be taken on and adjacent to the Site. While no residual radioactivity is expected or likely in these locations, this final set of radiological measurements and samples will verify that these locations have no radioactive materials due to Windsor Site operations or dismantlement.

Soil samples adjacent to the Windsor Site will be taken in the immediate proximity of three below grade pipes which have the potential to contain low levels of radioactivity and which are on the Combustion Engineering, Inc. property used under a permanent easement or extend slightly beyond the easement boundary. One pipe extends to Goodwin Pond and was inactivated in 1959. One pipe extends just on to Combustion Engineering, Inc. property to the west of the Windsor Site and was also inactivated in the 1960s. The remaining pipe currently discharges storm water to the drainage brook, but was used to discharge water containing low levels of radioactivity until 1979, as discussed in Section 4.3.3 of this Environmental Impact Statement. When the pipes are removed during the dismantlement, soil samples will be taken at all end points, joints or other portions of the pipes that are not leak tight. Residual radioactivity, if present, will be removed consistent with the on-site release limits.

G.6 Summary of Radiological Survey Instrumentation and Measuring Techniques

This section provides a general description of the radiological survey instrumentation and measuring techniques that will be used for unrestricted release of Windsor Site facilities. All surveys will be conducted per Naval Reactors approved requirements. Not all survey techniques will be used for all group areas. Survey techniques are chosen based on the extent and type of radioactivity potentially present within the area.

1. Beta-Gamma Surveys

This survey technique is used in Group 2-5 areas. Surveys will be made using an E-140N meter with a DT-304 probe or equivalent. These instruments are useful for detecting low levels of beta and gamma radiation. Surveys are made within ½ inch of all accessible surfaces within a grid, including attachments and depressions. Surveys are performed slowly (about 1 to 2 inches per second).

2. Gamma Scintillation Surveys - Narrow Energy Range (1.1 - 1.4 MeV)

This survey technique is used in Group 2-5 areas. Surveys will be made using an IM-253 operating in the HV-1/PHA mode which detects low-levels of gamma radiation in a narrow energy range around the energy of cobalt-60 gamma radiation. Surveys are made within ½ inch of all accessible surfaces within a grid including attachments and depressions. Surveys are performed slowly (about 1 to 2 inches per second). Readings equal to, or exceeding, twice the natural background readings on the X1 range will be investigated and the cause identified. Any discernible increase above natural background on the X10, X100, and X1000 range will be investigated and the cause identified.

Natural background is determined in the HV-1/PHA mode by measuring levels of similar building materials in analogous areas of the Windsor Site, based on environmental factors that affect natural background radiation levels. If an analogous

building or area is not available at the Windsor Site, the building or area to be surveyed may be used for determination of its own background. In this case, background surveys will be performed outside of the building or at the perimeter of the building. The location selected for determining natural background levels will not have been affected by radioactive material handled by the Windsor Site. The background radiation level and background location for the gamma scintillation survey will be documented in the final facility status report for each area surveyed.

3. Gamma Scintillation Surveys - Wide Energy Range (0.1 - 2.1 MeV)

This survey technique is used in Group 3-5 areas. Surveys will be made using an IM-253 operating in the HV-2/GROSS mode which detects low-levels of gamma radiation over a wide energy range (0.1 - 2.1 MeV). Surveys are made within ½ inch of all accessible surfaces including attachments and depressions. Surveys are performed slowly (about 1 to 2 inches per second). Readings equal to, or exceeding, twice the natural background shall be investigated and the cause identified. Natural background will be determined in the HV-2/GROSS mode by measuring levels of similar building materials in analogous areas of the Windsor Site, based on environmental factors that affect natural background radiation levels. If an analogous building or area is not available at the Windsor Site, the building or area to be surveyed may be used for determination of its own background. Background surveys will be performed outside of the building or at the perimeter of the building. The location selected for determining natural background levels will not have been affected by radioactive material handled by the Windsor Site. The background radiation level and background location for the gamma scintillation survey will be documented in the final facility status report for each area surveyed.

4. Waist-Level Gamma Scintillation Survey - Narrow Energy Range (1.1 - 1.4 MeV)

This survey technique is used in Group 1 areas. Surveys of an area will be performed with a IM-253 operating in the HV-1/PHA mode for detecting gamma radiation in a narrow energy range around the energy of cobalt-60 gamma radiation. The surveys will be performed approximately three feet above the floor or ground. Any readings which exceed twice established background for that area shall be investigated and the cause identified.

5. Waist-Level Gamma Scintillation Survey - Wide Energy Range (0.1 - 2.1 MeV)

This survey technique is used in Group 1 areas. Surveys of an area will be performed with a IM-253 operating in the HV-2/GROSS mode which detects low-level gamma radiation over a wide energy range. The surveys will be performed approximately three feet above the floor. Any readings which exceed twice established background for that area will be investigated and the cause identified.

6. Alpha Survey

This survey technique is used in Group 6 areas. Surveys will be made using with a Ludlum 43-2 Alpha Survey Probe coupled with an E-140N or equivalent for detection of alpha radiation. Light contact will be maintained between the alpha probe and the affected surfaces within the grid, including attachments and depressions.

7. Gamma Analysis of Water Samples

Water samples will be analyzed using a multi-channel analyzer and a minimum detectable activity level of 2×10^{-8} microcuries per milliliter equivalent cobalt-60 will be attained. Sample results which exceed 1×10^{-7} microcuries per milliliter will be investigated and the cause identified.

8. Gamma Analysis of Solid Samples

Solid samples will be taken and will include potentially contaminated ground coverings (for example, asphalt or porous concrete) and building materials. Samples with gross gamma results greater than 1 picocurie per gram for solid samples and 3 picocuries per gram for paint samples will be analyzed for cobalt-60 specific radioactivity. A gamma energy spectrum analysis will be performed to determine whether any of the radioactive isotopes present are attributable to Windsor Site operations or result from naturally occurring radionuclides.

9. Gamma Analysis of Sediment/Soil

Soil samples will be analyzed using a multi-channel analyzer and a minimum detectable activity level of 0.25 picocuries per gram for radionuclides attributable to Windsor Site operations will be attained. If detectable activity above 1 picocurie per gram is measured, isotopic analysis will be performed on samples to characterize any residual radioactivity to investigate and identify the cause of the detectable activity.

G.7 Summary of the Naval Reactors Radiological Release Criteria

Naval Reactors radiological release criteria are at least as protective of human health and the environment as the criteria used by other agencies. Naval Reactors radiological release criteria provide assurance that final radiation exposure levels at the Windsor Site will be indistinguishable from normal background radioactivity. The first column of the following table shows Naval Reactor radiological release criteria that will be used for unrestricted radiological release of Windsor Site facilities areas. Radiological release criteria of other agencies are provided for comparison.

SITE RELEASE CRITERIA COMPARISON

Sample	NNPP	DOE	NRC	EPA
Surface [1] contamination	450 pCi/per frisk (about 20 cm^2)	NRC criteria used	2250 pCi/100 cm^2 [2] 6750 pCi/100 cm^2 450 pCi/100 cm^2	Not specified
Material samples	1 pCi/g (cobalt-60)	Varies, 5-15 pCi/g [3] (cobalt-60)	Not specified	Not specified
Paint samples	3 pCi/g	Not specified	Not specified	Not specified
Annual dose	Not specified [4]	30 mrem/yr [5]	15 mrem/yr (proposed) [6]	15 mrem/yr (proposed) [7]

ABBREVIATIONS:

DOE = Department of Energy
NNPP = Naval Nuclear Propulsion Program
NRC = Nuclear Regulatory Commission
EPA = Environmental Protection Agency
cm^2 = square centimeters
g = gram
mrem/yr = millirem per year
pCi = picocuries (10^{-12} curies)

NOTES:

1. The surface contamination limit is also used for release of items.

2. Nuclear Regulatory Guide 1.86 average, maximum and loose values, respectively. Disintegration per minute figures converted to picocuries for the purpose of comparison. Naval Nuclear Propulsion Program criteria are identical to the Nuclear Regulatory Commission criteria with the exception that the Naval Nuclear Propulsion Program does not allow the peak values.

3. Shippingport Atomic Power Station was decommissioned by the Department of Energy. Shippingport criteria were 5 picocuries per gram to a depth of 1 meter, and 15 picocuries per gram at depths greater than 1 meter.

4. Computer modeling using the RESRAD code demonstrates that if a large area were contaminated to a considerable depth with an average of 1 picocurie per gram cobalt-60, the exposure above background to later site residents would be less than 15 millirem per year. In fact, any residual radioactivity on the site would be restricted to small areas of past inadvertent releases which were cleaned up at the time. Since 1 picocurie per gram is used as a peak acceptance criteria for closure, rather than an allowable average, the expected exposure level to any subsequent site users would be substantially below 15 millirem per year (that is, orders of magnitude lower, as shown during the recent shipyard closure activities). It is worth noting that 1 picocurie per gram cobalt-60 is well below the level detectable by sensitive field survey instruments.

5. Proposed 10 CFR Part 834 rule-making.

6. Reference 3-4 of this Environmental Impact Statement.

7. Reference 3-5 of this Environmental Impact Statement.

G.8 Basis for the Naval Reactors Radiological Release Criteria

The radioactivity of interest at and adjacent to the Windsor Site consists of two parts: radioactivity attributable to Windsor Site operations and naturally occurring background radioactivity. Both constituents must be understood to quantify measurements and assess compliance to release criteria.

As discussed in Appendix A, Section A.1, background radioactivity is always present, regardless of location, and the levels vary widely from place to place. Background radioactivity must be considered when surveying for radioactivity and when establishing cleanup standards. The survey process must be able to distinguish the naturally occurring radioactivity from man made radioactivity.

There has been considerable national debate over the radiological release criteria and associated health risks from conditions at industrial facilities. The Nuclear Regulatory Commission and the Environmental Protection Agency have proposed or drafted similar standards of 15 millirem per year for radioactivity, but neither agency has enacted these standards. As discussed in Appendix A of the Environmental Impact Statement, the principle health risk from radioactivity is the potential of developing a cancer at a rate higher than statistically found in the US population from natural causes. The International Commission on Radiological Protection estimates a fatal cancer risk of 5×10^{-4} per man-rem. A risk of 10^{-4} = 1 chance in 10,000 over a lifetime. Assuming a linear relationship between radiation dose and risk of cancer the following can be concluded:

- There is a 10^{-2} theoretical lifetime fatal cancer risk from natural background radiation (approximately 300 millirem per year, or about 21 rem for a 70 year lifetime).

- There is a 5×10^{-4} risk theoretical lifetime fatal cancer risk from receiving 15 millirem per year above background radiation for a 70-year exposure scenario (about 1 rem). An exposure of 15 millirem per year is consistent with the proposed Nuclear Regulatory Commission and draft Environmental Protection Agency cleanup standards.

For perspective, the additional exposure a person receives due to naturally occurring radioactivity during three round trip airline flights from coast to coast of the United States amounts to about 15 millirem (Reference G-3). Also, a resident of Denver, Colorado receives on average 23 millirem per year more naturally occurring cosmic radiation than the average U.S. citizen simply due to the elevation of the city of Denver (Reference G-3). This does not include the increased naturally occurring terrestrial sources of background radiation in Denver and elsewhere, which can be substantially higher than the average across the United States.

Standard computer models used by the Environmental Protection Agency and the Nuclear Regulatory Commission, such as RESRAD, can be used to estimate the radiation dose from a residual cobalt-60 radioactivity concentration of 1 picocurie per gram distributed uniformly over a site the size of the Windsor Site (about 10.8 acres). The result is less than 15 millirem per year. The RESRAD program models the various pathways (such as ingestion, inhalation,

and direct exposure) from which an individual could receive exposure from residual radioactivity.

Since the stringent Naval Reactors radiological controls have been highly effective at preventing the uncontrolled spread of radioactive contamination at all facilities, nearly all areas of the Windsor Site are expected to contain no residual radioactivity. The extent of soil remediation, if any, to meet the criteria of less than 1 picocurie per gram, is expected to be small. The annual dose at the Windsor Site following closure will be substantially less than 15 millirem per year based on highly conservative scenarios analyzed with the computer models and the fact that the average cobalt-60 concentration will be substantially below 1 picocurie per gram.

The Naval Reactors material sample criterion of 1 picocurie per gram is a very low, but practically measurable, concentration. Analysis sensitivity is a fraction of this limit. This limit is well below the natural background radioactivity in soil which often contains more than 10 picocuries per gram of naturally occurring radionuclides. Although the cobalt-60 concentration in soil will be lower than the naturally occurring radioactivity in the soil, cobalt-60 does not occur in nature, and hence is readily distinguishable from background when using sensitive laboratory gamma spectroscopy equipment. This criterion is lower than typical Department of Energy limits or Nuclear Regulatory Commission limits which have been specified.

The Naval Reactors surface contamination limit of 450 picocuries per frisk has been a conservative control limit since the 1960s. This limit is within the range of background radioactivity. Radioactivity at this low level contributes negligible exposure to personnel. This limit is comparable to the Nuclear Regulatory Commission Regulatory Guide 1.86 limits, as shown in the table in Section G.7.

Metal surfaces with potentially contaminated paint are not released for unrestricted use until the areas are inspected and samples do not exceed a concentration of 3 picocuries per gram. Paint has a different limit due to the practical difficulties of collecting large enough paint samples to detect 1 picocurie per gram. Since paint is thinly spread, paint at 3 picocuries per gram will result in radiation levels lower than other solid material at 1 picocurie per gram.

G.9 Quality Assurance Program

Key elements of the quality assurance program include data collection by trained personnel, use of calibrated instruments, use of written procedures, formal sample custody, independent audits, and sample analysis cross-checks.

The Windsor Site quality assurance program is supported by the Knolls Site Laboratory located in Schenectady, New York to validate Windsor Site radiological sample analysis data. On a quarterly frequency, the Windsor Site provides samples to the Knolls Site Laboratory for independent analysis. These samples consist of 50 to 60 randomly selected solid Windsor Site closure survey samples. Samples to date have included asphalt, concrete, and paint. On a

semi-annual frequency, the Knolls Site Laboratory provides the Windsor Site with 10 "blind" samples (samples containing radionuclide concentrations unknown to the Windsor Site) which contain various concentrations of cobalt-60 known to the Knolls Site.

In addition, the Knolls Site Laboratory participates in interlaboratory quality assurance programs, conducted by the Department of Energy Environmental Measurements Laboratory and the Environmental Protection Agency Environmental Monitoring Systems Laboratory as discussed in the annual Knolls Atomic Power Laboratory Environmental Monitoring Report (Reference G-4).

Quality Assurance Surveys and Sampling

Quality assurance surveys and sampling will occur by repeating sampling and surveying of specific areas during Windsor Site radiological release efforts. These quality assurance measurements will occur in areas comprising 1 to 10 percent of the surveyed area.

Independent Surveys

The State of Connecticut Department of Environmental Protection and the Environmental Protection Agency - Region I will be invited to independently check the performance of the radiological survey process for unrestricted release of the Windsor Site.

G.10 Final Report

The final release report will be a comprehensive document that describes the survey and sampling process and includes detailed results from surveys of the final condition of the Windsor Site. The report will specify unique sample location identifications and will diagrammatically show all sample locations on maps. Results will include the radionuclides of concern, the sample media (air, water, soil, sediment, direct survey, etc.), and the concentrations or radiation levels measured. The significance of the results will be summarized. The report will be approved by Naval Reactors. The State of Connecticut Department of Environmental Protection and the Environmental Protection Agency - Region I will be invited to comment on the final report prior to publication.

REFERENCES

G-1 Nuclear Regulatory Commission regulations 10 CFR Part 20

G-2 G.Uchrin et al., *^{14}C Release from a Soviet-Designed Pressurized Water Reactor Nuclear Power Plant*, Health Physics, Volume 63, Number 6, December 1992.

G-3 Nuclear Council on Radiation Protection and Measurements Report No. 94, *Exposure of the Population in the United States and Canada from Natural Background Radiation.*

G-4 Knolls Atomic Power Laboratory, *Environmental Monitoring Report*, calendar year 1994, KAPL-4812.