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United States Government

Booz, Allen

Department of Energy

CT.3

112

memorandum

DATE: JUN 20 1994

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Authority Determination -- Combustion Engineering Site, Windsor, Connecticut

TO: The File

The attached review, documents the basis for determining whether the Department of Energy (DOE) has authority for taking remedial action at the Combustion Engineering (CE) Site in Windsor, Connecticut, under the Formerly Utilized Sites Remedial Action Program. CE was a prime contractor for the Atomic Energy Commission (AEC) and performed high-enriched uranium fuel fabrication work from 1955 to 1967. The services furnished at the CE site included some experimental work; however, it primarily consisted of fabrication of high-enriched uranium into fuel which met Government specifications. Several areas of the CE plant were used for the performance of these contracts. The following factors are significant in reaching a determination:

- The high-enriched uranium was owned and furnished by the AEC;
- CE was an AEC prime contractor; it also performed some subcontractor work;
- The AEC inspected the facility as part of the contracting process;
- There was an on-site AEC presence at another part of the site by virtue of the construction and operation of a reactor prototype;
- The AEC provided health and safety advice and direction related to the handling of the high-enriched uranium;
- Although the facility is licensed for possession of nuclear materials, it has never been licensed for production activities involving high-enriched uranium; and
- Any authority for remedial action at this site must be restricted to high-enriched uranium or other nuclear materials whose possession has not been licensed.

A draft copy of the attached authority review was furnished to the Office of General Counsel for review. That office offered indicated that the review was adequate.

After review of the available original records and the authority review, I have determined that the DOE has authority to conduct remedial action at the former CE facility in Windsor, Connecticut. In view of commercial nuclear production activities at the site, this authority is limited only to the following: (1) Building 3; (2) other facilities or areas

associated exclusively with Building 3 (*i.e.*, sewer lines); or (3) contamination that is exclusively high-enriched uranium (*i.e.*, enriched to more than 20 percent in the isotope uranium-235).

W. Alexander Williams, PhD
Designation and Certification Manager
Off-Site/Savannah River Program Division
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Attachment

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Distribution:
EM-40 (2)
EM-42 (3)
Williams Reader

EM-421:williams:djn:903-8145:6/16/94:ce3.aut

EM-421
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Authority Review For
Combustion Engineering
Windsor, Connecticut

1.0 INTRODUCTION

As part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Department of Energy (DOE) has reviewed available information on the Combustion Engineering (CE) site in Windsor, Connecticut. The site is being investigated for potential inclusion in FUSRAP, which applies to certain sites previously involved with activities of the Manhattan Engineering District (MED) or U.S. Atomic Energy Commission (AEC), both DOE predecessors. Such sites may require remedial action if they have residual contamination from those previous activities. This review is conducted to determine whether DOE has the authority to conduct remedial action at the CE site.

The site in Windsor, Connecticut, is located at 1000 Prospect Hill Road, 13 km north of Hartford, Connecticut, and within 5 km of Bradley International Airport. It is located south of the Farmington River and north of Prospect Hill Road. The site was used during the 1950s and 1960s for nuclear research, fabrication of nuclear fuel from high-enriched uranium, and construction of a naval reactor prototype. The site was subdivided in 1960, with the naval reactor prototype becoming a DOE-owned facility and CE retaining ownership of the remainder of the property. The DOE property consists of the naval reactor prototype, known as the S1C Prototype Reactor. The CE property includes a commercial nuclear reactor fuel fabrication plant, as well as other facilities (Landis 1989). This Authority Review deals only with the CE property and not with the DOE-owned S1C site.

The specific boundaries and ownership history of the CE property are not well known; however, a time-dependent series of available maps are presented in Figure 1. In addition, in the 1980s, CE acquired the contiguous quarry property on the west edge of the site (Young and Mitchell 1992).

The remainder of this review consists of the following sections:

Information presented in these sections is in summary form. Pertinent references are identified in Section 7.0 and copies included.

2.0 OPERATIONAL HISTORY

At least since the 1950s, CE has operated a facility on the site of approximately 1,100-acres near Windsor, Connecticut. During the late 1940's and early 1950's, CE supplied certain non-nuclear component parts to AEC reactor projects (CE 1991). A 1955 agreement between CE and the AEC, accepted by parties on March 8 and March 3, respectively, appears to represent CE's initial involvement in AEC's naval reactor program. The agreement was followed some months later by AEC Contract No. AT(30-3)-198 that was to run until final settlement in July 1967. The initial scope of work of designing a submarine nuclear power plant facility ultimately led to the manufacture, assembly, tests, and operation of the S1C Prototype Reactor facility on the CE site. The first amendment to the contract called for the development, design, and fabrication of fuel element subassemblies for the reactor -- apparently CE's entry into reactor core development and fuel fabrication work. The agreement and initial contract identified above cite special benefits to the Government in return for experience gained by CE to facilitate their entry into the fuel-fabrication market. Contracts with other AEC activities followed. According to CE, as many as 20 of some 100 contracts with the AEC during the decade beginning in 1955 involved the use of highly-enriched uranium (HEU) and other special nuclear material. The percentage of enrichment in the isotope U-235 in the HEU to which they refer was not provided. However, extracts from a June 1960 materials processing contract provided by CE indicates that Government furnished materials included 895 kilograms of uranium enriched to approximately 93 percent U-235 in the form of uranium metal buttons for use in fabricating high-enriched uranium assemblies. Contracts for similar non-naval reactor fabrication work using uranium metal enriched in the range of 5 percent U-235 followed. Therefore, it is apparent that the uranium furnished for use at the CE facility varied from approximately 5 percent to over 90 percent enrichment of U-235.

In early 1959, 18 commercial firms were fabricating fuel elements at their own facilities. CE was one of two companies that were not required to license these activities because they were manufacturing exclusively for the Government (AEC 1960). CE presented descriptions of nine contracts for fabrication of core assemblies and fuel components, the last in 1962 (CE 1991). Additional contract information was provided later (Bickwit 1992) as reflected in References ii through qq.

By 1960, CE was designated as a source and special (SS) nuclear material accountability station subject to the policy and procedures of AEC Manual, Part 7400 - Materials Management, Chapter SCH-7401 Control of SS Material, Special Health and Safety Requirements. Enforcement was apparently accomplished by AEC audit and inspection of the CE facilities and operations. The results of an AEC nuclear safety inspection of the CE facility in 1962 included the statement that 8 kg of U-235 were not accounted for. It requested that CE

inform the AEC of its conclusions regarding the location of the material and identify what assurances exist that the material did not exist in a form or location constituting a hazard to the plant or environment. It recommended corrective action "with regard to the storage of waste and scrap materials." This is one of several admonishments for the loss of SS material contained in records reviewed.

In 1963 the AEC conducted health, safety, and fire protection surveys at CE (Glauberman and Weintraub 1964) -- evidence of continued control and concern on the part of the AEC for worker protection and for proper operation of equipment and facilities. Available historical records indicate that AEC was concerned about releases to the environment. However, these records focus more on monetary penalties for material losses than on cleanup of any release to the environment resulting from what were then standard waste management practices on the part of CE.

In the early 1960's, CE began commercial reactor fuel-fabrication. Although AEC contracts continued, some of the commercial work was performed in the same general areas used for AEC HEU work. However, CE has indicated that the commercial work did not involve the use of uranium enriched to the degree of that handled under the AEC contracts. The percentage or range of enrichment in the isotope U-235 was not provided. CE also indicated that some of the buildings used for commercial work were built after completion of the work for AEC. The nuclear fuel manufacturing facility was the example provided (CE 1991). According to CE, the first AEC license, obtained in 1961 for authority to possess source and special nuclear materials, did not include HEU (CE 1991).

However, the license SNM-551, as renewed August 1965 (Nussbaumer 1965), authorized possession of specific quantities of uranium enriched to 5%, 15% and a small quantity (2 kg) enriched to any percent. In October 1968, SNM-551 was terminated and the activities were reauthorized under license SNM-1067 (Nussbaumer 1968); up to 5 kg were permitted to any enrichment. Today, amendment 21 to SNM-1067 (NRC 1991a) allows for possession of limited quantities of plutonium, encapsulated sources, and uranium in the following quantities and percentages of enrichment in the isotope U-235:

- 500,000 kg enriched to not more than 5 percent
- 4,800 g enriched to less than 20 percent
- 1000 g enriched to or more than 20 percent

For a period during the 1960's, CE was operating as an SS Accountability Station for source and special nuclear material provided for AEC work and subject to the policies and requirements of the AEC Manual chapter pertaining to control of SS material. And, at the same time, CE was doing work for commercial clients under authority granted by AEC license.

Information contained in several of the documents referenced in Section 7.0 indicate that licensed activities were, or could have been, conducted in or in closed proximity to some of the same facilities or areas used in support of AEC-sponsored activities. Examples are Buildings 1 through 6, buried waste lines between buildings, the creek bed, the sewage plant, and outside waste storage areas. Building 3 may be the only building used exclusively by CE for AEC contract work involving highly-enriched uranium (Young and Mitchell 1992).

At the start of the 1990's, approximately 10 percent of 2,500 employees at the site were involved with nuclear fuel fabrication and low-enriched uranium nuclear fuel research and development with uranium oxide powders.

3.0 OTHER CONSIDERATIONS

Storage and disposal of recoverable and non-recoverable wastes or residues was a subject of several meetings starting in 1957 between AEC representatives and fuel fabrication contractors (AEC 1957-1958). There was repeated guidance encouraging reduction of the volume of waste generated. In addition, due to the unavailability of regional disposal facilities, contractors were responsible for disposal of wastes generated at their sites. However, the meeting notes were specific regarding the requirement for contractors to obtain AEC approval for any disposal or discharges. CE did discharge and dispose of radioactive residues and wastes on-site (CE 1991).

Limited records on the discharges and disposal indicate some degree of AEC involvement and direction. In a meeting with the AEC in late 1957 (Bowie and Hoover 1958), a review of CE's on-site disposal methods (1) confirmed the low-level liquid waste disposal system with AEC and Connecticut approval, (2) identified that procedures for AEC-acceptable incineration by a Calcinator would be submitted to AEC and Connecticut for approval, and (3) identified environmental and cost objections to opening an on-site burial ground. The meeting notes also indicated that the AEC cost-recovery policy was that contractors were to bear the costs of disposal of waste. A comparison of cost for four methods of waste disposal indicated that incineration was the cheapest by far. Subsequent contract provisions (AEC/CE 1960) confirmed that the Contractor was not to be allowed any payment for disposal of materials authorized by the Contracting Officer for discard. AEC instructions (Nitzman) in 1960 directed CE to document technical problems, decisions, commitments, and evaluations.

Under contract SCH-60-301 in mid 1961, CE indicated (Bowie 1961) in a materials report to the AEC that CE had handled 83,814 grams of uranium-235 which included at completion of work 18,399 grams of reusable material, 12,681 grams identified as scrap, 49 grams as BPID, 178 grams as losses, and 56 grams as approved inventory liquid write-off.

The matter of contractor indemnification is an important consideration in the determination of authority for cleanup under FUSRAP. However, official contract files have been destroyed in accordance with records management disposition schedules, which over the years called for retention of such records for a period of only 6 to 10 years following final closeout of the contracts. Records assembled for this authority review include copies and extracts from copies of contracts obtained from various sources.

Contract No. AT(30-3)-198 provided CE with broad indemnification by the Government in 1955. Subsequent contracts apparently contained indemnification clauses of lesser scope consistent with the different nature of subsequent contracts for the production of reactor fuel rather than design and operation of a prototype nuclear reactor.

Other considerations are (1) the question of the environmental standards of the day during the period of performance of the contracts compared with today's standards and criteria and (2) the residual contamination resulting from operations conducted under NRC (or predecessor, AEC) license, which is not authorized for cleanup under FUSRAP.

4.0 CURRENT CONDITIONS

CE identified the sites and facilities involved in AEC work as the Prototype Reactor, Buildings 1 through 6 and related drainpipes and sewer lines, a waste storage pad area, a drum burial site, and a creek bed (CE 1991).

CE indicated that HEU contamination has been found at five general locations involving six buildings. The HEU contamination is described as "tiny particles or shavings," "minute scrap material," and "other residues". The soil in these areas is reported to exceed uranium concentrations of 30 picocuries per gram. Concentrations exceeding several hundred thousand picocuries per gram of uranium in soil were found in some parts of a storage pad area (CE 1991).

In 1989, the Oak Ridge Institute for Science and Education (ORISE, formerly Oak Ridge Associated Universities (ORAU)) conducted a survey for the NRC of CE's Burn and Drum Storage Area. The survey results found the area within the NRC's guidelines for thorium and uranium in soil (Landis 1989). ORISE also took several samples nearby at the (dry) Waste Storage Pond. There they found ratios of U-235:U-238 in the soil and debris samples, which indicated the presence of HEU with no other significant nuclides present (Landis 1990).

Awareness of current conditions apparently unfolded as a result of several discoveries of HEU contamination and cleanup campaigns in the 1980s. CE requested a license amendment to accommodate the radioactive contaminants in 167 55-gallon drums and 1,100 cubic feet of soil accumulated during cleanup campaigns. The contaminants, thorium and uranium residues (enrichments ranging from 1 to 80

percent), were attributed to the burning of scrap metal 20 or more years earlier (Lichtenberger 1980). In 1984, CE reported the uranium contamination (up to 80-percent-enriched uranium) in the Building 3 waste line and Building 6 waste tanks that CE attributed to the 1950s era and the fabrication of fuel assemblies for the Naval Reactor Program (Lichtenberger 1984).

In 1993, the ORISE preformed a radiological survey of portions of the site and confirmed that high enriched uranium was present in various areas of the facility (Abelquist and Gibson, 1994).

5.0 AUTHORITY ANALYSIS

The authority determination is made according to the FUSRAP protocol by considering the answers to five questions. The answers to these questions from a review of available information are provided below.

5.1 Was the site/operation owned by a DOE predecessor or did a DOE predecessor have significant control over the operations or site?

CE owns the land and the facilities in question at the Windsor site. The AEC exercised control over all source and special nuclear material used at the site for work performed under Government contract by holding CE accountable for the material during fuel fabrication and other manufacturing processes, to include scrap, wastes, and residues. The AEC control of the physical plant operations was apparently limited to the enforcement of prescribed operating procedures and conducting health, safety and fire protection surveys. Although there are no supporting documents, there was an on-site AEC presence at another part of the site by virtue of the construction and operation of a reactor prototype.

AEC control of CE's commercial fuel fabrication operations under license included enforcement of provisions of the license limiting possession of source and special nuclear material, approval of criticality assessments, and review of plans (e.g., decommissioning plan, NRC 1990).

5.2 Was a DOE predecessor agency responsible for maintaining or ensuring the environmental integrity of the site (i.e., was it responsible for clean-up)?

CE, as the owner and operator, was and is still responsible for maintaining or ensuring its environmental integrity, primarily as a condition of license termination.

However, mitigating circumstances must be considered before rendering a response to this question for the period during which CE performed work under AEC contract. The criteria for release of contaminants to the environment and the degree of compliance with these release criteria by CE during the period of operation were controlled by the AEC. While the records are incomplete, there is some evidence of AEC

(and Connecticut) approvals for some methods of waste disposal, including release of liquids to the sanitary sewer system at the site. There is also evidence that the AEC objected to other proposed methods of waste disposal (*i.e.*, drum burial). There is also evidence that the AEC shifted the cost burden of disposal to contractors like CE. Finally, a former DOE employee has stated that the AEC, at the time of the contracts, provided environmental and health guidance to its contractors.

5.3 Is the waste or radioactive material on the site the result of DOE predecessor related operations?

The portion of the waste or radioactive material that contains uranium enriched above 20 percent is probably a result of AEC-directed or approved operations under CE contracts to the AEC. The remaining waste or radioactive material on the site is attributed to CE's commercial operations covered by AEC or NRC license and/or other work performed by CE for the AEC. Only the waste or radioactive material exclusively attributable to work performed by CE for the AEC can be considered for cleanup under FUSRAP.

5.4 Is the site in need of further clean-up and was the site left in a non-acceptable condition as a result of DOE predecessor related activity?

The site is in need of further cleanup. However, the authority under FUSRAP must be limited to: (1) those areas where HEU (uranium enriched in the isotope U-235 by greater than 20 percent) have been discovered, and (2) those areas where radioactive contamination above current guidelines (DOE Order 5400.5) is found and it can be established that the facilities or areas were used exclusively for unlicensed AEC work.

5.5 Did the present owner accept responsibility for the site with the knowledge of its contaminated condition and that additional remedial measures are necessary before the site is acceptable for use without radiological restrictions?

CE has owned most of the property since their entry into the field of nuclear fuel fabrication in the early 1950's. CE would likely be most knowledgeable of the condition of the adjacent quarry land acquired in the 1980s. There was knowledge of contaminated conditions that required remedial measures. There is evidence of several cleanup campaigns conducted by CE subsequent to the termination of the AEC contract. NRC license termination conditions accepted by CE require eventual cleanup of the plant site for use without radiological restrictions.

6.0 DISCUSSIONS AND CONCLUSIONS

There is sufficient evidence to indicate that the radioactive contamination containing HEU (uranium enriched to greater than

20 percent in the isotope U-235) discovered at the site is waste or residue from operations under AEC contracts and warrant cleanup under FUSRAP.

Evidence assembled indicates that only Building 3 was used exclusively for work under AEC contracts. There is not sufficient information to determine that there is authority under the Atomic Energy Act, as amended, in those areas that were used for both AEC work and work done by CE for commercial clients. Furthermore, under current FUSRAP Protocols, sites and facilities identified with AEC/NRC licenses for the same activity as conducted under AEC contracts are not to be considered for cleanup under FUSRAP.

Based upon the analysis presented above, DOE may have authority under the Atomic Energy Act to take remedial action at the following locations at the Windsor Site:

- Building 3;
- those located exclusively with Building 3 (i.e., sewer lines); or
- contamination that is exclusively HEU (enriched to greater than 20 percent in the isotope uranium-235).

This authority determination does not include areas where concentrations of HEU do not exceed applicable DOE guidelines contained in DOE Order 5400.5, Chapters II and IV.

7.0 COPIES OF REFERENCES

The following is the list of references that are provided in this section.

a. Atomic Energy Commission (AEC), 1955-1957: Standards for Protection Against Radiation. 10 CFR 20. Federal Register. Proposed Rule Making, pp 5105-5105, July 16, 1955. Published Rule, pp 548-554, January 29, 1957.

b. AEC, 1957-1958: Various meeting notes and correspondence on discussions with fuel fabricators regarding disposal and discharges.

c. AEC, 1960: *Annual Report to Congress on AEC Activities for the period January to December 1959*. Page 23. January.

d. AEC, 1981: Review of Amendment Application Dated November 10, 1980, and Its Revisions Dated April 10, and May 1, 1981. AEC internal note. June 29.

e. Borawski, E. T., 1968 (estimated): Environmental Monitoring Report, January 1965 to December 1967. Combustion Engineering, Nuclear Power Department, Windsor.

f. Combustion Engineering (CE), 1991: Grounds for Designating Certain Areas of Combustion Engineering Inc.'s Windsor, Connecticut Property for Inclusion in the Department of Energy's Formerly Utilized Sites Remedial Action Program or Another Appropriate Remedial Action. Memorandum. April 15.

g. Glauberman and Weintraub, 1964: Combustion Engineering, Inc., Nuclear Division, Windsor, Connecticut, Health, Safety and Fire Protection Survey. U.S. Atomic Energy Commission New York Operations Office. 64-8, CEND-1. March 10.

h. Ennis, T.A., 1960: Conveyance by CE of land and rights of way associated with the S1C Prototypes Site from CE to the United States Government. (Includes Amendments of Deed and Easement, CE/DOE, May 1982.) December 7.

i. Harris and Weinstein, 1956: Open Field Burning of Low Level Radioactive Contaminated Combustible Wastes. *American Industrial Hygiene Association Quarterly*, 17:4, pp 388-390. December.

j. Jackson, R. L., 1985: Evaluation Memo: CE-Windsor SSNM Waste. CE letter sent to Brown, W. B. Includes: Brown, W. B., 1985: License No. SNM-1067. May 30.

k. Landis, M. R., 1989: Follow-up Confirmatory Radiological Survey of other Drum Storage Area, Combustion Engineering Property, Windsor, Connecticut. Oak Ridge Associated Universities, ORAU 89/E-93. May.

l. Landis, M. R., 1990: Oak Ridge Associated Universities letter to Roth, Region I NRC. June 7.

m. Lichtenberger, H. V., 1971: Combustion Engineering Waste Management Program. CE letter to Cunningham, AEC, with selected enclosures. October 4.

n. Lichtenberger, H. V., 1973. CE Request for Renewal of License SNM-1067. CE letter to Rouse. April 16.

o. Lichtenberger, H. V., 1978: Letter from CE to Rouse, AEC, on effluent monitoring data in 1977. February 4.

p. Lichtenberger, H. V., 1980: CE letter to Crow, NRC, on uranium and thorium residues with enclosure Attachment A--SNM License Amendment Criteria. November 10.

q. Lichtenberger, H. V., 1984: SNM-1067. CE letter to Page, NRC, on 80 percent U-235 at Buildings 3 and 6. November 30.

r. Lichtenberger, H. V., 1985: SNM-1067. CE letter to Jackson, R., NRC. April 12. Enclosure: Appendix I.

s. Moulton, J. C. 1991a. CE letter to J. W. Wagoner, DOE. Included two enclosures. April 15.

t. Moulton, J. C., 1991b: Windsor Site Project, Status Update. CE letter J. Roth, NRC. May 15.

u. Nuclear Regulatory Commission (NRC), 1973: SNM-1067, Outside Waste Storage Area and Liquid Wastes, pp XIV-2 to XIV-4. April 16.

v. NRC, 1990: SNM-1067, Decommissioning Plan, page I.6-1. January 17.

w. NRC, 1991a: SNM-1067, Amendment 21. March 20.

x. NRC, 1991b: SNM-1067, Authorized Activities, page I.1-3. June 12.

y. Nussbaumer, D. A., 1965. AEC letter to Shippenberg, CE, regarding renewal of SNM-551. August 9.

z. Nussbaumer, D. A., 1968: AEC letter to West, CE, regarding termination of SNM-551 and continuation under SNM-1067. October 30.

aa. Radiological Health Data, 1963: S1C Prototype Reactor Facility, Second Half of 1961 and First Half of 1962, CE, Windsor, Connecticut. pp 388, 389. July.

bb. Rouse, L. C., 1989: AEC letter to Waterman, CE, regarding release of wooded area for unrestricted use. August 10.

cc. Scherer, A. E., 1988a: Final Report on Disposal of High-Enriched Uranium Found at the Windsor Fuel Fabrication Site. CE letter to Branch, NRC. August 15.

dd. Scherer, A. E., 1988b: Request for Release of Land for Unrestricted Use. Enclosure (1) Radiological Survey Report-Wooded Area, CE, November 1988, (2) Direct Gamma Radiation Survey of 15′ Grid Intersection at Thorium and Uranium Pit, CE, 1986, (3) Radionuclide Concentrations in Surface Soil Samples Collected from Wooded Area, CE, November 1986. November 1988.

ee. Schoenberg, T. H., 1962: Letter from AEC to Shippenberg, CE. Enclosure Inspection Report by T. Gutman, July 25, 1962. September 5.

ff. West, J. M., 1965. CE letter to Nussbaumer, AEC, on proposed change to SNM-1067, including authorization for up to 5 kilograms of U-235 for any percentage enrichment. September 30.

gg. Zinn, W. H., 1964. CE letter to Nussbaumer, AEC, on proposed

changes to SNM-551, including authorization for up to 2 kilograms of U-235 for any percentage enrichment. June 19.

hh. Bowie, T. B., and R. L. Hoover, 1958: Trip Report. CE Memo to G. M. Chambers. Enclosure trip report, "Removal of Scrap and Wastes from Fabricator's Sites," held December 10 and 4, 1957, at the initiation of J. D. Anderson, Schenectady Operations Office. [Enclosure of Bickwit 1992] January 2.

ii. AEC/CE, 1960. Contract, estimated to be drafts of SCH-60-301 of April 15, 1960 and SCH-60-345 of May 20, 1960. Alterations to General Provisions contract, of regarding Special Nuclear Materials and Payments (3 pages). [Enclosure of Bickwit 1992] March 23.

jj. Winkler H. H, 1960. General Electric teletype to Satchwell, CE, regarding approval of preliminary process for fabrication of preproduction elements and approval of uranium quality with regard to SCH-60-301, CE 4360. [Enclosure of Bickwit 1992] April 19.

kk. Miller, A. F., 1960: Contract No. 4360 - Code PTR, Delegation of Authority. CE memo to H. V. Ross. [Enclosure of Bickwit 1992] April 29.

ll. Nitzman, S. W., 1960: Recording and Review of Technical Decisions and Advice Concerning Work Being Performed Under Prime Core Contracts Administered by Schenectady Naval Reactors Operations Office. AEC letter to A. F. Miller, CE. Enclosure Conference Reports. [Enclosure of Bickwit 1992] May 16.

mm. Combustion Engineering, (estimated) 1960: Cost-Plus-A-Fixed Fee Subcontract No. 73-(14-1107) Between Westinghouse Electric Corporation and Combustion Engineering, Inc. Under Prime Contract AT-11-1-GEN-14 with Atomic Energy Commission. Contains only selected pages; enclosure 3 pages of administrative procedures for Cost-Type Subcontracts, Bettis Atomic Power Division, Westinghouse Electric Corporation; and enclosure 3 pages of General Provisions for Westinghouse CPFF Actions Under Prime Contract AT-11-1-GEN-14 with the Atomic Energy Commission. [Enclosure of Bickwit 1992] July 25.

nn. Bowie, T. B., 1961: Contract SCH-60-301, CEND #4360. CE letter to attention of D. W. Short, Manager, AEC, Schenectady. Enclosure Uranium Utilization Schedule, Contract SCH-60-301, Project SNR-40702-00-4, 6-9-61. [Enclosure of Bickwit 1992] July 17.

oo. Shippenberg, S. H., 1962: Subcontract 73-(14-1107), CEND-4260. CE letter to M. L. Guido, Westinghouse, regarding close out of contract. [Enclosure of Bickwit 1992] May 14.

pp. Nitzman, S. W., 1968. AEC letter to H. M. Winterson, CE, of satisfaction with CE replacement General Manager at SIC Site for AEC Contract AT(30-3)-519. [Enclosure of Bickwit 1992] April 9.

qq. Bickwit, L. 1992. Letter on behalf of CE to W. A. Williams, DOE. Various enclosures, selectively cited separately. July 7.

rr. Young C. and E. Mitchell, 1992: Interview With Former Employee of Combustion Engineering, Windsor, CT. OTS note to A. Williams, DOE. October 7.

ss. Abelquist E. and D. A. Gibson, 1994: Designation Survey Combustion Engineering Site, Windsor, Connecticut, Oak Ridge Institute for Science and Education (ORISE 94/D-63)

Maps by Date of Combustion Engineering Property at Windsor

Map 1	CE Property in July 1963
Map 2	CE Property in February 1969
Map 3	CE Property in October 1974
Map 4	CE Property in November 1980
Map 5	CE Property in November 1980
Map 6	CE Property in 1984
Map 7	CE Property in November 1986
Map 8	CE Property in 1988
Map 9	CE Property in March 1991
Map 10	CE Property in April 1991