Invitation to Comment on the Proposed Cleanup of Remaining Commercial and FUSRAP Radiological Areas at the CE Windsor Site, Windsor, Connecticut

INTRODUCTION

This Proposed Remedy Plan presents the proposed cleanup plan for radiological and chemical contamination in groundwater, buildings, soil, and sediment associated with Formerly Utilized Sites Remedial Action Program (FUSRAP) materials and remaining NRC-licensed materials from past commercial operations commingled with FUSRAP materials (collectively "FUSRAP areas") at the Combustion Engineering, Inc. (CE) Site located at 2000 Day Hill Road in Windsor, Connecticut (CE Windsor Site). It also provides the rational for proposal of the preferred remedies: Enhanced In-Situ Biodegradation for groundwater, and Excavation and Off-Site Disposal for buildings, soil, and sediment. CE acquired ownership of the Site in the 1950s, and maintains the property title. In 1989, CE was purchased by ABB, Inc. ABB is the current Site Administrator.

This Proposed Remedy Plan provides information about the preferred cleanup alternatives that have been developed by ABB in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The purpose of the Proposed Remedy Plan is to:

- Provide basic background information;
- Identify the preferred cleanup approach;
- Describe why the preferred alternatives were selected; and
- Request the public to review and provide any comments or concerns they may have regarding the preferred alternatives.

Community input is an important part of the CERCLA cleanup process. The public is invited to participate in the decision-making process. Comments provided by the public are valuable in helping ABB select the final cleanup approach for these sites.

This Proposed Remedy Plan summarizes key information from other documents that have been prepared for the FUSRAP areas, especially the *Alternatives Evaluation Report for Remaining Commercial and FUSRAP Radiological Areas* (MACTEC, 2007). This and other documents that provide additional background information are available for public review in the Administrative Record that is maintained at the Windsor Public Library, 323 Broad Street, Windsor, Connecticut 06095 (library@townofwindsorct.com).

Submit written comments

Public Comment Period: September 27 through October 27, 2007.
ABB will accept written comments on the Proposed Remedy Plan during the public comment period. Comments may be submitted to ABB's consultant, MACTEC to:

Nelson Walter
Project Manager
MACTEC Inc.
PO Box 7050
Portland, Maine 04101
Phone : 207) 775-5401
Fax : (207) 772-4762

Attend the Public Meeting

You are invited to a meeting to hear about the proposed cleanup of the CE Windsor Remaining Commercial and FUSRAP Radiological Areas. At this meeting you will be able to state your views about the cleanup. The meeting will be held

October 18, 2007 at 7:00 PM at the
Ludlow Room
Windsor Town Hall

SITE BACKGROUND

The CE Windsor Site is located approximately four miles northwest of Windsor center and eight miles north of Hartford. The Site occupies approximately 600 acres south of and bordering the Farmington River. A mixture of residential, agricultural, commercial, and industrial land uses surround the site. The Site includes various wooded areas and three ponds – Goodwin Pond, Small Pond, and Great Pond. Site Brook transects the northern portion of the property, flowing northwest into the Farmington River.

Operations began at the Site in the late 1950s. Over the history of its operation, there were historically more than 30 buildings on the Site that have been used for nuclear and/or fossil fuel research and development, nuclear fuel production, nuclear power plant support, engineering and designing activities, administration, materials storage, and general property and equipment maintenance.

From the mid-1950s and through the early 1960s, nuclear fuel fabrication was conducted for the Atomic Energy Commission, which is now the U.S. Department of Energy. After the early 1960s, CE performed similar operations for the commercial nuclear industry. Nuclear fuel production ceased in 1993, and all other commercial nuclear activities ceased in 2001, with the exception of decontamination and decommissioning of the commercial areas.

In 1960, an area of approximately 11 acres was segregated from the CE Windsor Site for exclusive federal government use (S1C Facility), and was purchased by the US Government. CE and subsequently ABB used the rest of the site for various nuclear operations and activities, until those operations ceased. The FUSRAP areas of the CE Windsor Site are located on the parcel that CE continues to own; the S1C Facility, which incorporates the other 11 acres, is not a part of this Proposed Remedy Plan.

It is the objective of ABB to decommission the CE Windsor Site, including associated buried piping and adjacent grounds, such that the areas will meet the criteria required by the U.S. Nuclear Regulatory Commission (NRC) for unrestricted use, and to terminate the NRC licenses for the CE Windsor Site.

FUSRAP AREA CHARACTERISTICS

The CE Windsor Site was originally designated in FUSRAP by DOE in 1994. Buildings 3 and 6, and areas of the site that contained uranium enriched at 20 percent or greater in Uranium-235 were identified by DOE as FUSRAP areas. In 2004, the designation was expanded by the US Army Corps of Engineers to include all uranium enrichments, and any chemicals used in CE government contract work.

The original designation surveys and subsequent investigation by ABB and the U.S. Army Corps of Engineers identified the following FUSRAP Areas:

- Building 3
- Building 6
- Areas Surrounding Building 3 and 6
- Woods Area (AOCs 1 and 4)
- Equipment Storage Yard (AOC 10)
- Industrial Waste Lines (AOC 12)
- Debris Piles (AOC 13)
- Site Brook (AOC 14)
- Drum Burial Pit (AOC 21)
- Clamshell Pile (AOC 27).

Media affected by chemicals, uranium, and/or cobalt-60 at these areas include soil, sediment, interior building surfaces (Building 3 and Building 6 only), and groundwater (Equipment Storage Yard and Industrial Waste Lines).

Building 3. Building 3 is a 56,000-square-foot, one-story structure constructed of concrete block, concrete floors, and steel framing with transite (asbestos) siding, and a steel roof deck. Building 3 was used for nuclear research and fabrication of nuclear fuel from highly-enriched uranium fuel stock, and houses multiple process control systems. These systems include multiple ventilation units for heating and isolating contaminated areas, and a water supply and drainage system for controlling process waters, industrial waste, sanitary waste, and radiological waste.

Building 6. Building 6 was constructed in 1956 as a liquid radiological waste collection and dilution facility for Buildings 3, 5, and 17. Building 6 is a reinforced concrete building (approximately 40 by 60 feet) with a steel roof deck and a deep basement extending approximately 20 feet below ground surface. The building houses four 5,000-gallon steel dilution tanks and ten 2,000-gallon steel storage tanks, and there is a shallow sump located in the southwest corner. The building is also equipped with a roof mounted ventilation system.

Areas Surrounding Buildings 3 and 6. This area was studied in 1993 as part of the Designation Survey. Subsequent studies were performed in 1998 and a remedial investigation was performed in 2000/2001. During the remedial investigation phase, Gamma Walkover Survey measurements and analytical data were reviewed and interpreted. Total uranium was identified as posing potential risks to human health based on its chemical toxicity and radioactivity. Total uranium was not considered to pose unacceptable risks to ecological receptors.

Woods Area (AOCs 1 and 4). The Woods Area consists of an asphalt pad and an adjacent roadway and woodland comprising a total of approximately 7 acres. The pad itself is located in a lightly wooded area

with mildly sloping terrain adjacent to a dirt access road and was used historically to store and process low-level radioactive waste. There has also been evidence of machinery from Building 3 being stored in the area for extended periods prior to disposition.

Total uranium was identified as posing potential risks to human health and ecological receptors, based on its chemical toxicity and radioactivity. In addition, tetrachloroethene was identified as being present at concentrations exceeding Connecticut Remediation Standard Regulations (RSR) criteria.

Equipment Storage Yard (AOC 10). The Equipment Storage Yard occupies approximately one acre along the southwestern shore of Small Pond. The area was originally used in the mid-1950s to store fill and construction debris. In 1968, Building 20 was constructed and used as a test facility for trash incineration. The Facility and Engineering Services Department subsequently used Building 20 for their daily maintenance operations. In fall 2001, Building 20 was dismantled.

Two interim corrective measures have been completed at the Equipment Storage Yard. The first was performed in 1999 to remove crushed drums and polyaromatic hydrocarbon (PAH)-contaminated soils exceeding Connecticut RSR Criteria; however, some soil still remains with PAHs present at concentrations above Connecticut RSR Direct Exposure Criteria. The second interim corrective measure consisted of the installation of a fence to limit/control human exposure to elevated concentrations of PAHs in surface soils.

In addition, sampling has identified two areas within the former Equipment Storage Yard with elevated total uranium activity. These are: (1) a partially buried drum containing uranium which remains on the fill bank above the edge of Small Pond, and (2) fill soils discovered during excavation of test pit TP-1012. Anecdotal information indicates a drum containing byproduct material was removed from the vicinity of TP-1012 in the past.

Industrial Waste Lines (AOC 12). The Industrial Waste Lines area consists of three parallel subsurface pipelines and the surrounding soil. The pipelines are known to have transported radioactive and chemical materials from process areas to wastewater treatment facilities. The remedial investigation evaluated the residual radioactivity within the lines, as well as potential evidence of radioactivity in soil surrounding the lines, which could have resulted from leakage. Uranium activity exceeding Connecticut RSRs has not been detected in soil surrounding the lines; however, there is evidence of leakage from the lines, based on chemical concentrations in soil and groundwater in the vicinity of the lines and anecdotal evidence of a significant leak that required replacement of the old industrial waste line.

Debris Piles (AOC 13). This area consists of two distinct piles, one of concrete debris and one of wood debris. Some metallic debris is located within both of the piles, and is most prevalent within the northern edge of the wood debris pile. Each pile is approximately 15 feet in diameter at the base, and 3 feet tall in the center.

Total uranium activities were compiled for 40 soil samples within this one area. In general, the highest total uranium activities were detected in the surface of the northern portion of the area, immediately adjacent to the debris piles.

Site Brook (AOC 14). Site Brook flows northwest for approximately ½ mile through the CE Windsor Site from Goodwin Pond to the Farmington River. Surface water depths are generally less than 1 foot.

Site Brook received discharges of treated sanitary wastewater, industrial wastewater, diluted radioactive wastewater from Building 6, and low-level radioactive wastes from the S1C facility.

Cobalt-60 and total uranium in brook sediments were the only chemicals detected that pose a potential risk. Cobalt-60 and total uranium were identified as posing potential risks to human health based on their radioactivity.

The highest Cobalt-60 activity in soil was detected in the surface of the eastern portion of the study area, in the immediate vicinity of the outfall of the industrial drain lines and a former sewage treatment plant. For sediment, the highest Cobalt-60 activity was detected in surface sediment, along the northwestern portion of the study area. This is the same sample where the highest total uranium activity was detected. A review of the distribution of Cobalt-60 reveals that the higher values appear in the immediate vicinity of the outfall from the S1C Site, and in the middle portion of the study area, immediately downstream from where the brook exhibits a slight change in flow direction. Like the detection of total uranium, the presence of Cobalt-60 is most prevalent in the surface of the areas investigated.

Drum Burial Pit (AOC 21). The Drum Burial Pit study area consists of a manmade pit used for disposal of drums and other materials. The pit was originally a sand and gravel pit, which was filled with miscellaneous waste material from 1955 to 1960. During an excavation conducted in 1990, 26 drums/barrels were discovered and removed. Material found included electrical wiring, plastics, paint cans, personnel protective clothing and asbestos. In addition to buried drums and containers, miscellaneous debris, including bottles, pails, and machine parts, have been historically visible and reported at the ground surface. Many buried drums/containers currently exist within the pit, and extend to a depth of 15 feet below ground surface.

Beryllium, total uranium, and PCBs pose potential risks to human health based on their chemical toxicity. Total uranium was also identified as posing potential risks to human health based on its radioactivity.

Clamshell Pile (AOC 27). The Clamshell Pile contains a pile of clamshells that were removed from Site Brook. The clamshells were placed in Site Brook to buffer low pH (i.e., acidic) conditions resulting from the discharge of wastewater to Site Brook prior to upgrading the wastewater treatment facility. The addition of clamshells as a buffer was reportedly successful as a passive neutralization technique; however, their high absorptive properties retained low-level radioactive and other materials (ENSR, 2004). The uranium-rich clamshells were subsequently removed from Site Brook, and placed in their current location, 600 feet north of the brook. The previous location of the clamshells within the brook has not been identified.

Elevated total uranium activity was detected throughout the soil that is underlying the clamshell pile.

Zirconium and PCBs were identified as posing potential risks to human health based on their chemical toxicity. Total uranium was identified as posing potential risks to human health based on its radioactivity. Ecological risks were not associated with these chemicals.

Groundwater at AOCs 10 and 12. There are two groundwater plumes in the southern portion of the CE Windsor Site that have groundwater contamination associated with FUSRAP areas. The Western Plume is located east of Great Pond, in the vicinity of former Building 6A and the former Industrial Waste Line. The Eastern Plume is located in the vicinity of the Equipment Storage Yard, along the southwestern

shoreline of Small Pond. Groundwater contaminants exceeding RSRs consist of tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride.

SCOPE AND ROLE OF PROPOSED CLEANUP ACTIONS

The proposed cleanup actions will address all remaining commercial and FUSRAP radiological contamination, as well as collocated chemical contamination at the Windsor Site. These cleanup actions are required to demonstrate compliance with Applicable or Relevant and Appropriate Requirements (ARARs), including but not limited to the NRC's license termination requirements and the Connecticut RSRs. The clean up actions will result in conditions that allow for unrestricted use and unlimited exposure in accordance with NRC guidelines for license termination and consistent with U.S. Environmental Protection Agency (EPA) risk management guidance and Connecticut RSRs. Termination of ABB's NRC licenses and compliance with state and federal required cleanup standards will support ABB's goal of Site redevelopment.

RESULTS OF RISK ASSESSMENTS

Baseline risk assessments have been performed for the CE Windsor Site as part of the RCRA Facility Investigation, Building 3 Complex and Building 6 Remedial Investigations, and the Remedial Investigation for FUSRAP Areas. These risk assessments are summarized and supplemented in Appendix A to the *Alternatives Evaluation Report for Remaining Commercial and FUSRAP Radiological Areas* (MACTEC, 2007). The risk assessments demonstrate that human health risks at all of the FUSRAP areas exceed risk limits established in the EPA's National Contingency Plan (NCP). Specifically,

- cancer risks associated with radionuclides at all of the FUSRAP areas exceed the upper bound of the NCP cancer risk range (i.e., an excess lifetime risk of 1 in 10,000);
- cancer risks associated with chemicals at one of the FUSRAP areas (Equipment Storage Yard) exceed the upper bound of the NCP risk range; and
- non-cancer hazard index values associated with chemicals at the Clamshell Pile exceed the threshold hazard index value of 1.

As stipulated by EPA, when risk to an individual for either current or future land use exceeds the 1 in 10,000 excess lifetime cancer risk end of the risk range, or if there are non-carcinogenic hazards in excess of a hazard index of 1, action under CERCLA is generally warranted. Therefore, the preferred alternatives identified for groundwater and buildings, soil, and sediment, or one of the other active measures considered, in this Proposed Remedy Plan, are necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances to the environment.

No ecological risks have been identified at the FUSRAP areas.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives for the FUSRAP areas to demonstrate compliance with ARARs are listed below.

- Decontaminate and dismantle radiologically contaminated buildings and systems at Building 3 and Building 6 to prevent exposure to unacceptable levels of radiological contamination.
- Dismantle Buildings 3 and 6 to allow complete evaluation of contamination conditions in soil and drain lines beneath and next to the buildings.
- Prevent contaminants in vadose zone soil at concentrations exceeding the Connecticut GA Mobility Criteria from contributing to groundwater contamination above concentrations of concern.
- Prevent human receptor exposure to radiologically contaminated soil and sediment at the identified FUSRAP areas at levels exceeding Derived Concentration Guideline Levels.
- Prevent human receptor exposure to chemically contaminated soil and sediment at the identified FUSRAP areas at concentrations exceeding Connecticut RSRs.
- Prevent human receptor exposure to groundwater with contaminants exceeding Connecticut RSRs.

SUMMARY OF EVALUATED REMEDIAL ALTERNATIVES FOR GROUNDWATER

The Alternatives Evaluation Report evaluated the following four alternatives for cleanup of groundwater:

- Alternative GW1: No Action
- Alternative GW2: Enhanced In-Situ Biodegradation
- Alternative GW3: Groundwater Extraction and Treatment
- Alternative GW4: Monitored Natural Attenuation

Alternative GW1, the No Action Alternative, does not include remedial action components to eliminate, reduce, or control actual or potential risks to human or ecological receptors. It was evaluated, however, as a baseline with which to compare the other alternatives.

Alternative GW2 relies on enhanced in-situ bioremediation of groundwater to mitigate human receptor exposure to contaminants exceeding preliminary remediation goals (PRGs) based on Connecticut RSRs. This alternative would consist of the following key components:

- Injection of nutrients and other compounds to stimulate biodegradation of chlorinated VOCs in groundwater
- Performance monitoring to evaluate the effectiveness of the remedial action

Alternative GW3 relies on extraction and treatment of groundwater to mitigate human receptor exposure to contaminants exceeding PRGs. This alternative would consist of the following key components:

- Installation of groundwater extraction wells
- Construction of the groundwater treatment system
- Discharge of treated groundwater to the local waste water treatment facility

- Performance monitoring to evaluate the effectiveness of the remedial action

Alternative GW4 relies on natural attenuation processes to mitigate human receptor exposure to contaminants exceeding PRGs. This alternative would consist of the following key components:

- Installation of groundwater monitoring wells
- Performance monitoring to evaluate the effectiveness of the remedial action

SUMMARY OF EVALUATED REMEDIAL ALTERNATIVES FOR BUILDINGS, SOIL, AND SEDIMENT

The Alternatives Evaluation Report evaluated the following three alternatives for cleanup of buildings, soil, and, sediment:

- Alternative SS1: No Action
- Alternative SS2: Excavation and Disposal in On-Site Landfill
- Alternative SS3: Excavation and Off-Site Disposal

Alternative SS1, the No Action Alternative, does not include remedial action components to eliminate, reduce, or control actual or potential risks to human or ecological receptors. It was evaluated, however, as a baseline with which to compare the other alternatives.

Alternative SS2 relies on institutional controls and excavation and on-site disposal of FUSRAP area soil and sediment exceeding PRGs based on the NRC License Termination Rule and the Connecticut RSRs to mitigate human receptor exposure to contaminants. An on-site containment cell would be constructed specifically to contain the contaminated material on-site.

This alternative would consist of the following key components:

- Institutional controls
  - Signs
  - Fencing
- Environmental Land Use Restriction
- Construction of an on-site containment cell
- Building decontamination and dismantlement
- Excavation and on-site disposal of FUSRAP area media exceeding PRGs and consolidation in on-site containment cell
- Wetland restoration and monitoring
- Maintenance of the containment system
- Monitoring and management of leachate
- Post-remediation groundwater monitoring for compliance with Connecticut RSRs

Alternative SS3 relies on excavation and off-site disposal of FUSRAP area soil and sediment exceeding PRGs to mitigate human receptor exposure to contaminants. The institutional controls and construction of an on-site containment cell that are a part of Alternative SS2 are not required as part of this alternative. This alternative would consist of the following key components:

- Building decontamination and dismantlement
- Excavation and off-site disposal of FUSRAP area media exceeding PRGs
- Wetland restoration and monitoring
- Post-remediation groundwater monitoring for compliance with Connecticut RSRs

EVALUATION CRITERIA FOR REMEDIAL ALTERNATIVES

The following is a summary of the nine criteria developed by EPA for the evaluation of remedial alternatives.

Overall protection of human health and the environment: The alternative should ensure that there are no unacceptable risks to human health or the environment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): The alternative should meet applicable or relevant and appropriate federal and state environmental statutes, regulations, and requirements.

Long-term effectiveness: The alternative should maintain reliable protection of human health and the environment over time.

Reduction of toxicity, mobility, or volume through treatment: CERCLA contains a statutory preference that the selected alternative should use a treatment process to permanently reduce the level of toxicity of contaminants at a site, the spread of contaminants away from the site, or the amount of contamination at the site.

Short-term effectiveness: The alternative should minimize the short-term hazards to workers, residents, and the environment during implementation of the remedy.

Implementability: The alternative should be technically feasible, and the materials and services needed to implement the remedy should be readily available.

Cost: The alternative should provide the necessary protection at a reasonable cost.

State acceptance: The state environmental agencies should agree with the preferred alternative.

Community acceptance: Community acceptance of the preferred alternative is evaluated based on the comments received during the public hearing and public comment period.

The first two of these, overall protection of human health and the environment and compliance with ARARs, are considered threshold criteria which must be met for an alternative to be selected. The next

five are considered balancing criteria used to help alternative evaluation. The last two, state and community acceptance, are modifying criteria that take state and community response into consideration.

PREFERRED ALTERNATIVES

ABB's preferred alternative for groundwater is Alternative GW2-Enhanced In-Situ Biodegradation. Based on the information currently available, ABB believes this alternative meets the threshold criteria and provides the best balance of tradeoffs among the other groundwater alternatives with respect to the balancing and modifying criteria. ABB expects this alternative to satisfy the following statutory requirements of CERCLA 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; 4) utilize permanent solutions and alternative technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as principal element.

ABB's preferred alternative for buildings, soil, and sediment is Alternative SS3-Excavation and Off-Site Disposal. Based on the information currently available, ABB believes this alternative meets the threshold criteria and provides the best balance of tradeoffs among the other building, soil, and sediment alternatives with respect to the balancing and modifying criteria. ABB expects this alternative to satisfy the following statutory requirements of CERCLA 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; 4) utilize permanent solutions and alternative technologies to the maximum extent practicable. It is expected that excavated material will be landfilled at off-Site disposal facilities; therefore, this alternative does not satisfy the CERCLA preference for reduction of toxicity, mobility, or volume of contaminants through treatment. Disposing of excavated material at off-Site facilities will, however, reduce on-site toxicity, mobility, and volume of contaminants.

COMMUNITY PARTICIPATION

Community input is an important part of the cleanup process at the CE Windsor Site. The public is encouraged to participate in the decision-making process. ABB will accept written comments on the Proposed Remedy Plan, provided by e-mail, fax, or mail, during the 30-day public comment period from September 27 to October 27, 2007. See page 2 for directions on submitting comments. ABB will also hold a Public Meeting, during which comments may be provided orally or in writing. ABB will consider these comments in determining the final decision about the FUSRAP areas that will be documented in the Selected Remedy Plan. Answers to the public comments and concerns will be provided in the Responsiveness Summary portion of the Selected Remedy Plan and will be made available to the public. Information about the Public Meeting and where to send your comments are provided on the second page of this Proposed Remedy Plan.

PUBLIC COMMENTS ON THE PROPOSED REMEDY PLAN

Your input on this Proposed Remedy Plan for the FUSRAP areas at the CE Windsor Site is important to ABB. Comments provided by the public are valuable in helping select the final cleanup approach for these sites. Please remember that comments must be post-marked no later than October 27, 2007. Written comments can also be submitted at the Public Meeting to be held on October 18, 2007 (see page 2 for more information about the Public Meeting and how to submit comments).