

CORRECTIVE ACTION COMPLETION REPORT

RCRA CORRECTIVE ACTION PROGRAM

CONNECTICUT YANKEE ATOMIC POWER COMPANY

**HADDAM NECK PLANT
HADDAM, CONNECTICUT**

Prepared for:

**Connecticut Yankee Atomic Power Company
Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424**

Prepared by:

**AMEC Environment and Infrastructure, Inc.
511 Congress Street, Suite 200
Portland, Maine 04101**

JULY 2014

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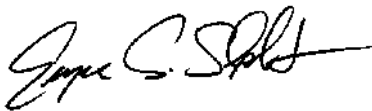
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RCRA CORRECTIVE ACTION PROGRAM CYAPCO, HADDAM NECK PLANT HADDAM, CONNECTICUT

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1.0 INTRODUCTION

This Corrective Action Completion Report (Report) has been prepared by AMEC Environment and Infrastructure, Inc. (AMEC) formally MACTEC Engineering and Consulting, Inc. (MACTEC) for Connecticut Yankee Atomic Power Company's (CYAPCO) Haddam Neck Plant (HNP) located at 362 Injun Hollow Road in East Hampton, Connecticut (Site) (Figure 1-1) to support site closure. This Report serves to:

- Document the completion of Resource Conservation and Recovery Act (RCRA) Corrective Action Program (CAP) requirements;
- Demonstrate that the environmental conditions at the HNP are in compliance with the Connecticut Department of Energy and Environmental Protection (CTDEEP) Remediation Standard Regulations (RSRs); and
- Satisfy CYAPCO's remaining Stewardship Permit obligations.

Historically, both chemical and radiological constituents have been detected in soils and groundwater at concentrations above CTDEEP RSRs. These two types of contamination (i.e., chemical and radiological) are discussed separately in the following sections of this document. Chemical remediation is discussed in Section 3.0 and radiological remediation is discussed in Section 4.0. The combined groundwater monitoring program is discussed in Section 5.0 and a summary of information supporting site closure is discussed in Section 6.0. These sections support the conclusion that corrective action measures for site closure, including environmental investigation, remediation activities, and post-remediation groundwater monitoring have been completed in accordance with applicable state and federal requirements.

CYAPCO's Stewardship Permit requires submission of a Corrective Action Completion Report following completion of groundwater monitoring within sixty (60) days of the completion of the post-remediation groundwater monitoring requirements. On June 4, 2014, CYAPCO notified CTDEEP of the completion of the post-remediation groundwater monitoring requirements (CYAPCO, 2014).

This Report has been prepared to satisfy the Corrective Action Completion Report submittal requirement pursuant to Section II.B of CYAPCO's Stewardship Permit. This Report summarizes the investigations, remediation, and groundwater monitoring conducted to fully meet closure

requirements for the HNP and support a petition for termination of the Stewardship Permit and the issuance of a Certificate of Completion from the CTDEEP Commissioner for the HNP.

2.0 BACKGROUND

The HNP Site is owned by CYAPCO and is located at 362 Injun Hollow Road in the Town of Haddam, Middlesex County, Connecticut (see Figure 1-1). The HNP consists of approximately 525 acres of mostly wooded land located on Haddam Neck, 21 miles south-southeast of Hartford. The HNP is bordered to the west by the Connecticut River, to the north by residential areas, to the east by rural undeveloped land and the Salmon River, and to the south by Salmon Cove.

Only about 25 acres of the property were developed as an industrial area. The main power station area was located on a level, 600-foot wide terrace. The remaining acreage is mostly undeveloped, with the exception of five acres that encompass the Independent Spent Fuel Storage Installation (ISFSI), and a smaller parcel that included half of the Haddam Neck substation, in the northern portion of the property.

On November 18, 1980, CYAPCO first submitted an application to be a permitted generator and storage facility for hazardous waste. CYAPCO was then issued RCRA Part A Treatment, Storage, and Disposal Facility (TSDF) Permit No. CTD042306720. Several revisions were later submitted to modify the permit, with the last revision submitted in March 1989 to comply with regulatory changes concerning mixed waste. The revised application qualified HNP for interim status to treat and store mixed waste at the Site. It was this RCRA permit that brought CYAPCO into the RCRA CAP.

The RCRA CAP was conducted under the regulatory authority of the United States Environmental Protection Agency (USEPA) and was in compliance with the CTDEEP RSRs with the final goal to facilitate transfer the property in accordance with the Connecticut Property Transfer Act. The RCRA investigations and remediation work were conducted from 2002 through 2007.

On July 24, 2006, CYAPCO submitted an Environmental Condition Assessment Form (ECAAF) to enter into the Voluntary Remediation Program (CGG Section 22a-133x). The CTDEEP responded by letter dated May 11, 2007 that approved the proposed schedule and stated that the CTDEEP would provide formal review and approval of the remediation (*i.e.* the site will not be delegated to a Licensed Environmental Professional [LEP]). The CTDEEP, in consultation with USEPA, issued a Stewardship Permit in August 2007 to document that all investigation and remediation activities were complete and that the only remaining work required to obtain site closure was the completion of post-remediation groundwater monitoring.

The HNP completed decommissioning in 2007, and in November 2007 the CYAPCO Operating Licensed area was reduced under the regulatory authority of the Nuclear Regulatory Commission (NRC). In addition to NRC license reduction, site closure includes: the RCRA CAP under the regulatory authority of the USEPA, oversight of radiological issues defined in Title 22a, Chapters 446 and 446A of the Connecticut General Statutes (CGS) regulated by the CTDEEP Bureau of Air Management and Radiation Division, and oversight of Voluntary Remediation under CGS Section 22a-133x and the CTDEEP Property Transfer Act conducted by the Bureau of Water Protection and Land Reuse.

Since 2007 CYAPCO has been monitoring groundwater at the HPN and, as documented in the Groundwater Report for Compliance with CTDEEP RSRs Monitoring Plan Closure (AMEC, 2013), has met the monitoring requirements outlined in the Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014).

3.0 CHEMICAL CHARACTERIZATION AND REMEDIATION

The HNP has been investigated under the RCRA CAP with regulatory oversight from the USEPA. The HNP is also in the CTDEEP Voluntary Remediation Program with regulatory oversight from the CTDEEP. Additionally, a Stewardship Permit was issued to CYAPCO in 2007 for post-remediation groundwater monitoring. The overall goals of these programs are to achieve site closure under RCRA in accordance with USEPA guidance (USEPA, 1996 and 2003) and comply with the requirements of the CTDEEP Voluntary Remediation Program to facilitate property transfer consistent with the RSRs.

The results of RCRA CAP activities are presented in several types of documents that will be used to support site closure and demonstrate that the HNP has been investigated and remediated in accordance with applicable standards, guidance, and regulations. These activities and associated documents fall into the general categories listed below and are discussed in this section.

- Quality Assurance;
- Community Relations;
- Health and Safety;
- Site Investigations;
- Ecological Risk Assessments;
- Remedial Actions;
- RCRA Closures;
- Tank Closures;
- Post-Demolition Survey and Sampling;
- Peninsula Investigations;
- Groundwater Characterization; and
- Post-Remediation Groundwater Monitoring.

A list of each submittal and date of agency approval are provided in Table 3-1. A flow chart of where each of these reports fits into the overall closure pathway is provided on Figure 3-1.

3.1 QUALITY ASSURANCE

A Quality Assurance Project Plan (QAPP) was prepared for the RCRA CAP at the HNP (MACTEC Engineering and Consulting, Inc. [MACTEC], 2006a). The QAPP, prepared in accordance with applicable USEPA guidance, documents the site-specific objectives, policies, organizations, functional activities, sampling and analysis activities, and specific quality assurance/quality control activities designed to achieve the identified data quality objectives. The RCRA CAP QAPP also provides sampling, analytical, and validation procedures, as well as quality assurance and quality control requirements.

The QAPP was approved by USEPA on June 24, 2003 and by CTDEEP on March 8, 2007 (in conjunction with approval of the RCRA Facility Investigation [RFI] Report).

3.2 SITE CHARACTERIZATION

Site characterization activities at the HNP have been conducted in a phased approach. This approach was similar to the phases outline in the CTDEEP Draft Site Characterization Guidance Document (CTDEEP, 2000); however, CYAPCO employed the nomenclature used in the USEPA RCRA guidance documents (USEPA, 1986 and 1989). Instead of Phase I, II, and III investigations, the CYAPCO RCRA CAP was conducted by completing a Historic Records Review (HRR) (Phase I), a Limited Field Investigation (LFI) Program (Phase II), and a RFI Program (Phase III), including a Baseline Ecological Risk Assessment (BERA).

The RCRA Corrective Action Program is under the regulatory authority of both CTDEEP and USEPA. However, USEPA has delegated RCRA Authority to CTDEEP with the understanding that the RSRs are protective of human health and the environment and are the appropriate clean up criteria for RCRA sites in Connecticut. The RSR Criteria are human health risk-based values that are based on a target cancer risk of $1.0\text{E-}06$ and a hazard index of 1.0. During site characterization, the analytical data were evaluated to assess whether site characterization goals of adequately defining the nature and extent of contamination were achieved. Data were also evaluated using ecological screening values as required under the RSRs.

3.2.1 Historical Record Review

The HRR was conducted to identify areas of the HNP where pollutants may have been released to the environment. Phase I activities included:

- Interviews with current and former Site employees to understand past practices and operations;
- Review of previous investigations;
- Review of aerial photographs;
- Review of files from the CTDEEP;
- Review of files from the USEPA; and
- Review of files from the HNP.

The HRR identified 21 areas of concern (AOCs), including numerous potential contaminant sources (PCSs) where chemicals were potentially released and/or historical practices may have impacted environmental conditions (Figure 3-2). The HRR findings were presented in the HRR (MACTEC, 2003a). The HRR also provided recommendations for the LFI activities.

3.2.2 LFI Program

The LFI was conducted to provide initial data on environmental conditions at each of the 21 AOCs identified in the HRR. An LFI Work Plan was prepared and submitted to the USEPA and CTDEEP in June 2003 (MACTEC, 2003b). During the LFI, another AOC (AOC 22) was identified and investigated (see Figure 3-2). The LFI field program included completion of geophysical surveys, soil borings, and test pits; installation of monitoring wells; and collection of soil, sediment, surface water, and groundwater samples for various laboratory analyses. LFI field activities were completed in 2003 and documented in the Draft LFI Report and RFI Work Plan (MACTEC, 2004a).

3.2.3 RFI Program

Based on the results of the Phase II characterization activities (i.e., LFI Report), the RFI was conducted to further assess environmental conditions each AOC. The Draft LFI Report and RFI Work Plan were prepared and submitted to the USEPA and CTDEEP in March 2004 (MACTEC,

2004a). During the initial RFI, two additional AOCs (AOCs 23 and 24) were identified and investigated. A Supplemental RFI Work Plan was also prepared to address data gaps and comments from the CTDEEP. The Supplemental RFI Work Plan was submitted to the USEPA and CTDEEP in November 2004 (MACTEC, 2004b).

The RFI and Supplement RFI included completion of geophysical surveys, soil borings, and test pits; installation of monitoring wells; and collection of soil, sediment, surface water, and groundwater samples for various laboratory analyses. RFI and Supplemental RFI activities were completed in the fall of 2006. The USEPA approved the RFI Report by letter dated December 28, 2006. The RFI Report was revised based on comments from the CTDEEP and the Final RFI Report (MACTEC, 2007a) was submitted to the USEPA and CTDEEP in January 2007.

The CTDEEP approved the Final RFI Report by letter dated March 8, 2007.

3.2.4 Baseline Ecological Risk Assessment

The RSRs require documentation that releases of site related constituents do not adversely impact ecological receptors. RCRA guidance also requires a BERA to be completed as part of the RFI Program.

The BERA was conducted in accordance with applicable USEPA risk assessment guidance documents. The BERA was conducted to identify possible ecological receptors and potential exposure pathways; qualitatively assess the risk of adverse effects to ecological receptors; and provide information that may be used to evaluate if response actions are required to achieve final remedy for the Site. The draft BERA was submitted to the USEPA and CTDEEP in February 2006 (MACTEC, 2006b). USEPA provided comments on the BERA in May 2006 and CYAPCO submitted a final response to comments and a BERA Addendum in October 2006 (MACTEC, 2006d).

USEPA approved the BERA in an email dated December 22, 2006. CTDEEP documented their concurrence with the USEPA approval in an Interdepartmental Memorandum dated January 30, 2007 and approved the BERA as part of the approval of the Final RFI Report by letter dated March 8, 2007.

3.3 RCRA CLOSURES

Closure activities have been completed at four former RCRA storage areas at the HNP. These areas consist of the following:

- Lube Oil Storage Room greater than 90-day (GT-90) RCRA Container Storage Area (CSA) (located within AOC 5);
- Spent Resin Facility CSA (located within AOC 8);
- Radioactive Waste Reduction Facility CSA (located within AOC 9); and
- Building 160 less than 90-day (LT-90) RCRA Storage Area (located within AOC 10).

A list of the associated documentation and CTDEEP approval of the work plans and closure reports for the RCRA storage areas is provided in Table 3-2.

3.4 TANK CLOSURES

Closure activities have been completed at the three former underground storage tanks (USTs) identified at the HNP. The former USTs include:

- Two USTs at AOC 7; and
- One UST at AOC 19.

Closure of the AOC 7 USTs was documented in an Interim Corrective Measure (ICM) Completion Report (MACTEC, 2006c). Closure of the AOC 19 UST was documented in an ICM Completion Report (MACTEC, 2007d). The CTDEEP “Underground Storage Facility Notification Form” was forwarded to the CTDEEP for each tank and copies were provided in the appropriate completion reports. A list of the associated documentation and CTDEEP approval of the work plans and closure reports for the USTs is provided in Table 3-2.

Closure activities have been completed at former aboveground storage tanks (ASTs) at AOCs 1, 2, 4, 5, 7, 8, 10, 13, 19, and 20. All of the ASTs at the HNP were investigated, cleaned, and closed as part of the RCRA CAP, Decommissioning and Dismantlement (D&D), and License Termination Program (LTP) demolition activities and documented in the RFI Report (MACTEC, 2007a) and/or the Post-Demolition Survey and Sampling Report (MACTEC, 2007e).

3.5 OTHER SUPPORTING DOCUMENTATION

With the characterization of the HNP complete, remediation of the HNP focused on efforts to achieve site closure under RCRA, as well as to comply with the requirements of the CTDEEP RSRs and the Voluntary Remediation Program. CYAPCO has completed Interim Corrective Measures (ICMs) and prepared a Corrective Measures Study (CMS) and Remedial Action Plan (RAP) to address environmental media at the HNP in support of site closure. A post-remediation groundwater monitoring program has also been completed. Activities associated with the remediation are discussed in the following subsections. The groundwater monitoring program is discussed in Section 5.0.

3.5.1 Remedial Actions

Remedial actions fall into two categories: interim actions and final actions. These actions, as well as the remedial alternative evaluation and public notification processes, are discussed in the following subsections.

3.5.1.1 Interim Actions

ICMs have been completed at numerous AOCs in accordance with the USEPA RCRA Corrective Action Plan Guidance (USEPA, 1994, 1996, and 2003). The ICMs have included removal of soils with contaminant concentrations above applicable CTDEEP RSR Criteria. A list of each of the ICMs completed at CYAPCO is provide in Table 3-3 and shown by PCS number on Figure 3-2.

Work Plans were prepared for each ICM in accordance with USEPA guidance. Each ICM Work Plan provided the scope of work to be completed, including confirmation sampling, analysis, and reporting requirements.

As part of the ICMs, confirmation samples were collected to verify that all soil with contaminant concentrations above CTDEEP RSR Criteria was removed. Confirmation samples from sediment remediation were compared to ecological screening values. ICM confirmation samples were collected and analyzed in accordance with the ICM Work Plans and the QAPP.

The results of the ICMs have been documented in ICM Completion Reports, which have been prepared in accordance with USEPA guidance documents and submitted to the USEPA and CTDEEP. Agency approvals of these reports are listed in Table 3-3.

3.5.1.2 Remedial Alternatives Evaluation

As part of the RCRA CAP, a CMS/RAP was prepared to present corrective measures that are necessary at the HNP to achieve site closure under RCRA in accordance with USEPA guidance (USEPA, 1996 and 2003) and in accordance with the CTDEEP's Voluntary Remediation Program (Section 22a-133x of the Connecticut General Statutes). The CMS/RAP (MACTEC, 2007b) was submitted to USEPA and CTDEEP in May 2007.

The CMS/RAP was approved by the CTDEEP on May 24, 2007. Subsequent to CTDEEP's approval, the EPA requested that additional information be provided under separate cover. EPA approved the CMS/RAP on June 8, 2007, and the CTDEEP approved the Addendum (provided for clarification in response to EPA's comments) on August 16, 2007.

3.5.1.3 Final Actions

In 2007, the CTDEEP in consultation with USEPA terminated HNP's interim status under RCRA and issued a Stewardship Permit. The Stewardship Permit documented that all environmental investigation and remediation activities had been completed and that the only remaining requirement to obtain site closure was the completion of the groundwater monitoring program presented in the Groundwater Monitoring Plan to Demonstrate Compliance with CTDEEP RSRs (MACTEC, 2007c).

The final groundwater monitoring plan, Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014) was approved by CTDEEP Commissioner on February 25, 2014 (CTDEEP, 2014).

Following USEPA's approval of the CMS, a Corrective Measure Implementation (CMI)/Remedial Action Report (CMI/RAR), the last phase of the RCRA Corrective Action Program, was completed and submitted to both agencies (MACTEC, 2007f). For the HNP, all soil, sediment, and groundwater remediation has been completed as ICMs and therefore, with the exception of post-remediation groundwater monitoring, no additional remedial actions were required. USEPA approved the CMI/RAR. CTDEEP provided verbal comments and Revision 1 of the CMI/RAR was published in August 2007.

The effectiveness of HNP's remediation activities was assessed by the groundwater monitoring program conducted in compliance with the CTDEEP approved Groundwater Monitoring Plan to Demonstrate Compliance with CTDEEP RSRs, Revision 3 (AMEC, 2014). This plan was designed and completed to assess the remedial activities completed, verify compliance with groundwater remediation criteria, and document long-term effectiveness of the remediation. Groundwater monitoring is discussed further in Section 5.0.

3.5.1.4 Public Notification

The Property Transfer Act (CGS Sections 22a-134 through 22a-134e) identifies public notification requirements associated with remedial activities at hazardous waste facilities. Specifically, CGS Section 22a-134a(j) requires that: (1) a notice of the remediation be published in a newspaper of substantial circulation in the area affected by the facility; (2) notification be given to the Director of Health of the municipality where the facility is located; and (3) either (a) a sign be erected and maintained at the facility, visible from the public highway, informing the public of the remediation project, or (b) a notice of the remediation be mailed to property owners that abut the facility.

To comply with these requirements, CYAPCO provided public notification on February 11, 2004 prior to beginning remediation projects to the following:

- Public notice published in a local newspaper (e.g., Middletown Press; Middletown, CT);
- Health Director, Town of Haddam;
- Posted signs at the HNP entrances; and
- Submitted notification letters to property owners abutting the HNP (February 11, 2004).

Additional public notification was issued by CTDEEP as part of the Stewardship Permit. A public information session was held on September 19, 2007 during the public notice period.

3.5.1.5 Site Status Update through July 2014

Since the submittal of the CMI/RAR in August 2007, CYAPCO has continued to implement a comprehensive spill reporting program at the HNP. The program is used to identify and report all releases to CTDEEP. The CMI/RAR reviewed CYAPCO and CTDEEP spill reports through July 2007. A review of CYAPCO and CTDEEP spill reports from August 2007 to July 2014 did not reveal any releases. CYAPCO prepared a letter to update the status of the Site to document that no known releases of hazardous waste or hazardous substances have occurred since CMI/RAR for the Site was submitted in August 2007. That letter is included as Attachment A of this Report.

4.0 RADIONUCLIDE CHARACTERIZATION AND REMEDIATION

Radiological remediation has been completed at the HNP in accordance with the LTP (CYAPCO, 2007a) under the regulatory authority of the NRC and in accordance with the requirements of the CTDEEP Bureau of Air Management, Division of Radiation Protection for radiological issues defined in Title 22a Chapters 446 and 446A of the Connecticut General Statutes. Figure 4-1 shows the survey areas that have been characterized for release under the NRC and CTDEEP Bureau of Air Monitoring, Radiation Division.

By letter dated November 20, 2002, CTDEEP promulgated an RSR for radionuclides of 19 milliRem per year Total Effective Dose Equivalent (TEDE), plus As Low As Reasonably Achievable (ALARA) for all media. This is consistent with the NRC cleanup goal of 25 milliRem per year TEDE, plus ALARA. To achieve these goals, Derived Concentration Guideline Levels (DCGLs) were calculated for each media to provide criteria for each radionuclide by media.

In addition to the CTDEEP and NRC criteria based on total dose, CTDEEP also promulgated site-specific RSR Criteria for groundwater protection. By letter dated October 7, 2004, CTDEEP accepted the USEPA Maximum Contaminant Levels (MCLs) as criteria for groundwater. The MCLs also include an evaluation of sum of the fractions, or the unity rule to demonstrate that there is no unacceptable risk from radionuclides in groundwater at the time of site closure.

4.1 SOIL, CONCRETE, AND SEDIMENT CHARACTERIZATION AND REMEDIATION

The characterization and remediation of impacted media was conducted in accordance with the LTP and in parallel with NRC guidance; the radiological characterization followed a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) approach of characterization. Documents prepared under NRC regulations were also used to document radiological conditions. Under this program, soils that exceeded the calculated DCGLs were remediated.

Areas were characterized by survey area designated in the LTP. Survey areas are shown on Figure 4-1. The reports documenting the release of each area from the Site's radiological materials license

were submitted to the NRC and CTDEEP for review and approval. A list of these reports and agency approvals is provided in Table 4-1.

4.2 GROUNDWATER CHARACTERIZATION AND REMEDIATION

The radiological groundwater program was also conducted in support of the LTP; however, instead of using DCGLs as the cleanup criteria, the groundwater program compared data to the MCLs for the “Resident Farmer’s Well” exposure scenario. As noted above, the MCLs are also the CTDEEP Site-Specific RSR Criteria for Groundwater Protection. Documents supporting the Hydrogeologic Investigations and Conceptual Site Model, documents submitted to NRC and CTDEEP to demonstrate the final status of the HNP, and the date of regulatory approvals are provided in Table 4-1.

Under the CTDEEP RSRs, post remediation groundwater monitoring is required to reach site closure. The areas remediated for radionuclides are shown on Figure 4-1. The groundwater monitoring required to reach closure is described in Section 5.0.

5.0 GROUNDWATER MONITORING AND REMEDIATION

This section summarizes the activities associated with groundwater monitoring and remediation, including groundwater compliance monitoring as required by the CTDEEP RSRs.

5.1 CHEMICALS DETECTED IN GROUNDWATER

Based on data collected during the RFI, groundwater beneath the HNP has been characterized. Historically low-levels of polynuclear aromatic hydrocarbons (PAHs) and inorganics were detected. These detections were generally located within the industrialized portion of the HNP. During D&D activities, and more specifically during the soil and groundwater remediation conducted within the Radiologically Controlled Area (RCA), most of the sources and impacted areas were excavated and replaced with clean fill.

Under the RCRA CAP, groundwater did not require remediation, and with the exception of boron, there are no discernable chemical plumes. Boron was used at the HNP as a neutron absorber and was collocated with radiologically impacted water. Boron had been detected in groundwater; however, at concentrations below the applicable RSR Criteria, and did not require remediation.

5.2 RADIONUCLIDES DETECTED IN GROUNDWATER

Radionuclides were released from several sources within the Industrial Area, resulting in several plumes of groundwater impacted with tritium, strontium, and cesium. After characterizing the nature and extent of radionuclides (and boron) in groundwater, the source areas were remediated by dewatering and excavating overburden soil and bedrock below the water table (including blasting of bedrock). The excavation and off-site disposal of these materials, followed by backfilling the excavations with clean fill from off-site borrow sources, which eventually resulted in reduced concentrations of radionuclides to below MCLs.

5.3 GROUNDWATER MONITORING TO REACH SITE CLOSURE

CYAPCO initiated and completed groundwater monitoring as outlined in its LTP. The required LTP groundwater monitoring was completed in 2007, and in November 2007 the CYAPCO NRC Operating License was reduced to a small area of the Site under the regulatory authority of the NRC.

Under the RCRA CAP, groundwater monitoring is conducted to: (1) assess remedial activities, (2) document compliance with remediation criteria (e.g., RSRs), and (3) document the effectiveness of the remediation (i.e., post-remediation monitoring). Additionally, Section 22a-133k-3(g) of the CTDEEP RSRs provide specific requirements for groundwater compliance monitoring to be conducted following remediation of a release area or contaminated groundwater plume. Groundwater sampling, analysis, and validation for chemical constituents were conducted in accordance with the QAPP (MACTEC, 2006a).

Release areas were remediated for both chemical and radionuclides. These areas are shown on Figures 3-2 and 4-1, respectively. Groundwater monitoring activities are detailed in the Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014). The Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 1. (MACTEC, 2007e) was submitted to CTDEEP and USEPA on May 21, 2007. CTDEEP approved the plan on May 24, 2007. The Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 2. (MACTEC, 2007e) was submitted to CTDEEP and USEPA on September 12, 2007. CTDEEP approved Revision 2 of the plan on September 20, 2007. The Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014) was submitted to CTDEEP and USEPA on January 10, 2014. CTDEEP approved Revision 3 of the plan on February 25, 2014.

5.3.1 Groundwater Monitoring for License Reduction by the NRC

To fulfill the groundwater monitoring requirements under the LTP, CYAPCO initiated and completed the 18-month long groundwater monitoring program outlined in the LTP. From December 2005 through June 2007, CYAPCO completed the groundwater monitoring on at least a quarterly basis. After completion of the June 2007 sampling event, the data collected demonstrated that the:

- Concentrations of Substances of Concern were stable or decreasing; and
- Cumulative dose resulting from residual soil, existing groundwater, and future groundwater did not exceed 25 milliRem per year.

The results of the LTP groundwater monitoring program were documented in the document titled, June Groundwater Sampling Event and Final Groundwater Compliance Summary (CYAPCO, 2007b). Based in part on this submittal, the CYAPCO NRC Operating License was reduced to a small area of the Site under the regulatory authority of the NRC in November 2007.

5.3.2 Groundwater Monitoring for Compliance with CTDEEP RSRs

The Groundwater Monitoring Plan for Compliance with CTDEEP RSRs, Revision 3 (AMEC, 2014) defines the requirements for chemical and radiological constituents to comply with the CTDEEP RSRs. This is the last step in reaching site closure under the RCRA CAP.

As presented in the Groundwater Report for Compliance with CTDEEP RSRs Monitoring Plan Closure (AMEC, 2013), the groundwater monitoring program conducted at the HNP meets the monitoring requirements outlined in the Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014) and meets the requirements of the CTDEEP RSRs and other CTDEEP approved numerical criteria.

5.3.2.1 Status Summary for Groundwater Monitoring For Chemical Constituents

The data collected under the long-term groundwater sampling program for chemical constituents demonstrates compliance with the CTDEEP RSRs and other CTDEEP approved numeric criteria. Sampling results for chemical constituents have met the monitoring requirements prescribed in the CTDEEP RSRs. Based on the results collected, groundwater monitoring for chemical constituents has been completed at all locations in compliance with applicable RSR requirements.

5.3.2.2 Status Summary for Groundwater Monitoring For Radiological Constituents

The data collected under the long-term groundwater sampling program for radiological parameters at the HNP likewise demonstrates compliance with the CTDEEP RSRs and other CTDEEP approved numeric criteria. Sampling results for radiological parameters have met the monitoring requirements prescribed in the CTDEEP RSRs. Based on the results collected, groundwater monitoring for radiological parameters has been completed at all locations and has demonstrated regulatory compliance.

5.3.2.3 Termination of the Post Remediation Groundwater Monitoring Program and Well Decommissioning

By letter dated January 28, 2014, CYPSCO formally requested termination of the post-remediation groundwater monitoring program and concurrence from CTDEEP to proceed with decommissioning the remaining groundwater monitoring and support wells associated with the Site. In a letter dated March 7, 2014, CTDEEP approved CYAPCO's plan to terminate the post-remediation groundwater monitoring program and decommission the remaining wells.

In March/April 2014 the remaining groundwater monitoring wells at the Site were decommissioned. The decommissioning activities were documented in a letter submitted to CTDEEP dated May 9, 2014.

6.0 CONCLUSION - SITE CLOSURE DOCUMENTATION AND STATUS

This Report presents a summary of the chemical and radiological programs completed to date and fully demonstrates that the characterization and remediation of impacted media and release areas has been completed in accordance with CTDEEP and USEPA regulations.

Twenty four AOCs have been characterized for chemical constituents. All RCRA CSAs and USTs have been closed. Thirty seven ICMs were completed to remediate chemicals released at 18 AOCs. Similarly the entire property has been characterized for radionuclides in accordance with MARSSIM and the LTP. Based on the radiological program, eight areas were remediated and meet the CTDEEP RSR of 19 milliRem per year TEDE plus ALARA and the USEPA MCLs for groundwater.

All investigation and subsequent remediation has been documented and approved by the NRC, CTDEEP, and USEPA (where applicable). A list of these documents is provided in Tables 3-1 through 3-3 and Table 4-1.

As presented in the Groundwater Report for Compliance with CTDEEP RSRs Monitoring Plan Closure (AMEC, 2013), the groundwater monitoring program conducted at the HNP meets the monitoring requirements outlined in the Groundwater Monitoring Plan for Compliance with the CTDEEP RSRs, Revision 3 (AMEC, 2014) and meets the requirements of the CTDEEP RSRs and other CTDEEP approved numerical criteria. With the completion of the groundwater monitoring program, submittal of this Corrective Action Completion Report fulfills the requirements of CYAPCO's Stewardship Permit.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
AMEC	AMEC Environment and Infrastructure, Inc., formally MACTEC Engineering and Consulting, Inc.
AOC	Area of Concern
AST	Aboveground Storage Tank
BERA	Baseline Environmental Risk Assessment
CAP	Corrective Action Program
CGS	Connecticut General Statutes
CMI	Corrective Measure Implementation
CMS	Corrective Measures Study
CSA	Container Storage Area
CTDEEP	Connecticut Department of Environmental Protection
CYAPCO	Connecticut Yankee Atomic Power Company
DCGLs	Derived Concentration Guideline Levels
D&D	Decommissioning and Dismantlement
ECAF	Environmental Condition Assessment Form
GT-90	Greater than 90-day RCRA CSA
HNP	Haddam Neck Plant
HRR	Historical Review Report
ICM	Interim Corrective Measure
LEP	Licensed Environmental Professional
LFI	Limited Field Investigation
LT-90	Less than 90-day RCRA CSA
LTP	License Termination Plan
MACTEC	MACTEC Engineering and Consulting, Inc., now AMEC Environment and Infrastructure, Inc.
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCLs	Maximum Contaminant Levels
NRC	Nuclear Regulatory Commission
PAH	polynuclear aromatic hydrocarbon
PCS	potential contaminant source
QAPP	Quality Assurance Project Plan
RAP	Remedial Action Plan
RAR	Remedial Action Report
RCA	Radiologically Controlled Area
RCRA	Resource Conservation and Recovery Act

RFI	RCRA Facility Investigation
RSRs	Remediation Standard Regulations
Site	CYAPCO Haddam Neck Plant; Haddam, Connecticut
TEDE	Total Effective Dose Equivalent
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

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- MACTEC, 2006c. "Interim Corrective Measure Completion Report for Area of Concern (AOC) 7 – Diesel Building Underground Storage Tanks"; RCRA Corrective Action Program; Connecticut Yankee Atomic Power Company; Haddam Neck Plant; Haddam, Connecticut; February 2006.
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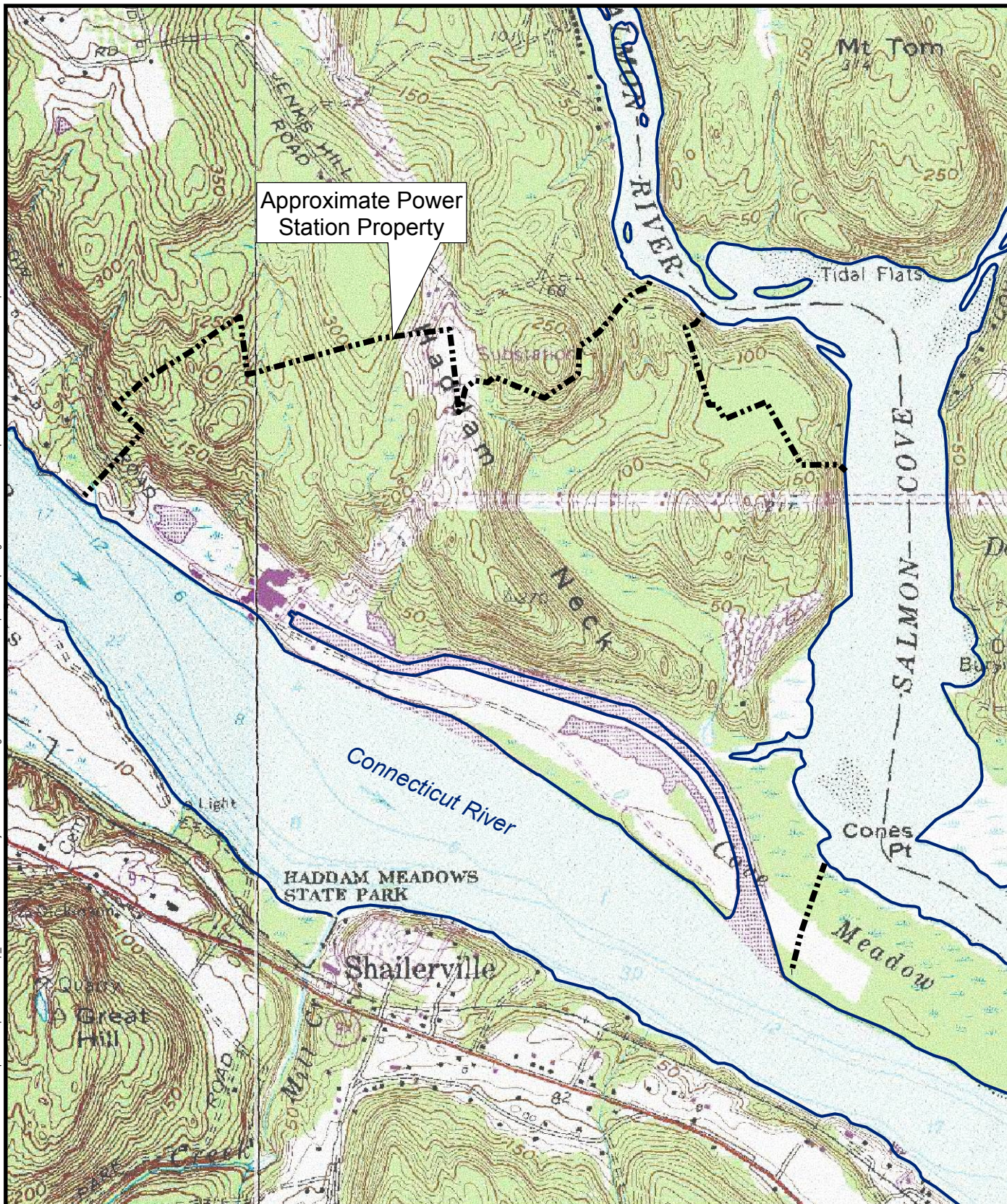
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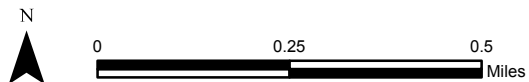
USEPA, 1996. "Advanced Notice of Proposed Rulemaking; Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule"; Federal Register Volume 61, No. 85, Pages 19432 through 19464; May 1, 1996.

USEPA, 2003. "Final Guidance on Completion of Corrective Action Activities at RCRA Facilities"; Federal Register Volume 68, No. 37, Pages 8757 through 8764; February 25, 2003.

FIGURES



Note:
USGS digital topographic map and water bodies obtained from UCONN Map and Geographic Information Center at: <http://magic.lib.uconn.edu>
Approximate property outline obtained from CYAPCO



Legend

- Water
- Approximate Property Outline

Figure 1-1
Site Location

Corrective Action Completion Report
CYAPCO, Haddam Neck Plant
Haddam, Connecticut



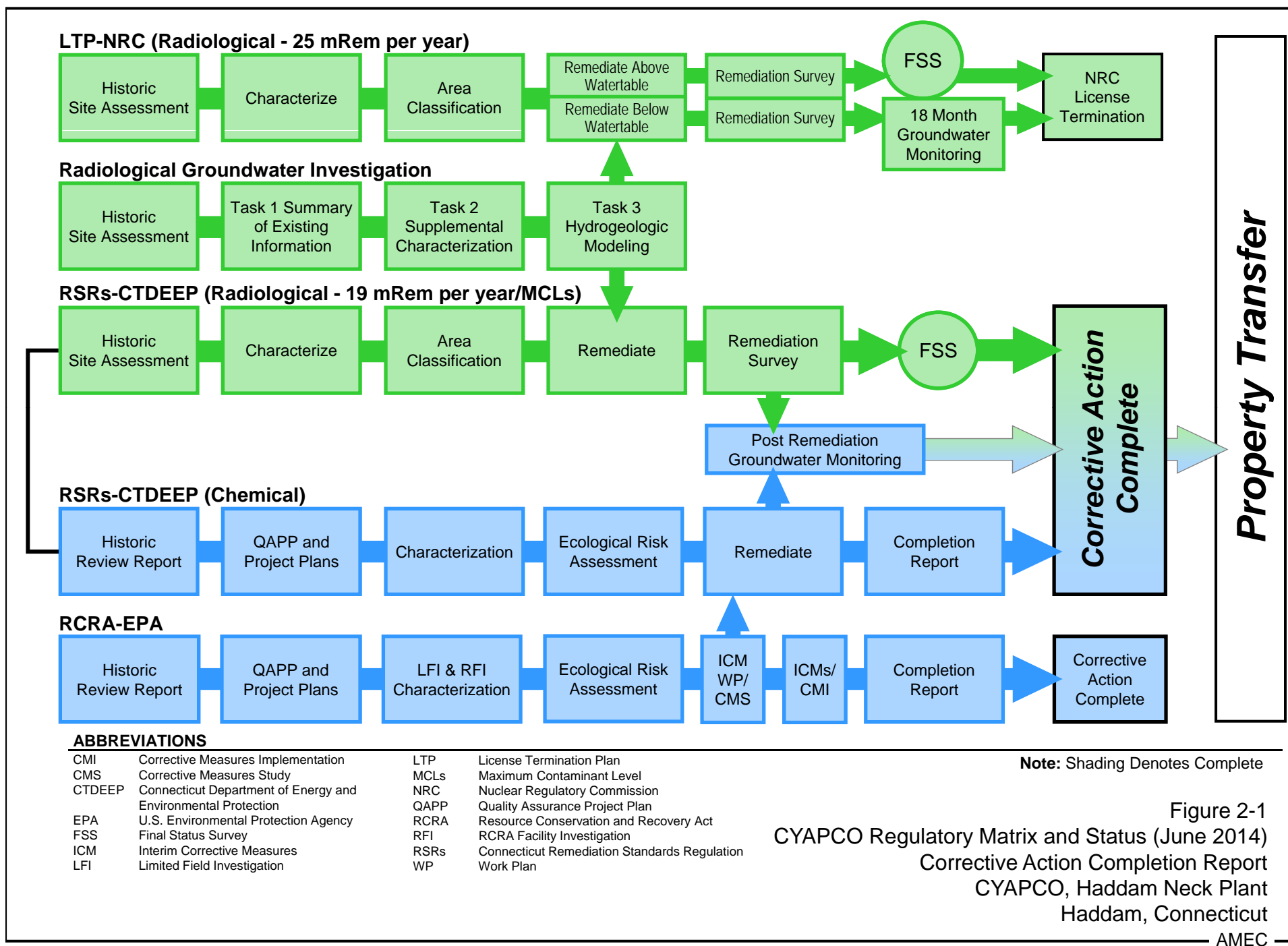


Figure 2-1
CYAPCO Regulatory Matrix and Status (June 2014)
Corrective Action Completion Report
CYAPCO, Haddam Neck Plant
Haddam, Connecticut

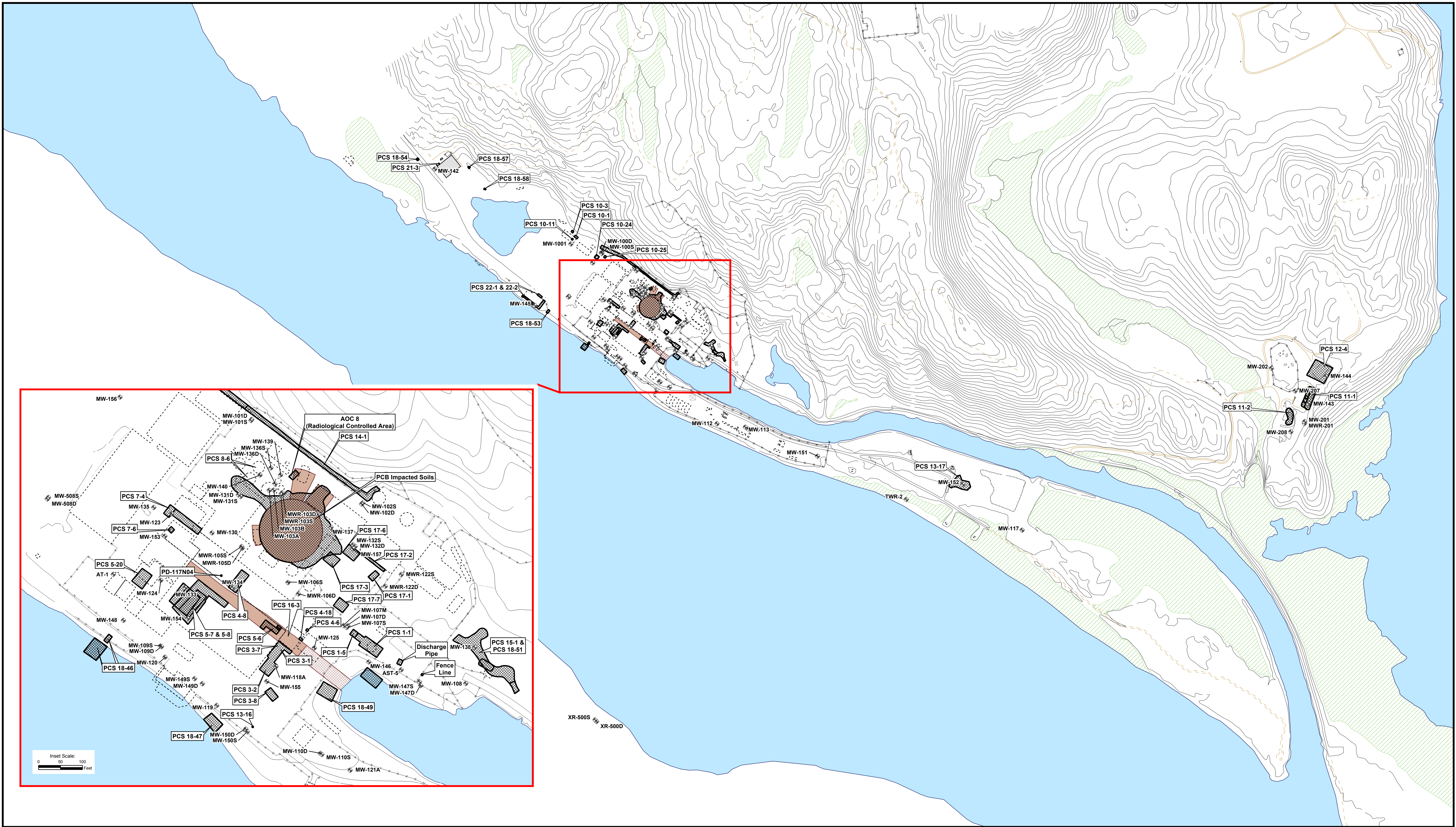
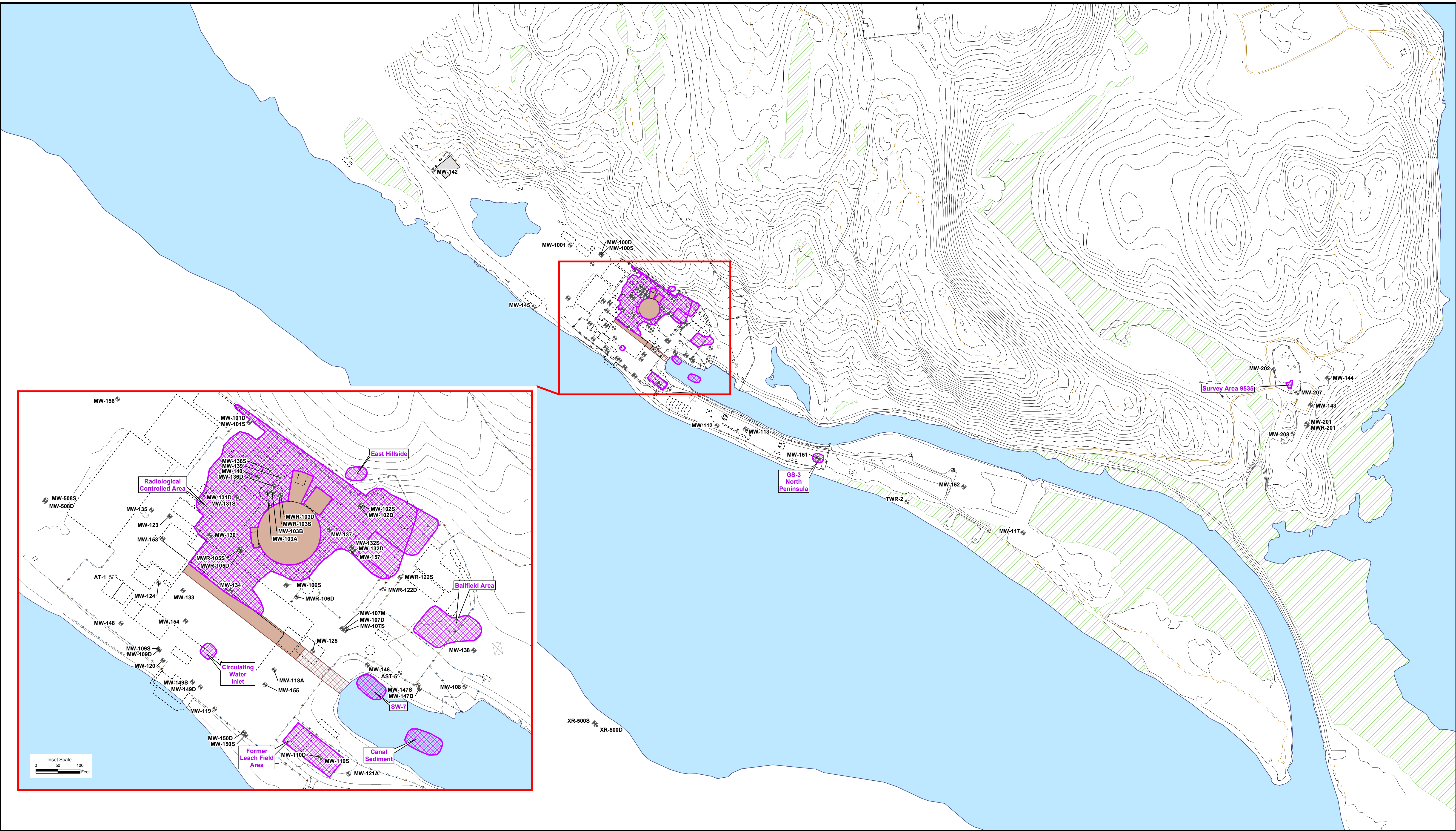


Figure 2-2
Chemical Remediation Areas
Corrective Action Completion Report
CYAPCO, Haddam Neck Plant
Haddam, Connecticut



TABLES

**Table 2-1
Summary of RCRA CAP Documents to Support Site Closure**

**Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut**

Reports	Submittal Date/ CYAPCO Letter ID	Date of Report Approval (or Concurrence)	
		CTDEEP	USEPA
Historic Review Report	CY-03-043, March 28, 2003	NA	NA
Health and Safety Plan	CY-03-043, March 28, 2003 (Revised May 2006)	NA	NA
Quality Assurance Project Plan	CY-03-074, June 20, 2003 (Last revision August 2006)	See Approval of RFI Report	July 7, 2003
Community Relations Plan	CY-03-043, March 28, 2003	NA	NA
Limited Field Investigation Work Plan	CY-03-074, June 20, 2003	See Approval of RFI Report	NA
Limited Field Investigation Report and RCRA Facility Investigation Work Plan	CY-04-062, March 17, 2004 (Revised April 21, 2004)	See Approval of RFI Report	July 15, 2004
Supplemental RCRA Facility Investigation Work Plan	CY-04-238, November 29, 2004	See Approval of RFI Report	See Approval of RFI Report
Draft RFI Report	CY-05-241, December 7, 2005	See Approval of RFI Report	See Approval of RFI Report
Final RFI Report	CY-07-018, January 3, 2007	March 8, 2007	December 28, 2006
Ecological Risk Assessment Work Plan	CY-04-015, March 17, 2004	See Approval of BERA	See Approval of BERA
First Interim Deliverable: Screening-Level Ecological Risk Assessment	CY-04-118, June 14, 2004	See Approval of BERA	See Approval of BERA
Study Design: Ecological Investigative Activities in Support of the BERA	CY-04-133, June 30, 2004	See Approval of BERA	See Approval of BERA
Ecological Risk Assessment for Radionuclides	CY-05-041; February 15, 2005	March 30, 2006	NA
Baseline Ecological Risk Assessment	CY-06-023, February 8, 2006	January 30, 2007	e-mail transmittal December 22, 2006
Discharge Tunnel Integrated Characterization Report	CY-05-073, March 15, 2005	April 20, 2005	See Approval of RFI Report
Screenwell House Evaluation Completion Report	Published as an Appendix to the RFI Report	See Approval of RFI Report	See Approval of RFI Report
Peninsula Investigation	CY-06-098, July 26, 2006	See approval of Final Supplemental Information to Support Peninsula Investigation	NA (CTDEEP Lead)
Supplemental Peninsula Investigation Report	CY-06-126, September 13, 2006	See approval of Final Supplemental Information to Support Peninsula Investigation	NA (CTDEEP Lead)
Final Supplemental Information to Peninsula Investigation Report	CY-06-143, November 16, 2006	April 18, 2007	NA (CTDEEP Lead)
Post Demolition Survey and Sampling Report	CY-07-071, April 26, 2007	May 17, 2007	May 24, 2007
Groundwater Monitoring Plan to Demonstrate Compliance with CTDEEP RSRS	CY-07-038, May 21, 2007	May 24, 2007	NA (CTDEEP Lead)
Corrective Measures Study/Remedial Action Plan	CY -07-059, March 29, 2007 and CY-07-084, May 21, 2007	May 24, 2007	June 8, 2007
Corrective Measures Implementation and Remedial Action Report and Rev 1	CY-07-102; June 18, 2007 CY-07-114, August 27, 2007	August 27, 2007	July 3, 2007
ECAF	CY-06-079, July 24, 2006	May 11, 2007	NA
Corrective Action Completion Report Status through August 2007	CY-07-115, August 30, 2007	NA	NA
Groundwater Monitoring Plan for CTDEEP RSRS, Rev. 2	CY-07-119, September 12, 2007	September 20, 2007	NA (CTDEEP Lead)
Annual Groundwater Monitoring Report June 2007 through March 2008	CY-08-014, July 31, 2008	NA	NA
Annual Groundwater Monitoring Report June 2008 through March 2009	CY-09-011, July 8, 2009	NA	NA
Annual Groundwater Monitoring Report June 2009 through March 2010	CY-10-013, August 19, 2010	NA	NA

**Table 2-1
Summary of RCRA CAP Documents to Support Site Closure**

**Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut**

Reports	Submittal Date/ CYAPCO Letter ID	Date of Report Approval (or Concurrence)	
		CTDEEP	USEPA
Request for Approval of Additional Polluting Substances for Groundwater EPH/VPH	MACTEC, March 9, 2010	March 22, 2011	NA (CTDEEP Lead)
Request for Approval of RSR Criteria for ETPH	CY-11-027, September, 13, 2011	November 23, 2011	NA
Annual Groundwater Monitoring Report June 2010 through March 2011	CY-11-026, September 13, 2011	NA	NA
Request for Approval of Criteria on the 2005 List of APS Criteria	CY-11-028, September 20, 2011	November 23, 2011	NA (CTDEEP Lead)
Decommissioning of Monitoring Wells	CY-12-025, April 3, 2012	March 29, 2012 (Note: CY and CTDEEP agreed to which wells would be decommissioned prior to the formal letter request)	NA (CTDEEP Lead)
Monitoring Well Decommissioning Completion Documentation Letter	AMEC, June 29, 2012	NA	NA
Annual Groundwater Monitoring Report June 2011 through March 2012	CY-12-047, August 30, 2012	NA	NA
Change in Sampling Frequency of Cross River Wells	CY-12-056, October 17, 2012	November 7, 2012	NA
Decommissioning of Monitoring Wells	CY-12-62, November 6, 2012	January 17, 2013	NA
Monitoring Well Decommissioning Completion Documentation Letter	CY-13-032, May 16, 2013	NA	NA
Annual Groundwater Monitoring Report June 2012 through March 2013	CY-13-035, June 25, 2013	NA	NA
Groundwater Report for Compliance with CTDEEP RSRs Monitoring Plan Closure	CY-13-038, August 22, 2013	March 7, 2014	NA
Groundwater Monitoring Plan for CTDEEP RSRs, Rev. 3	CY-14-002, January 10, 2014	February 25, 2014	NA (CTDEEP Lead)
Request for Concurrence of Prior Variance Approvals, Termination of Post-Remediation Groundwater Monitoring Program, and Decommissioning of all Remaining Groundwater Monitoring and Support Wells	CY-14-006, January 28, 2014	March 7, 2014	NA
Completion of Monitoring Well Decommissioning	CY-14-025, May 9, 2014	NA	NA

Prepared/Date: ESS 06/06/14

Checked/Date: MSC 6/11/2014

Notes: NA - Not applicable

Table 2-2
Summary of RCRA CSA and UST Closure Reports

Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut

RCRA CSA / UST	Closure Plan		Corrective Measure / Remedial Action Conducted		Closure Report		Closure Report Approval	
	Document Date	CYAPCO Letter	Description	Date	Document Date	CYAPCO Letter	CTDEEP	USEPA
Underground Storage Tanks								
Diesel USTs, (AOC 7 - Diesel Building)	August 2004 Revision 1	CY-04-180, September 13, 2004	UST Closure and ICM completed to remediate PAH and ETPH contaminated soil.	August 2005	February 2006	CY-06-021, February 9, 2006	March 8, 2007	February 21, 2006
Fuel Oil UST (AOC 19 - Warehouses #1 and #2)	UST Closure Work Plan included in Appendix E of the LFI Report & RFI Work Plan; March 2004	CY-04-062, March 17, 2004	UST Closure - no soil remediation warranted	November 2006	February 2007	CY-07-035, February 22, 2007	April 18, 2007	March 6, 2007
RCRA Container Storage Areas								
Mixed Waste RCRA CSA (Spent Resin Facility GT-90)	January 2005 Revision 1: March 2005	RCRA Closure Plan CY-05-032; February 3, 2005 CY-05-085; March 28, 2005	RCRA Closure for Mixed Waste CSA	January - April 2005 December 2006 - January 2007	RCRA GT-90 Closure Report April 2007	CY-07-067, April 17, 2007	August 23, 2007	NA
Mixed Waste RCRA CSA (Radioactive Waste Reduction Facility - GT-90)	January 2005 Revision 1: March 2005	RCRA Closure Plan CY-05-032, February 3, 2005 CY-05-085, March 28, 2005	RCRA Closure for Mixed Waste CSA	November 2006	RCRA GT-90 Closure Report April 2007	CY-07-067, April 17, 2007	August 23, 2007	NA
RCRA CSA (Lube Oil Room - GT-90)	RCRA Closure Plan January 2005	CY-05-031, February 3, 2005	GT-90 Closure and ICM completed to remediate ETPH and lead contaminated soil removal and	June-August 2005	RCRA Closure Report November 2005	CY-05-232, November 9, 2005	August 23, 2007	November 17, 2005
RCRA LT-90 (Northern Warehouses and Outside Storage Areas:)	RCRA LT-90 Closure Plan included in Appendix E of the LFI Report & RFI Work Plan; March 2004	CY-04-062, March 17, 2004	RCRA Closure for LT-90 CSA	December 2006	RCRA GT-90 Closure Report April 2007	CY-07-063, April 5, 2007	August 23, 2007	NA

Prepared/Date: ESS 06/06/14
Checked/Date: MSC 6/11/2014

Notes:
** = These ICMs were reviewed and approved by the CTDEEP as part of the RFI Report (January 2007), which was approved by CTDEEP March 8, 2007.

AOC = Area of Concern
AST = aboveground storage tank
COC = constituent of concern
CTDEEP = Connecticut Department of Energy and Environmental Protection
CTDEP = Connecticut Department of Environmental Protection
ETPH = extractable total petroleum hydrocarbons
GT-90 = Greater Than 90-Day Storage Area
ICM = Interim Corrective Measure
LOSR = Lube Oil Storage Room
LT-90 = Less Than 90-Day Storage Area
NA = not applicable
PAH = polynuclear aromatic hydrocarbon
PCS = Potential Contaminant Source
RCRA = Resource Conservation Recovery Act
RFI = RCRA Facility Investigation
UST = underground storage tank

Table 2-3
Summary of Corrective Measures and Remedial Actions

Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut

Area of Concern (AOC)		Potential Contaminant Source (PCS)	Interim Corrective Measure (ICM) Work Plan		Corrective Measure / Remedial Action Conducted		ICM Completion / Closure Report		ICM Completion Approval	
			Document Date	CYAPCO Letter	Description	Date	Document Date	CYAPCO Letter	CTDEEP	USEPA
AOC 1	Fuel Oil Storage Tanks	1-1, 1-2, 1-3, & 1-6 (ASTs, Berm, & Valve)	August 2004	CY-04-126, August 25, 2004	PAH, ETPH, and lead contaminated soil removal	March 2005, September 2005, September 2006	February 2007	CY-07-026, February 12, 2007	April 18, 2007	March 2, 2007
AOC 3	Former 345 KV Transformer Area	3-1, 3-2, & 3-8 (Transformers 309 & 319 and Insulator Oil Release Area)	September 2004	CY-04-186, September 24, 2004	ETPH contaminated soil removal	July 2005	October 2005	CY-05-219, October 24, 2005 CY-05-229, November 9, 2005	March 8, 2007**	November 1, 2005
AOC 3	Former 345 KV Transformer Area	3-7 (Paint chips from Service Building)	Letter Work Plan March 14, 2005	Sent via e-mail, March 14, 2005	Chromium-contaminated soil removal	July 2005	October 2005	CY-05-219, October 24, 2005 CY-05-229, November 9, 2005	March 8, 2007**	November 1, 2005
AOC 4	Maintenance Shop and Service Building	4-8 (Chemistry Lab)	October 2004	CY-04-212, October 26, 2004	BEHP contaminated soil removal	June-July 2005	January 2006	CY-06-008, January 9, 2006	March 8, 2007**	January 20, 2006
AOC 4	Maintenance Shop and Service Building	4-6 (Loading Area) & 4-18 (Dry Well)	Letter Work Plan July 11, 2005	NA	PAH contaminated soil removal	July 2005	January 2006	CY-06-008, January 9, 2006	March 8, 2007**	January 20, 2006
AOC 4	Maintenance Shop and Service Building	Post-Demo location PD117N0400	Letter Work Plan September 9, 2005	NA	PAH contaminated soil removal	September 2005	January 2006	CY-06-008, January 9, 2006	March 8, 2007**	January 20, 2006
AOC 5	Turbine Building	5-20 (2003 Hydraulic Oil Release)	July 2004	CY-04-151, July 28, 2004	ETPH contaminated soil removal	September 2006	February 2007	CY-07-027, February 12, 2007	April 18, 2007	March 1, 2007
AOC 5	Turbine Building	5-6 (Flume Trench & Sump)	Letter Work Plan July 11, 2005	NA	PAH and ETPH contaminated soil removal	July 2005	November 2005	CY-05-228, November 9, 2005	April 18, 2007	November 17, 2005
AOC 7	Diesel Building	7-4 (USTs)	August 2004 Revision 1	CY-04-180, September 13, 2004	PAH and ETPH contaminated soil removal and UST Closure	August 2005	February 2006	CY-06-021, February 9, 2006	March 8, 2007	February 21, 2006
AOC 7	Diesel Building	7-6 (Diesel Building)	NA	NA	Post-Demo PAH contaminated soil (SS-0706) removal	September 2004, July-August 2005	October 2005	CY-05-230, November 9, 2005	March 8, 2007**	December 2, 2005
AOC 8	Reactor Containment Building and Yard Area	Reactor Containment Building, Tank Farm, and Yard Area	NA	NA	Radiological soil remediation and PAH contaminated soil removal	March - August 2005, January - December 2006	March 2007	CY-07-045, March 20, 2007	May 22, 2007	April 4, 2007
AOC 8	Reactor Containment Building and Yard Area	Reactor Containment Building Area	January 2007	CY-07-021, February 1, 2007	PCB contaminated soil removal	November 2006 - March 2007	June 2007	CY-07-090; June 1, 2007	August 16, 2007	July 25, 2007
AOC 10	Northern Warehouses and Outside Storage Areas	10-1 & 10-3 (Waste Oil AST & Fuel Oil AST)	January 2005	CY-05-024, February 3, 2005	ETPH & chromium (PCS 10-1) and BEHP (PCS 10-3) contaminated soil removal	December 2006	April 2007	CY-07-064, April 5, 2007	May 22, 2007	April 13, 2007
AOC 10	Northern Warehouses and Outside Storage Areas	10-11 (Maintenance Equipment Storage)	NA	NA	ETPH contaminated soil removal	January 2007	April 2007	CY-07-064, April 5, 2007	May 22, 2007	April 13, 2007
AOC 10	Northern Warehouses and Outside Storage Areas	10-24 (Former Oil Release)	NA	NA	ETPH contaminated soil removal	January 2007	April 2007	CY-07-064, April 5, 2007	May 22, 2007	April 13, 2007
AOC 10	Northern Warehouses and Outside Storage Areas	10-25 (Former Unknown Foundation)	NA	NA	Lead contaminated soil removal	January-February 2007	April 2007	CY-07-064, April 5, 2007	May 22, 2007	April 13, 2007
AOC 11	Shooting Ranges	11-1 & 11-2 (Pistol/Rifle and Shotgun Ranges)	NA	NA	Access restrictions	Summer 2003	NA	CY-03-140, November 4, 2003	March 8, 2007**	March 5, 2004
AOC 11	Shooting Ranges	11-1 & 11-2 (Pistol/Rifle and Shotgun Ranges)	February 2004	CY-04-006, February 19, 2004	Lead (PCSs 10-1 & 10-2) and antimony (PCS 10-1) contaminated soil removal	February - April 2004	June 2004	CY-04-110, June 17, 2004	March 8, 2007**	July 16, 2004
AOC 12	Land Disposal Areas	12-1 thru 12-4 (Land Disposal Areas)	NA	NA	Access restrictions	Fall 2003	NA	CY-04-21, October 29, 2004	March 8, 2007**	May 20, 2005
AOC 12	Land Disposal Areas	12-1 (Bulky Waste Disposal Area)	NA	October 18, 2005	Surrender of Solid Waste Disposal Area Permit; Final Clean Closure	CTDEP Letter, January 9, 2006	NA	NA	NA	NA
AOC 12	Land Disposal Areas	12-4 (Off-site Soils Area)	December 2004	CY-04-004, January 4, 2005	PAH contaminated soil removal	CYAPCO Letter, March 30 2007	June 2007	CY-07-093; June 7, 2007	August 16, 2007	June 14, 2007
AOC 13	Peninsula, Equipment Storage Yard, and Septic Systems	Upper and Lower Peninsula Areas	Supplemental Investigation Work Plan (April 2006)	NA	Asbestos-containing material removal	March - August 2006	Peninsula Investigation Report (July 2006) Supplemental Information to Support Peninsula Investigation (September 2006) Final Supplement Information to Support Peninsula Investigation (November 2006)	CY-06-098, July 26, 2006 CY-060126, September 13, 2006 CY-060143, November 16, 2006	April 18, 2007	March 9, 2007
AOC 13	Peninsula, Equipment Storage Yard, and Septic Systems	13-16 (Grant Machine Hydraulic Oil Spill [07/19/05])	Letter Work Plan September 9, 2005	NA	ETPH contaminated soil removal	September 2005	February 2007	CY-07-034, February 22, 2007	April 18, 2007	March 9, 2007
AOC 13	Peninsula, Equipment Storage Yard, and Septic Systems	13-17 (Lower Peninsula Berm Area)	NA	NA	ETPH contaminated soil removal in conjunction with ACM remediation	July 2006	February 2007	CY-07-034, February 22, 2007	April 18, 2007	March 9, 2007
AOC 14	Eastern Drainage Ditch	14-1 (Ditch)	NA	NA	ETPH contaminated soil removal	April - June 2004	August 2004	CY-04-143, August 12, 2004	March 8, 2007**	September 14, 2004

Table 2-3
Summary of Corrective Measures and Remedial Actions

Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut

Area of Concern (AOC)	Potential Contaminant Source (PCS)	Interim Corrective Measure (ICM) Work Plan		Corrective Measure / Remedial Action Conducted		ICM Completion / Closure Report		ICM Completion Approval	
		Document Date	CYAPCO Letter	Description	Date	Document Date	CYAPCO Letter	CTDEEP	USEPA
AOC 14 Eastern Drainage Ditch	14-1 (Ditch)	NA	NA	ETPH & PAH contaminated soil removal	January 2007	March 2007	CY-07-046, March 20, 2007	May 17, 2007	April 4, 2007
AOC 15 Ball Field Area	15-1 (Former 115 KV Switchyard Trench Outfall) Combined with AOC 18	October 2005	CY-05-218, October 19, 2005	ETPH contaminated soil removal	January 2006	Combined with AOC 18, March 2007	CY-07-060, March 29, 2007	May 22, 2007	April 5, 2007
AOC 17 115 KV Switchyard	17-1 (Switchyard)	NA	NA	Access restrictions	Summer 2004	NA	CY-04-218, October 29, 2004	March 8, 2007**	December 14, 2004
AOC 17 115 KV Switchyard	17-1, 17-2, 17-3, 17-6, & 17-7 (Switchyard, Trench, Tie-Breaker, Transformer 12R-21S, & Transformer 12R-22S)	February 2005	CY-05-037, February 9, 2005	ETPH & PAH (PCSs 17-1 & 17-2), ETPH & PCBs (PCS 17-6), and ETPH (PCSs 17-3 & 17-7) contaminated soil removal	December 2006 - January 2007	March 2007	CY-07-047, March 20, 2007	May 17, 2007	April 5, 2007
AOC 18 Storm Water System	18-46 (SW-3), 18-47 (SW-4), 18-49 (SW-6), 18-51 (SW-8), 18-53 (Info Ctr), 18-57 (EOF Parking), & 18-58 (EOF CBs)	October 2005	CY-05-218, October 19, 2005	ETPH, PAHs, SVOCs, & arsenic contaminated soil removal (COCs vary by PCS)	October 2005 - December 2006	March 2007	CY-07-060, March 29, 2007	May 22, 2007	April 5, 2007
AOC 18 Storm Water System	18-54 (NW of EOF)	Letter Work Plan February 21, 2006	NA	Benzene, ETPH, & PAH contaminated soil removal	January & December 2006	March 2007	CY-07-060, March 29, 2007	May 22, 2007	April 5, 2007
AOC 18 Storm Water System	18-46 (sediment in CT River near SW-3)	Letter Work Plan March 27, 2006	NA	Lead in sediment poses a potential ecological risk	October 2006	March 2007	CY-07-060, March 29, 2007	May 22, 2007	April 5, 2007
AOC 18 Storm Water System	18-62 (Unknown Outfall)	NA	NA	Lead contaminated soil removal	January 2007	March 2007	CY-07-060, March 29, 2007	May 22, 2007	April 5, 2007
AOC 21 Emergency Operations Facility	21-3 (EOF Transformer)	January 2005	CY-05-012, January 12, 2005	ETPH contaminated soil removal	November 2005	February 2006	CY-06-034, February 23, 2006	March 8, 2007	March 9, 2006
AOC 22 Information Center	22-1 & 22-2 (Paint Chips & Wooden Deck)	November 2004	CY-04-225, November 12, 2004	Arsenic, cadmium, and lead contaminated soil removal	September 2006	February 2007	CY-07-028, February 13, 2007	May 17, 2007	February 22, 2007
AOC 22 Information Center	22-1 (Paint Chips)	Letter Work Plan June 9, 2006	NA	Metals & PAHs (SS-2201) in shallow soil pose a potential ecological risk	September 2006	February 2007	CY-07-028, February 13, 2007	May 17, 2007	February 22, 2007

Notes:
** = These ICMs were reviewed and approved by the CTDEEP as part of the RFI Report (January 2007), which was approved by CTDEP March 8, 2007.

Prepared/Date: ESS 06/06/14
Checked/Date: MSC 6/11/2014

ACM = asbestos-containing material
AOC = Area of Concern
AST = aboveground storage tank
BEHP = bis(2-ethylhexyl)phthalate
CB = catch basin
COC = constituent of concern
CTDEEP = Connecticut Department of Energy and Environmental Protection
CTDEP = Connecticut Department of Environmental Protection
EOF = Emergency Operations Facility
ETPH = extractable total petroleum hydrocarbons
GT-90 = Greater Than 90-Day Storage Area
ICM = Interim Corrective Measure
LFI = Limited Field Investigation
LOSR = Lube Oil Storage Room
LT-90 = Less Than 90-Day Storage Area
NA = not applicable
PAH = polynuclear aromatic hydrocarbon
PCB = polychlorinated biphenyl
PCS = Potential Contaminant Source
RCRA = Resource Conservation Recovery Act
RFI = RCRA Facility Investigation
RRF = Radioactive Waste Reduction Facility
SRF = Spent Resin Storage Facility
TBD = to be determined
UST = underground storage tank

Table 3-1
Summary of Radiological Characterization and Release Reports

Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut

Document Title	Date Submitted to CTDEEP	CTDEEP Approval (or Concurrence)	NRC Approval
Radiologic Groundwater Reports			
Groundwater Monitoring Report	CY-99-077, November 17, 1999	ICY-07-079, May 24, 2007*	NA
Groundwater Monitoring Report	CY-01-021, January 15, 2001	ICY-07-079, May 24, 2007*	NA
Site Hydrological Parameter Evaluation	CY-01-058, March 9, 2001	ICY-07-079, May 24, 2007*	NA
Release of Site Hydrological Parameter Estimation Calculation	CY-01-074, March 20, 2001	ICY-07-079, May 24, 2007*	NA
Phase 2 Hydrogeologic Investigation Work Plan	CY-01-083, May 24, 2001	ICY-07-079, May 24, 2007*	NA
Revised Phase 2 Hydrogeologic Investigation Work Plan	CY-02-014, February 27, 2002	ICY-07-079, May 24, 2007*	NA
Final Phase 2 Hydrogeologic Investigation Work Plan	CY-02-070, April 23, 2002	ICY-07-079, May 24, 2007*	NA
Groundwater Analysis Results for Three Quarterly Sampling Rounds	CY-02-046, November 20, 2002	ICY-07-079, May 24, 2007*	NA
Groundwater Analysis Results for Sept. 2002 and Dec. 2002 Sampling Rounds	CY-03-050, May 5, 2003	ICY-07-079, May 24, 2007*	NA
Semi-Annual Groundwater Report (Mar & June 2003 Sampling Rounds)	CY-03-099, October 27, 2003	ICY-07-079, May 24, 2007*	NA
Phase 2 Hydrogeologic Work Plan Task 1 Deliverables	CY-04-061, April 19, 2004	(ICY-07-062; May 17, 2007)*	NA
Semi-Annual Groundwater Monitoring Report (Sept & Dec 2003 Sampling Rounds)	CY-04-091, May 19, 2004	ICY-07-079, May 24, 2007*	NA
Semi-Annual Groundwater Monitoring Report (Mar & June 2004 Sampling Rounds)	CY-04-191, October 13, 2004	ICY-07-079, May 24, 2007*	NA
Task 2 Supplemental Characterization Report	CY-04-243, November 29, 2004	(ICY-07-032; March 13, 2007)*	NA
Semi-Annual Groundwater Monitoring Report (Sept & Dec 2004 Sampling Rounds)	CY-05-110, April 7, 2005	ICY-07-079, May 24, 2007*	NA
LTP Supplemental Info – Results of Unconfined Aquifer Pumping Test	CY-05-059, April 14, 2005	ICY-07-079, May 24, 2007*	NA

**Table 3-1
Summary of Radiological Characterization and Release Reports**

**Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut**

Document Title	Date Submitted to CTDEEP	CTDEEP Approval (or Concurrence)	NRC Approval
Revised Hydrogeologic Conceptual Site Model for HNP	CY-05-163, July 18, 2005	ICY-07-064; May 17, 2006	NA
Semi-Annual Groundwater Monitoring Report (Mar & June 2005 Sampling Events)	CY-05-231, November 21, 2005	ICY-06-039; April 19, 2006	NA
Task 3 Groundwater Modeling Report	CY-05-243, December 15, 2005	ICY-07-78; May 24, 2007	NA
December 2005 Quarterly Summary Report	CY-06-046, March 23, 2006	ICY-07-079, May 24, 2007*	NA
Semi-Annual Groundwater Monitoring Report (Sept & Dec 2005 Sampling Events)	CY-06-057, April 12, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments on Semi-Annual GW Monitoring Report (1 st /2 nd Quarter 2005)	CY-06-072, May 18, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments on Task 2 Revised Hydrogeologic Conceptual Site Model for HNP	CY06-073, May 18, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments on Semi-Annual GW Monitoring Report (3 rd /4 th Quarter 2005)	CY-06-074, May 18, 2006	ICY-07-079, May 24, 2007*	NA
Spring 2006 Quarterly Summary Report	CY-06-078, June 13, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments on Task 1 Summary Report	CY-06-080, June 15, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments on Task 2 Supplemental Characterization Report	CY-06-081, June 15, 2006	ICY-07-079, May 24, 2007*	NA
Technical Memorandums Phase 2 Hydrogeologic Investigation Work Plan	CY-06-088, June 8, 2006	ICY-07-079, May 24, 2007*	NA
Proposed CTDEEP PAB Tank Farm Wells	CY-06-101, August 1, 2006	ICY-07-079, May 24, 2007*	NA
Response to Comments/Questions on the Groundwater Monitoring Plan to Support LTP	CY-06-102, September 22, 2006	ICY-07-079, May 24, 2007*	NA
June 2006 Quarterly Summary Report	CY-06-109, August 31, 2006	ICY-07-079, May 24, 2007*	NA
Response to CTDEEP Comments Tank Farm Well Proposal	CY-06-112, September 6, 2006	ICY-07-079, May 24, 2007*	NA
Response to Outstanding DEEP Comments on Semi-Annual GW Monitoring Report (3 rd /4 th Quarter 2005)	CY-06-119, September 13, 2006	(ICY-07-063; March 13, 2007)*	NA

**Table 3-1
Summary of Radiological Characterization and Release Reports**

**Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut**

Document Title	Date Submitted to CTDEEP	CTDEEP Approval (or Concurrence)	NRC Approval
Response to DEEP Comments on Task 3 Groundwater Modeling Report	CY-06-120, October 5, 2006	ICY-07-78; May 24, 2007	NA
1 st and 2 nd Quarter 2006 Sampling Events, Semi-Annual Groundwater Monitoring Program	CY-06-129, October 30, 2006	(ICY-07-031; March 13, 2007)*	NA
Response to Outstanding CTDEEP Comments on Task 2 Revised Hydrogeologic Conceptual Site Model for HNP	CY-06-118, October 10, 2006	ICY-07-079, May 24, 2007*	NA
Response to Outstanding CTDEEP Comments on Semi-Annual GW Monitoring Report (1 st /2 nd Quarter 2005)	CY-06-117, October 16, 2006	ICY-07-079, May 24, 2007*	NA
Semi-Annual Groundwater Monitoring Report (January - June 2006 Sampling Events)	CY-06-136, October 30, 2006	ICY-07-079, May 24, 2007*	NA
Fall 2006 Quarterly Summary Report	CY-06-147, November 29, 2006	ICY-07-079, May 24, 2007*	NA
Borehole Summary Report - Tank Farm Monitoring Wells 139 & 140	CY-06-149, December 20, 2006	ICY-07-066; May 17, 2007	NA
CTDEEP Borehole Summary Report – XR Wells 500S & 500D	CY-07-012, January 11, 2007	ICY-07-065; May 17, 2007	NA
Groundwater Variance Request to DEEP (radionuclides)	CY-07-025, February 12, 2007	ICY-07-079, May 24, 2007*	NA
Evaluation of River Stage and Groundwater Head During Construction of XR Wells	CY-07-050, March 19, 2007	(ICY-07-067; May 17, 2007)*	NA
Winter 2006 Quarterly Summary Report	CY-07-048, March 20, 2007	ICY-07-079, May 24, 2007*	NA
Groundwater Variance Request to DEEP (chemical)	CY-07-039, March 26, 2007	ICY-07-079, May 24, 2007*	NA
Support Discussion of Groundwater Transport Modeling, Phase II, Task 3 Groundwater Modeling Report	CY-07-085, May 24, 2007	ICY-07-78; May 24, 2007	NA
Groundwater Monitoring Plan for License Termination	CY-07-004; January 9, 2007	NA	CY-07-085; June 13, 2007
Groundwater Monitoring Plan to Demonstrate Compliance with CTDEEP RSRs	CY-07-038, May 21, 2007	ICY-07-079, May 24, 2007	NA
Groundwater Monitoring Plan to Demonstrate Compliance with CTDEEP RSRs Rev. 1	CY-07-038, May 21, 2007	May 24, 2007	NA
Groundwater Monitoring Plan for CTDEEP RSRs, Rev. 2	CY-07-119, September 12, 2007	September 20, 2007	NA

**Table 3-1
Summary of Radiological Characterization and Release Reports**

**Corrective Action Completion Report
CYAPCO Haddam Neck Plant
Haddam, Connecticut**

Document Title	Date Submitted to CTDEEP	CTDEEP Approval (or Concurrence)	NRC Approval
Annual Groundwater Monitoring Report June 2007 through March 2008	CY-08-014, July 31, 2008	NA	NA
Annual Groundwater Monitoring Report June 2008 through March 2009	CY-09-011, July 8, 2009	NA	NA
Annual Groundwater Monitoring Report June 2009 through March 2010	CY-10-013, August 19, 2010	NA	NA
Annual Groundwater Monitoring Report June 2010 through March 2011	CY-11-026, September 13, 2011	NA	NA
Annual Groundwater Monitoring Report June 2011 through March 2012	CY-12-047, August 30, 2012	NA	NA
Annual Groundwater Monitoring Report June 2012 through March 2013	CY-13-035, June 25, 2013	NA	NA
Groundwater Report for Compliance with CTDEEP RSRs Monitoring Plan Closure	CY-13-038, August 22, 2013	March 7, 2014	NA
Groundwater Monitoring Plan for CTDEEP RSRs, Rev. 3	CY-14-002, January 10, 2014	February 25, 2014	NA
Request for Concurrence of Prior Variance Approvals, Termination of Post-Remediation Groundwater Monitoring Program, and Decommissioning of all Remaining Groundwater Monitoring and Support Wells	CY-14-006, January 28, 2014	March 7, 2014	NA

Prepared/Date: ESS 06/06/14
Checked/Date: MSC 6/11/2014

Notes:

- *\ Approval from CTDEEP is incorporated in the approval of the Groundwater Monitoring Plan to Demonstrate Compliance with CTDEP RSRs
() Parentheses indicate a separate concurrence letter signed by the CTDEEP Project Manager.

CTDEEP - Connecticut Department of Energy and Environmental Protection
CTDEP - Connecticut Department of Environmental Protection
HNP - Haddam Neck Plant
LTP - License Termination Plan
NA - Not Applicable
NRC - Nuclear Regulatory Commission

PAB - Primary Auxiliary Building+A29
RCA - Radiological Controlled Area
RSR - Remediation Standard Regulations+A70
TBD - to be determined
XR - Wells Across the River

APPENDICES



CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD • EAST HAMPTON, CT 06424-3099

July 2, 2014

CY-14-030

Mr. Craig Bobrowiecki
Remediation Division
Bureau of Water Protection and Land Reuse
State of Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Subject: Site Status Update through July 2014
Connecticut Yankee Atomic Power Company
East Hampton, Connecticut

Dear Mr. Bobrowiecki:

Connecticut Yankee Atomic Power Company (CYAPCO) submits this letter to document and confirm that no known releases of hazardous waste or hazardous substances have occurred at the Haddam Neck plant since the submittal of the Corrective Measures Implementation/Remedial Action Report (CMI/RAR) in August 2007. The CMI/RAR reviewed CYAPCO and Connecticut Department of Energy and Environmental Protection (CTDEEP) spill reports through July 2007. As identified in prior submittals, CYAPCO has continued to implement a comprehensive spill reporting program at the Haddam Neck Plant since submittal of the CMI/RAR. This program is used to identify and report all releases to the CTDEEP. A review of CYAPCO and CTDEEP spill reports from August 2007 to July 2014 did not identify any releases subsequent to when the CMI/RAR for the Site was submitted to the CTDEEP in August 2007.

If you have any questions, please contact Brantley Buerger at (860) 267-6426.

Sincerely,

Brantley Buerger, P.E.
ISFSI Manager