CONNECTICUT YANKEE ATOMIC POWER COMPANY

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

DEC 15 2005
CY-05-243

Mr. Peter Hill, LEP
Bureau of Waste Management
Connecticut Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Haddam Neck Plant
Transmittal of the Phase 2 Hydrogeologic Investigation Work Plan,Task 3 Deliverable - Groundwater Modeling Report

Dear Mr. Hill:

Connecticut Yankee Atomic Power Company (CYAPCO) hereby submits the Phase 2 Hydrogeologic Investigation Work Plan (Work Plan) Task 3 deliverable. Specifically, CYAPCO has developed a suite of groundwater models to support the decommissioning of CYAPCO's Haddam Neck Plant (HNP) and is hereby providing the Groundwater Modeling Report (Attachment 2). Development of a numerical simulation tool for the HNP was identified as a requirement under the Phase 2 Hydrogeologic Investigation Work Plan. The Work Plan was approved by the Connecticut Department of Environmental Protection (CT DEP) on May 10, 2002[1]. The Work Plan consists of three tasks; 1) Task 1-Existing Data Evaluation, 2) Additional Site Characterization, and 3) Evaluation of Fate and Transport Modeling. CYAPCO submitted the Phase 2 Work Plan Task 1 and Task 2 deliverables on April 19, 2004[2] , and November 29, 2004[3], respectively.

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[1] E. B. Patton (CT DEP) letter to K. Heider (CYAPCO), "Phase 2 Hydrologic Investigation Work Plan, Connecticut Yankee Atomic Power Company", dated May 10, 2002.

[2] G. P. van Noordennen (CYAPCO) letter to P. Hill (CT DEP), "Phase 2 Hydrogeological Investigation Work Plan- Task 1 Deliverables", dated April 19, 2004.

[3] G. P. van Noordennen (CYAPCO) letter to P. Hill CT DEP), "Transmittal of Task 2 Supplemental Characterization Report", dated November 29, 2004.

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The groundwater modeling activity is described generically under specifications of Task 3 of the Work Plan. The primary use of the simulation tool is to identify potential groundwater flow paths that can be used to assess groundwater monitoring needs (e.g., monitoring well locations, well depths and screened interval depths). Although the model has the capability to simulate fate and transport of specific constituents of concern, this capability is deemed to be less useful than the flow simulation due to the "mature" state of the groundwater contamination conditions at the HNP and on-going removal of primary and secondary sources of contamination. A "mature" groundwater contamination condition is indicated by generally stable or diminishing contaminant concentrations in groundwater and apparent cessation of release of contaminants from identified source areas (or removal of those sources). The modeling activity for the HNP has, therefore, focused most intensively on simulation of groundwater flow pathways, rather than reactive transport simulation of migration of specific contaminants along those pathways

Attachment 1 provides a matrix delineating the completed activities against the required activities under the Work Plan. Based on Attachment 1 and this submittal along with the submittals dated April 19, 2004 and November 29, 2004, CYAPCO concludes that all the activities included in the scope of the Work Plan, except the activity related to the investigation opposite the Connecticut River from the HNP site, are completed.

If you have any questions regarding this submittal, please call me at (860) 267-3938.

Sincerely,

Gerard van Noordennen 12-15-05

Gerard P. van Noordennen Date
Regulatory Affairs Manager

Attachment: Task 3 Groundwater Modeling Report, November 2005

cc: Mr. M. Firsick, CTDEP, Bureau of Radiation Protection
Mr. G. Ginsberg, CTDPH
Ms. M. Miller, USNRC Region 1
NRC Document Control Desk
Mr. T. Smith, USNRC Headquarters
Mr. J. Perez, USEPA Region 1
Mr. M. Rosenstein, USEPA Region 1

CY-05-243

Attachment 1
Haddam Neck Plant
A Review of the Phase 2 Work Plan to Identify Tasks Vs Task Completed

December 2005

ATTACHMENT 1
A REVIEW OF THE "PHASE 2 WORK PLAN" TO IDENTIFY TASKS VS TASK-COMPLETED AS PER THE SCOPE OF THE DOCUMENT

To ensure CYAPCO is conducting the site characterization and investigations of the Haddam Neck Plant as defined in the *Phase 2 Hydrogeologic Investigation Work Plan,* March 2001, Malcolm Pirnie, each item of the work plan was reviewed as described below:

Task	Activity and scope	Objective	How performed	Variations from work plan	How and/or where is the performance documented?
1	Compile well and geologic data for domestic wells within mile north-south and one-half mile east-west of HNP	To develop the understanding of local hydrogeologic conditions	Obtained and reviewed publicly available well logs, identified locations, and assessed conditions described in logs.	-NA-	Task 1 Summary Report
	Compile and review existing tidal studies	To determine potential influences of the tidal fluctuations on groundwater and contaminant transport	Obtained river stage records and other applicable information.	-NA-	Task 1 Summary Report
	Compile and review onsite and regional precip. Data. (collected for a minimum of one year and compared to the Bridgeport station for similarity)	To determine the seasonal and single incident effects of rainfall and runoff on the groundwater and transport mechanisms.	An onsite weather station provides site specific rainfall data, as do the Meriden, CT, and surrounding communities. Data were assessed and compared to Bridgeport records.	-NA-	Task 1 Summary Report
	Review construction records and blasting records for information on potential blast fractured bedrock	Determine blasting effects, i.e. the depth of fracture penetration resulting from the blast(s) and the resultant effect on the bedrock groundwater flow and transport	As built diagrams, photographs of the plant construction evolutions and shift records were reviewed and assessed to determine if any effects are obvious or need to be addressed in the flow regimens for the site.	-NA-	Task 1 Summary Report
	Review geologic and hydrogeologic data associated with facility siting and construction	To identify geologic structures and potential impacts of structures and facilities associated with the plant.	Early construction diagrams, geologic records and survey data were reviewed along with any and all sample data for the site prior to excavation and construction	-NA-	Task 1 Summary Report

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Task	Activity and scope	Objective	How performed	Variations from work plan	How and/or where is the performance documented?
	Present results of geologic mapping of outcrops to the east of the plant, and a review of the "overburden" and bedrock geology including pre- and post-construction bedrock contour maps	To evaluate the geologic framework for a stable siting of a nuclear plant, and verify that platform was not degraded during construction in addition to developing a basic geologic footprint.	Geologic outcrop and structures were mapped in the immediate vicinity of the HNP and compared to the original maps and data to develop an understanding of the bedrock surface changes due to plant construction. Bedrock surface maps were prepared	-NA-	Task 1 Summary Report
	Analyze the potential preferential pathways for groundwater flow	To assess the consolidated and unconsolidated geologic deposits and their relationship to structures and evaluate groundwater flow and identify potential preferential flow pathways.	Maps, boreholes, design and construction drawings and groundwater monitoring data revealed where the building supports are constructed directly onto bedrock, foundations extend well into the unconsolidated soils, and the density of those structures will provide an impediment to groundwater flow and transport. Groundwater flow in bedrock was established as a preferential pathway for flow.	-NA-	Task 1 Summary Report
	Present the locations of borings and existing monitoring wells, hydrogeologic data and SOC concentrations obtained	Identify existing boring locations and uses then incorporate the data and results into structural, stratigraphic, and hydrogeologic understanding.	Locate and verify the positions of, total depth, and water table elevation in existing monitoring wells. Assess existing cross sections.	-NA-	Task 1 Summary Report
	Develop conceptual site model	The objective is to collate, digest and condense the acquired data into formats from which a conceptual model of the flow structure, transport mechanisms, plume definition and potential source areas can be generated	Integrate existing information (hydrogeological, contaminant distribution, geochemistry) into conceptual site model and revise as new information is developed.	-NA-	Preliminary CSM in Task 1 Summary Report Revised CSM in *Hydrogeologic Conceptual Site Model for the Haddam Neck Plant, Haddam Neck, Connecticut* June 2005

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Task	Activity and scope	Objective	How performed	Variations from work plan	How and/or where is the performance documented?
2	Simultaneous collection of surface elevation data in the river, canal and adjacent monitoring wells.	To determine the influence of tidal effects on the groundwater	A network of 30 data-logging pressure transducers was installed in monitoring wells on-site and in the Connecticut River to record water elevations	-NA-	Task 1 Summary Report Task 2 Supplemental Characterization Report and subsequent Semi-Annual Groundwater Monitoring Reports
	Overburden and bedrock hydrogeological characterization through drilling, soil sampling rock coring, downhole logging (geophysics), hydraulic conductivity, overburden testing, transmissivity and bedrock interconnectivity	To supplement the current understanding of the geology and hydrogeology at the HNP.	72-hour Aquifer pumping test performed in the unconsolidated formation. Packer testing, geophysical logging, camera logging, and hydrophysical logging of bedrock boreholes. Examination of rock cores collected from borings. Transducer network records were evaluated to identify hydraulic responses to pumping and packer testing.	25 bedrock borings, ranging from 10 feet to 50 feet in depth were investigated in the former tank farm area. These borings were used to characterize bedrock in lieu of the initially-planned boring 103B. An additional monitoring well has been installed in the general vicinity identified for 103B to monitor water quality near the tank farm source area.	Task 2 Supplemental Characterization Report and subsequent Semi-Annual Groundwater Monitoring Reports
	Installation, sampling and radiological analyses of groundwater from onsite solitary and clustered monitoring wells and the residential former Schmidt residential water supply	To verify the background levels in groundwater, and establish naturally occurring radiological substances	Monitoring wells MW-118A, MW-119, MW-120, MW-121A, MW-122, MW-123, MW-124, MW-125, MW-130, MW-131, MW-132, MW-133, MW-134, MW-135 have been installed. Wells MW-122D and MW-106D were replaced to correct defective seals. Wells destroyed during demolition in the industrial area are being replaced as demolition is completed.	-NA-	Task 2 Supplemental Characterization Report and subsequent Semi-Annual Groundwater Monitoring Reports

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Task	Activity and scope	Objective	How performed	Variations from work plan	How and/or where is the performance documented?
	Radiological groundwater quality investigation opposite the river from the site	To build a well across the river from the HNP and evaluate the groundwater for possible man-made radionuclides	The well design has been completed and the easements are in process for the drilling location. Data from the deep bedrock "Westbay" wells have been evaluated and have been incorporated into the drilling and sampling plan for these wells.	-NA-	To be documented in subsequent Semi-Annual Groundwater Monitoring Reports
3	Evaluation of fate and transport modeling	To construct a model to forecast the nature and extent of potential or actual plumes and concentrations of those plumes at HNP	The groundwater addresses the hydrologic parameters, completeness of the data set, plume characteristics and future movement. The model is constructed using MODFLOW.	-NA-	Groundwater Modeling Report (December 2005)
	Landfill area groundwater monitoring	Downgradient monitoring of the landfill area	Use the existing monitoring wells for sampling groundwater, quarterly.	-NA-	Semi-Annual Groundwater Monitoring Reports
	Groundwater sampling and analyses	Obtain quarterly samples from specified wells and analyze for H3, B, alpha and gamma emitting nuclides, and Sr-90	Sampling continues on a quarterly basis and is presented in semi-annual reports	-NA-	Semi-Annual Groundwater Monitoring Reports
	Groundwater monitoring reports	Compile a record of the monitoring well water level activities, barometric and precipitation effects on groundwater, sampling and analytical results, and plume modifications due to new information.	Sample and assimilate the analytical results then incorporate them into groundwater and contaminant plume trend maps while using the corrected water level measurements and effects from natural occurring recharge. The report will include summary tables of the sampling and field notes, discussion of the results and recommendations for revisions to the plan.	-NA-	Semi-Annual Groundwater Monitoring Reports