THE STATE OF NEW HAMPSHIRE

BEFORE THE

SITE EVALUATION COMMITTEE

DOCKET NO. 2015-04

JOINT PRE-FILED TESTIMONY OF BJORN BJORKMAN AND CRAIG SWANSON

APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW 115 kV TRANSMISSION LINE

THE SEACOAST RELIABILITY PROJECT

July 1, 2018

Qualifications

Q. Please state your names, titles, and business addresses.

A. My name is Bjorn Bjorkman and I am a Senior Ecotoxicologist at GEI Consultants, Inc. My business address is 2625 Redwing Road, Suite 370, Fort Collins, CO 80526.

My name is Craig Swanson and I am a Principal Associate at Swanson Environmental Associates, LLC, formerly of RPS ASA. My businesses address is 78 Sycamore Lane, Saunderstown, RI 02874.

Q. Please describe your background, experience and qualifications.

A. Bjorn Bjorkman: My qualifications are based on over 25 years of experience consulting in environmental risk assessment and management; environmental due diligence; expert reporting; environmental, social, and health impact assessment (ESHIA), and natural resources evaluations. I have led or participated in ecological and human health risk assessments and risk based evaluations in over 30 states for facility permitting and for federal and state corrective action programs. I am fluent in Spanish and Swedish, and have extensive international experience. My focus has been in upstream and downstream oil and gas industry, power and utilities, railroads, mines, active and inactive military sites, and contaminated waterways.

I provide technical expert support for risk assessment and risk management, due diligence, evaluation of environmental liabilities, and natural resource damages at sites with media potentially affected by PCBs, hydrocarbons, metals and emerging contaminants such as PFOS/PFOA. I have extensive experience in due diligence evaluations, litigation support, natural resources damages, environmental impact, biodiversity, and aquatic toxicology. I have a M.S. from the University of Minnesota in Aquatic Ecology and limnology, with a research focus on nutrient-mediated eutrophication. My resume is attached as Attachment A.

Craig Swanson: I am a Principal Associate of Swanson Environmental Associates that I founded in 2015, was previously a Senior Associate of RPS ASA between 2011 and 2015, and was a cofounder and principal of Applied Science Associates from 1979 to 2011. I received a B.S. and M.S. in Mechanical Engineering from Purdue University and the University of Bridgeport, respectively, and an M.S. and Ph.D. in Ocean Engineering from the University of Rhode Island.

My initial professional focus was on the development and use of hydrodynamic, water quality, sediment dispersion and pollutant transport computer models to provide quantitative solutions for public and private sector clients in river, lake, estuarine, coastal and shelf environments. I subsequently directed the application of these models and associated field programs to solve a wide variety of problems in these aquatic surface water environments located in the United States and abroad. I have managed a large number of projects in my career that have incorporated a number of disciplines including physical oceanography; lake, riverine, coastal and marine processes; water quality; sediment dispersion and quality; and biological impact analyses. My resume provides further information of my activities over the last 39 years including authoring or co-authoring 15 journal articles or book chapters, 47 conference proceedings papers and over 100 technical reports.

Specific to the Seacoast Reliability Project, I have extensive experience in managing the development and use of hydrodynamic models and their applications to better understand circulation dynamics and to provide underlying transport information for other types of models including sediment dispersion models. I have been personally involved in the assessment of the potential impacts of suspended sediment plumes and bottom deposition patterns from cable and pipeline embedments and dredging for 22 projects as listed in my resume. My resume is attached as Attachment B.

Purpose of Testimony

Q. What is the purpose of this amended testimony?

A. The purpose of our joint pre-filed testimony is to serve as an additional resource to answer questions from the SEC and other parties about information already in the record pertaining to sediment modeling and sampling. We were retained by the Applicant to perform certain analyses both pre- and post-filing of the Application on April 12, 2016 and the Amendment to the Application on March 29, 2017. We have been involved with this Project since August 2014 (Swanson) and September 2016 (Bjorkman) and were substantially involved in the production and development of the Suspended Sediment Modeling Report and Amendments, the Characterization of Sediment Quality in Little Bay and Supplements, and responses to Department of Environmental Services, Counsel for the Public, and Town of Durham / UNH comments, all of which have already been submitted to the Site Evaluation

Committee and have been made available to the parties.

More specifically, as witnesses, we offer our knowledge and expertise to the Committee and the parties in this proceeding to answer questions and support the following portions of the Application, Amendment to the Application, and Supplemental Documentation. We are serving as joint sponsors, together with Ann Pembroke and Sarah Allen, on the following:

- Pre-Filed Testimony of Ann Pembroke at pages 3 to 4, and pages 5 to 9 regarding the RPS ASA modeling to characterize the effects of the proposed cable installation methods on water quality and nearby substrates where sediments suspended by the installation will resettle.
- Pre-Filed Testimony of Ann Pembroke at page 4 to 9 regarding sediment analyses and the potential impacts on water quality.
- Amended Pre-Filed Testimony of Ann Pembroke at page 1 regarding the Characterization of Sediment Quality Along Little Bay Crossing.
- Pre-Filed Testimony of Sarah Allen at pages 10 to 11 and Amended Pre-Filed Testimony of Sarah Allen at pages 3 to 4 regarding the Project's impact on water quality and the natural environment.
- RPS ASA Suspended Sediment Modeling Report – Appendix 35 to the Application.
- Characterization of Sediment Quality Along Little Bay Crossing, Durham to Newington, NH submitted on December 1, 2016.
- PSNH Response to DES Wetlands Bureau November 10, 2016 Progress Report (January 11, 2017), 2014 Vibracore Logs, submitted to NH Department of Environmental Services, March 29, 2017.
- Revised Modeling Sediment Dispersion, Supplement to Characterization of Sediment Quality Along Little Bay Crossing, Revised Environmental Monitoring Plan for Little Bay, Response to Comments from Counsel for the Public and The Town of Durham / UNH, and the Soil and Groundwater Management Plan contained in the Submission of Additional Information to DES, June 30, 2017.
- Applicant's Response to NHDES "Issues of Concern" From Their SEC Letter Dated August 1, 2017 and the Revised Environmental Monitoring Plan for Little

Bay, contained in Applicant's Response to NHDES Status Letter of August 1, 2017.

- Soil and Groundwater Management Plan for the Darius Frink Farm, dated June 30, 2017.

Q. Does this conclude your pre-filed testimony?

A. Yes, it does.

ATTACHMENT A.
RESUME OF BJORN A. BORKMAN

Bjorn A. Bjorkman
Senior Ecotoxicologist

resume

Mr. Bjorkman has over 25 years of experience consulting in environmental risk assessment and management; environmental due diligence; expert reporting; environmental, social, and health impact assessment (ESHIA), and natural resources evaluations. Mr. Bjorkman has led or participated in ecological and human health risk assessments and risk based corrective actions in over 30 States under RCRA, CERCLA, TSCA and State programs. He is fluent in Spanish and Swedish, and has extensive international experience. Focus has been in upstream and downstream oil facilities, railroads, mines, MGP facilities, active and inactive military sites, and contaminated waterways.

Mr. Bjorkman provides technical expert support for risk assessment and risk management, due diligence, evaluation of environmental liabilities, and natural resource damages at sites with media affected by PCBs, hydrocarbons, metals and emerging contaminants such as PFOS/PFOA.

PREVIOUS PROJECT EXPERIENCE

Litigation Support, Due Diligence and Natural Resources Damages

Expert Witness, PCB Contamination Site, Alaska (2017-ongoing). Prepared and defended an Expert Report evaluating PCB risk, impacts and cleanup in ongoing litigation involving third party property affected by PCB impacts from a nearby former military facility.

Due Diligence Ecological Evaluation, prospective subaquatic electric cables, confidential client, New Hampshire (2016 – ongoing). Currently supporting a power company during permitting of a submarine cable with addressing ecological concerns and objections by neighborhood groups about potential impacts of residual contaminants such as PFOS, PCBs, metals and pesticides in sediments disturbed by the construction.

Damage Evaluation, Inter-American Development Bank (IADB), Asuncion, Paraguay (2014). Project Manager and Lead Assessor. In-situ evaluation, on behalf of IADB, of a transformer yard fire location in Paraguay, considering efficacy of emergency response, potential health effects from PCB releases and smoke, potential longer-term risk from PCB releases, and recommendations for mitigation of ecological and human health risk

Litigation Support, Aquatic Toxicity and Impact Evaluation, State of New South Wales, Sydney, Australia (2009). Technical Expert/ Expert Witness. Expert Witness and author of technical report on the risk to the environment from PCBs and heavy metals leaching from intentionally scuttled naval ships for creating of artificial reefs.

Expert Witness and Report, arbitration proceedings, Peru (2017-2018). Prepared an Expert report on behalf of one party in ongoing arbitration related to legacy environmental liabilities from metals and hydrocarbons at a producing oil field in Peru.

EDUCATION

M.S., Aquatic Ecology and Limnology, University of Minnesota, 1987
B.A., Environmental Biology, University of California, Santa Barbara 1984

EXPERIENCE IN THE INDUSTRY

25 years

EXPERIENCE WITH GEI

2 year

TRAININGS AND CERTIFICATIONS

Certificate in Environmental Inspection and Enforcement, Stockholm, Sweden 1992
HAZWOPER 40-Hour Training
HAZWOPER 8-Hour Supervisor Training
Hydrogen Sulfide (H2S) Awareness
Railroad Safety Training
Shell Hazard and Effect Management Process (HEMP)
Chevron CSOC / EPDEP

PROFESSIONAL ASSOCIATIONS

Society of Environmental Toxicology and Chemistry

GEI Consultants

Litigation Support, Former Texaco Ecuador, Chevron, Lago Agrio, Ecuador (2005-2010). Technical Expert/Expert Witness. Appointed as Judicial Technical Expert in support of site investigations and evaluations related to an ongoing multibillion dollar lawsuit related to environmental impacts from past oil extraction in Ecuador. Supported risk-based site evaluations, ecological and biodiversity impact evaluations, valuation of damages, and review of technical and legal documents related to lawsuits.

Habitat Equivalency Analysis, Pluspetrol, Amazon Region, Peru (2014-2015). Project Manager. Led the preparation of a habitat equivalency analysis to determine losses and compensation from oil contamination in an Amazon lagoon. This was one of the first Habitat Equivalency Assessments prepared in Peru.

Inactive Reserve Pit Environmental Evaluation and NEBA Analysis, Chevron, Kenai, AK (2008-2009). Project Manager. Developed an evaluation and quantitative ranking procedure to determine the need for remediation and removal at inactive reserve pits in an on-shore oil field. The evaluation was based on failure risk, environmental consequence analysis, and net environmental benefit analysis based on the environmental damage from accessing and removing long abandoned pits in recovered environments.

Upstream Due Diligence Evaluation, Confidential Client, Orinoco Region, Venezuela (2010). Lead and Project Manager. Led a team to evaluate environmental liabilities associated with inactive oil fields in eastern Venezuela prior to purchase.

Upstream Due Diligence Evaluation, Confidential Client, Gabon, Africa (2012). Team Member: Environmental and Social Impact Liabilities. Participated in a team evaluating health, safety and environmental liabilities associated with pre-purchase assessment of off-shore and on-shore exploration and production blocks in Gabon. Responsible for evaluating environmental liabilities.

Upstream Due Diligence, BP, Southern Iraq (2011). Team Member: Environmental Impact Liabilities. Participated in a team evaluating environmental liabilities associated with purchase of a producing oil field in southern Iraq. Evaluated impacts to river wetlands and their inhabitants, and the effects of previous accidental and intentional spills to the desert environment and area aquifers.

Downstream Due Diligence Evaluation, Shell, Central America (2010-2013). Project Manager. Managed a divestment due diligence evaluation to identify potential health, safety and environment liabilities at refining, storage, and retail facilities in five Central American nations. Developed risk evaluation metrics, reviewed public and company documentation and applicable regulations. In Panama and Costa Rica, led a field component of the investigation, due to the absence of existing environmental documentation at those locations.

Railroad, Emergency Response - Derailments, BNSF, multiple locations, WY and MT (2000-2014). Task Manager. Developed a natural resource evaluation support program for Emergency Response for railroad clients. Responded and evaluated potential natural resource damage liabilities resulting from coal and chemical spills in Wyoming, Montana, and North Dakota.

Natural Resource Damage Assessment - Gas Well Blowout, International Oil and Gas Company (Upstream), Sylhet, Bangladesh (1998-2000). Technical Expert. Led a response team assessing the damage to natural resources caused by a gas well blowout in Bangladesh: habitat surveys, fire damage analysis, ground-, drinking, and surface water evaluations, collection of aerial survey data, and interviews with local population. Participated in the initial negotiations with the Bangladesh government on restoration and compensation.

Natural Resource Damage Assessment (NRDA) – Oil Spill, Confidential Client, Central California Coast (1999-2000). Technical Expert. Supported NRDA evaluation, rebuttals, and discussions with Trustees following an oil spill in California. Developed out-of-kind Habitat Equivalency Analysis (HEA) approaches as tools for compensatory restoration of coastal environment.

Upstream Due Diligence and Liability Transfer Evaluation, Petroperu, Amazon Region, Peru (1996-1009) Project Manager. Seller and buyer of joint due diligence evaluation of Block 8 in the Peruvian Amazon region prior

to privatization. Led field teams evaluating environmental and socio-economic liabilities. Site evaluation, sampling, risk assessment, definition of potential liabilities, remedial needs, and allocation of responsibilities.

Oil Spill Sensitivity Mapping, Petroperu, Lima, Peru (1997). Task Manager. Developed a coastal ecological sensitivity map for the Oil Spill Contingency Plan of an oil refinery south of the city of Lima using NOAA guidelines.

Site Investigations and Remediation

Refinery Lagoon sediments, confidential client, IL (2017-ongoing). Task manager for site investigation and development of remedial options for sediment in riverside lagoons along the Mississippi river affected by former refinery releases of metals and hydrocarbons.

TSCA Closure Report, former mill site, MA (2017- ongoing). Preparation of the ecological risk component for the closure under TSCA and State guidance of river and bank sediments with PCBs.

Shell Pond Ecological Risk Assessment, PG&E, Martinez, CA, 2016. Sampling (**2015-2016).** Task Manager. Directed sampling effort at waste lagoons affected by carbon black and other power plant effluents in environmental media and biota.

Emergent Contaminant Study, SEHSC, Washington, DC (2014-2016). Study Director. Study Director for implementation of a field program to evaluate potential fate, transport and ecotoxicity of silicone additives to personal products, as part of a Toxic Substances Control Act (TSCA) program. Developing and implementing a sampling program at Wastewater Treatment Plants across the country that includes sampling of influent, effluent, biosolids, receiving waters and sediments, and receiving water benthic biota and fish.

Site Investigation and Remedial Action, Sinclair Oil Refinery, Casper, WY (2001 – 2014). Risk Assessor / Biologist. Responsible for ecological risk assessment strategy and implementation, led aquatic and terrestrial habitat surveys and developed long-term monitoring plan for potential bird impacts from selenium in refinery evaporation ponds.

Remediation Evaluation, Pluspetrol, Amazon Region, Peru (2014-2017). Technical Expert. Evaluation of progress, efficacy and appropriateness of response activities to repeated pipeline spills as a result of sabotage actions in the Amazon to address insurance company concerns.

Caton Island Formerly Used Defense Site (FUDS), U.S. Army Corps of Engineers, AK (2012-2013). Task Manager. Site reconnaissance, sampling design and work plan development for a RI/FS at an abandoned military facility in SW Alaska.

Pearl Harbor Feasibility Study, U.S. Navy, Pearl Harbor, HI (2010-2014). Project Scientist. Developed sediment remedial action objectives for PCB impacted sediment in Pearl Harbor, Hawaii. Results were presented at Battelle sediment conference in 2013.

Tanaga Island Formerly Used Defense Site (FUDS) Investigation, U.S. Army Corps of Engineers, AK (2007-2010). Field Manager, Remedial Investigation and Risk Assessment Lead. Managed field investigation of abandoned World War II military bases on two remote islands in the Aleutian Islands. Led field investigation, which included leading a 40-man team for 6 weeks of field work evaluating hazardous substances (PCBs, hydrocarbons and metals), and military munitions in remote locations. Lead author for the remedial investigation report and the risk assessments. The project received awards from the USACE for excellence in performance.

CERCLA RI/FS, Alaska Railroad Corporation, Anchorage, AK (2006-2010). Project Manager. Project Manager for a RI/FS at the 600-acre rail yard facility in Anchorage, Alaska Superfund site. Designed and implemented innovative evaluation design shortening project by several years.

Pipeline High Consequence Area (HCA) Evaluation, Duke Energy Pipeline Services, TX and OK (2004-2006). Project Manager. Pre-development evaluation of potential injury to rivers and stream biota from chemical pipeline failures, per U.S. DOT procedures (64CFR 250 and 49CFR 195.6).

Site Investigation and Risk-Based Corrective Action (RBCA), Petroleum Storage Terminal, Lima, Peru (1998-2000). Project Manager. Site investigation, risk assessment, RBCA evaluation for a major oil terminal in Peru, as part of a joint buyer and seller evaluation to determine environmental liability allocations.

Risk Assessment

Ecological Risk Assessments, various former MGP plants, New Jersey and Massachusetts (2015 – ongoing). Ecological risk assessment and definition of risk based endpoints for natural areas and sediment impacted by residual contaminants from Manufactured Gas Plants (MGP) in NJ, MA. Focus on negotiating protective and realistic outcomes based on risk based endpoints.

Newton Creek Superfund Site; confidential client; New York, NY (2009-2010 and 2016-ongoing). Senior Risk Scientist. Strategy development and Work Plan preparation for data collection for sediment ecological risk assessment at the Newtown Creek Superfund site affected by multiple chemicals including PCBs, pesticides, metals, hydrocarbons and other organics Third party review and strategic advice for baseline risk assessment and remedial objectives.

Risk Assessment Strategy and Implementation; Agrium/Nuwest; Soda Springs, ID (2010 – ongoing). Lead Risk Assessment Advisor. Served as the lead risk assessor in ongoing CERCLA process at phosphate mines in southeast Idaho. The major environmental concern is selenium leaching into the environment. Participated in internal strategic and technical committees to address concerns and harmonize approaches across the various units of the company. Managed team of risk assessors conducting site specific risk assessment and habitat surveys. Devise innovative approaches to addressing Baseline Ecological Risk Assessment issues, including application of probabilistic approaches, population modeling, and bioavailability evaluations.

Ecological Risk Evaluation, NRG Energy, El Segundo, CA (2014-2015). Ecological Risk Assessor. Evaluation of potential marine impacts from subsurface migration to marine surf zone of PCBs from a power plant, including modeling of migration and dispersion in tidal habitat.

Oil Spill Evaluation and Site Restoration Planning, Petroperu, Loreto, Peru (2014-2015). Task Manager. Led risk based evaluation of consequences of several crude pipeline spills in the Peruvian Amazon, including leading field teams, design sampling plans, conduct risk assessment, and evaluate efficacy of primary response contractors.

Ecological Risk Assessment; U.S. Navy; San Diego, CA (2014-2015). Ecological Risk Assessor. Developing baseline ecological risk approaches using physiologically-based extraction tests and direct measurement of biota concentrations of metals at contaminated sites in the Channel Islands to address potential risk from exposure by endangered species. Developed Work Plan with innovative approaches to evaluation exposure to metals (blood testing, in-vitro bioaccessibility evaluations).

Kalamazoo River Spill Site, Enbridge Energy, Marshall, MI (2010-2015). Senior Scientist. Core team member for the response team at a large oil spill affecting 40 miles of the Kalamazoo River. Developed the Conceptual Site Model, led biological effect survey programs, ecological toxicity evaluations, and development of cleanup endpoints. Participated in Natural Resource Damage Assessment (NRDA) process. Lead author on chronic ecological effects to aquatic and sediment biota document. Active in oil forensics and fingerprinting process.

Risk Assessment and Management, U.S. Navy, San Diego, CA (2012-2014). Lead Risk Assessor. Lead risk assessor supporting remedial investigations and actions at Naval Air Station North Island in San Diego, CA. Site included terrestrial and off-shore areas of concern in active and inactive portions of the facility. A special concern was the presence of known threatened and endangered species.

Human Health and Ecological Risk Assessments; U.S. Navy; Various Locations, Hawaii and Guam (2011-2014). Peer Reviewer and Coordinator. Advisor for upland and marine aquatic risk assessments in Hawaii and Guam, and mentor to risk assessment staff conducting risk assessments. Led several of the ecological risk assessments.

Metal Contamination Risk Assessment, Neenah Foundry, Neenah, WI (2012-2014). Lead Scientist. Evaluated lead and other metal contamination in sediment at a former foundry outfall to a local watercourse, with focus on the development of risk-based ecological and human health endpoints.

Tok Terminal Risk Assessment; U.S. Army; Tok, AK (2010). Senior Risk Assessor. Prepared risk assessment revisions for a former dump site undergoing remedial evaluation in Alaska.

Ecological and Human Health Risk Assessment, BNSF Railroad, Burlington, IA (2004-2014). Risk Assessment Lead. Led risk assessment and evaluation strategies for chlorinated organics, lead, and hydrocarbons impacted soil, sediment, groundwater, surface water and fish at a former locomotive repair facility and impacted water bodies and open spaces.

Former Uranium and Rare Earth Metals Plant and Mine, Port Pirie, South Australia (2007-2009). Risk Assessment Task Manager. Performed ecological risk assessment for a former metals processing plant in Port Pirie, South Australia. Evaluated using RESRAD ecological model. Required development of specific risk-based criteria for rare earth metals.

Northwest Drain Sediment Remediation; NWOD Group; Salt Lake City, UT (2000-2004). Lead Risk Assessor. Risk Advisor for the cleanup of sediment in a Great Salt Lake discharge canal affected by multiple source historical industrial and municipal discharges from multiple sources.

Former Refinery RCRA RFI/RA; AMOCO; Casper, WY (1999-2005). Task Manager and Senior Risk Assessor. Project Manager for the risk assessment, remedial investigation and biological surveys for North Platte River portion of one of the largest RCRA RFI/RAs in the country at the location of a closed refinery.

Closed Refinery Risk Assessments, BP, Sugar Creek, MO (2000-2010). Task Manager, Risk Assessment. RCRA RFI/CMS site with multiple exposure media and contaminant migration pathways, including sediment, soil, and surface water.

Environmental Risk Assessment – CO_2 Releases; Confidential Client; Casper, WY (2006). Lead Scientist. Evaluation of the potential effects to wildlife and human health hazards of CO_2 leakage from CO_2 enhanced oil recovery project.

Other Ecological Risk Assessment, petroleum, industrial and utility sites, multiple states (2000-2014). Conducted dozens of ecological and human health risk assessments in support of remedial activities under State and/or RCRA/CERCLA guidance at multiple sites affected by PCBs, hydrocarbons, metals, volatile organics, and/or chlorinated organics. States include: MA, NY, NJ, PA, NC, GA, AL, IN, IL, MI, MN, WI, TX, OK, MO, IA, CO, NE, KS, WY, MT, ID, WA, OR, WA.

Environmental Impact Analysis

Offshore Oil and Gas Environmental Impact and Permitting, BG Group, Roatán, Honduras (2013-2014). Project Director and Country Coordinator. Coordinated the input from global experts and Honduran technical sub-consultants to provide international quality baseline data and impact analysis while complying with applicable regulations and requirements.

Off-shore Lease, Environmental, Social and Health Impact Analysis (ESHIA), Anadarko, Cartagena, Colombia (2013-2014). Technical Lead and In Country Coordinator. Coordinated the input from global experts on environmental oil and gas development issues and Colombian subconsultants to provide international quality baseline data and impact analysis while complying with Colombian regulations and requirements.

Offshore Oil and Gas Prospect Environmental Study, BG Group, Atlantic coast, Uruguay (2012-2013). Project Manager and Lead Author. Provided preliminary assessment of risks, potential social and environmental impacts, national regulatory framework, and attitudes towards a potential offshore oil and gas exploration project.

Environmental Impact Assessment (EIA), Pluspetrol, S. Atlantic Region, Argentina (1998-1999). Project Manager. Completed EIA for an off-shore gas exploration project in the South Atlantic under Argentine, World Bank, and International Convention for the Prevention of Pollution from Ships (MARPOL) guidelines.

Environmental Impact Assessments - Seismic and Exploration, Occidental Petroleum, Amazon Region, Peru (1995-2000). Technical Manager. Completed multiple EIAs for seismic surveys, exploration well drilling, and production well expansion in Block 1A/B oil field in the Peruvian Amazon.

Environmental Impact Assessment - Exploration Wells, Occidental Bangladesh, Sylhet, Bangladesh (1997). Task Manager. Completed EIA at potential locations for a gas extraction project in Bangladesh. Also evaluated residual risk from wastes left by a prior operator in the field.

Environmental Impact Assessment - Seismic Survey, Anadarko Petroleum, Amazon Region, Peru (1995-1999). Project Manager. Led EIA for a 3D seismic program in an undeveloped and remote part of the western Peruvian Amazon.

Biodiversity and Aquatic Toxicology

Toxicity Evaluation, Sinclair Refining, Casper, WY (2017-2018). Conducted a review of potential ecotoxicological impacts to receiving water aquatic life and waste water treatment system functioning from **a** planned increase in mercaptan releases to an industrial waste-water.

Aquatic Toxicology, DOW Chemical, Cartagena, Colombia (2015-2016). Aquatic Toxicologist. Supported Colombia office in developing dispersion model and quantitative estimates of fish kills and adverse effects to mangroves from a pesticide spill.

Dispersion and Effects Modeling, Arauco Pulp, Valdivia, Chile (2015). Aquatic Toxicologist. Led review of aquatic monitoring data and regional water quality issues to develop strategies for pulp and paper discharge treatment and potential litigation.

Biodiversity Assessment/Rapid Ecological Assessment, Confidential Oil Company, Amazon Region, Ecuador (2011-2013). Task Manager. Led a study team of biologists evaluating changes in biodiversity due to past oil exploitation. Used "rapid bioassessment protocols" in field sampling expeditions to evaluate mammals, birds, insects, herpetofauna, fish and benthic biota.

Use Attainability Analysis (UAA) - Site Specific Criteria, Anadarko Petroleum, Casper, WY (2003-2005). Project Manager. Prepared a UAA supporting site-specific water quality criteria for water courses affected by saline-produced water discharges at a producing oil field in Wyoming: wetland evaluation, bioassessments, fish community evaluation, water quality and hydrology investigations, impact to wildlife and livestock, and impact to landowner water use patterns. Established a site-specific criterion for chloride reflecting current conditions that was approved by the Environmental Quality Council for the creek.

Use Attainability Analysis (UAA) - Stream Reclassification, Kennedy Oil, Gillette, WY (2006). Project Manager. Conducted UAA to reclassify nine ephemeral and intermittent streams from Class 3 (Aquatic Life) to Class 4 (do not support aquatic life) at coal bed methane producing field in Wyoming.

Biodiversity Action Plan Guidelines, BP, Anchorage, AK (2003). Lead Author. Developed guidelines for the Alaska operations of a major international oil company for Biodiversity Action Plan design consistent with "green" corporate goals.

Biodiversity Action Plan, BP, Salt Lake City, UT (2004). Task Manager. Designed a biodiversity action plan to enhance habitat value of existing oil company-owned wetlands in the Salt Lake City area: wetland assessment and delineation, securing of water rights, repair of water level maintenance structures, biological surveys, and Wildlife Habitat Council certification.

Water Quality Studies and Monitoring Programs, Occidental Petroleum, Amazon Region Peru (1995-1999). Lead Scientist. Provided support for environmental monitoring and water quality modeling at Block 1A/B field in the Peruvian Amazon.

Water Quality: TIE/TRE and Biomonitoring, multiple clients, USA and Sweden (1992-1999). Scientist. Designed and conducted biomonitoring programs, toxicity identification evaluations, and toxicity reduction evaluations as part of two separate biomonitoring and toxicity laboratories (in Colorado and Sweden).

ATTACHMENT B.
RESUME OF J. CRAIG SWANSON

SWANSON ENVIRONMENTAL ASSOCIATES LLC RESUME

J. Craig Swanson – Principal Associate

craig.swanson@swansonenvironmental.com
401.741.4983
78 Sycamore Lane
Saunderstown, RI 02874

Capabilities

- Strategic technical advice to public and private clients on solutions to marine and freshwater related environmental problems
- Senior advisory support to project and program management leaders in coastal and estuarine circulation, offshore alternative energy and LNG related projects, thermal effluents, wastewater discharges, sediment dispersion from cable/pipeline embedment and dredging, pathogen and other pollutant transport and water quality (nutrients, dissolved oxygen)
- Strategic oversight of the development and application of hydrodynamic, water quality and sediment dispersion models in rivers, lakes, estuaries, and coastal regions
- Expert consulting in coastal physical oceanography, environmental impact assessments and environmental data collection and analysis
- Litigation support including expert document review, developing strategic and tactical strategies, providing expert testimony

Career Overview

Dr. Swanson is a Principal Associate of Swanson Environmental Associates, which he founded in 2015. He was a Senior Associate of RPS ASA between 2011 and 2015; and a cofounder and principal of Applied Science Associates from 1979 to 2011. He received a B.S. and M.S. in Mechanical Engineering from Purdue University and the University of Bridgeport, respectively, and an M.S. and Ph.D. in Ocean Engineering from the University of Rhode Island.

His initial professional focus was on the development and use of hydrodynamic, water quality, sediment and pollutant transport computer models to provide quantitative solutions for public and private sector clients in river, lake, estuarine, coastal and shelf environments. Dr. Swanson has directed the application of these models and associated field programs to solve a wide variety of problems in these aquatic surface water environments located in the United States and abroad. He has managed a large number of projects in his career that have incorporated a number of disciplines including physical oceanography; lake, riverine, coastal and marine processes; water quality; sediment dispersion and quality; and biological impact analyses from these physical and chemical processes.

Dr. Swanson's professional activities have included:

- Industrial Advisory Board to the Ocean Engineering Department at the University of Rhode Island
- Environmental Business Council, former Rhode Island Chapter Chair and former member of the Board of Directors
- American Society of Civil Engineers, Life Member
- Marine Technology Society
- Water Environment Federation
- International Association for Hydraulic Research
- Coastal and Estuarine Research Federation

Dr. Swanson has recently served as an advisor to senior level undergraduates for OCE 495/496 Ocean Engineering Systems Design Project:

- Fall 2014 / Spring 2015: Impact of Climate Change on Rhode Island Marinas: Sea Level Rise and Storm Surge
- Fall 2015 / Spring 2016: Assessment of Damage from Storm Surge and Sea Level Rise along Matunuck Beach Road and Surrounding Communities
- Fall 2016 / Spring 2017: Assessment of Damage to the Misquamicut Beach Community from Storms and Evaluation of Mitigation Strategies
- Fall 2017 / Spring 2018: Application of Coastal Environmental Risk Index (CERI) to Providence and Fox Point Hurricane Barrier

Example Project Experience

Hydrodynamics

- Managed a study to assess the effects of various dredging scenarios of the lower reach of the Narrow River, Narragansett, RI, to increase the tidal prism and thus reduce flushing times to improve water quality.
- Directed a study to assess the effects on circulation, water quality and sedimentation of a proposed channel deepening project at Quonset Point, Rhode Island. The study included an extensive field program and application of models for a range of areas surrounding the site.
- Developed a general three-dimensional boundary-fitted coordinate finite difference hydrodynamic model. The model used a semi implicit solution technique to solve the hydrodynamic equations. Forcing included tides, wind, river flow and density differences.
- Directed a hydrodynamic and suspended sediment modeling study of the effects of the removal of bridge piers and abutments for the Sakonnet River Bridge in Rhode Island.
- Directed a study to develop a hydrodynamic and pollutant transport model for Salem Sound in Massachusetts for use by state regulators. The model was applied to a wastewater treatment plant outfall to assess its effects on the sound.
- Directed a modeling study to estimate the circulatory and sediment effects of various bridge replacement configurations in Missisquoi Bay on Lake Champlain.
- Assessed the impacts of a restrictive bridge opening on the circulation and flushing in the Narrow River, Narragansett, RI. Analysis included and measurement program to determine the tidal characteristics of the estuary and application of analytical models to estimate changes with a new bridge.

Offshore Alternative Energy

- Responsible for preparing the water quality section of the Construction and Operations Plan for the lease holder of a portion of an offshore wind energy area off the northeast coast of the U.S. Included was an assessment of the potential water quality impacts of discharges and spills related to the wind farm and export cables with specific oversight of cable burial-related sediment dispersion modeling.
- Responsible for preparing the physical oceanography and water quality sections of the Environmental Assessment for the Massachusetts Wind Energy Area for the Bureau of Ocean Energy Management in support of commercial offshore wind energy lease activities.
- Led a study to develop a data base and synthesis of reference literature for selected scientific areas for use by the Minerals Management Service in support of developing Environmental Impact Statements for proposed alternative energy facilities on the mid and north Atlantic outer continental shelf. The project included performing a series of literature searches in the disciplines of chemical and geological oceanography, physical oceanography and air-sea interaction as well as research and development technology for alternative energy. A synthesis report was generated from the information gathered.
- Directing a study of the environmental effects of proposed Cape Wind farm of 130 turbines in Nantucket Sound. Studies included assessing the transport and fate of: a potential spill of insulating oil used in the turbines; estimating the recovery time of seabed scars from construction activities; predicting water column suspended sediment levels and bottom deposition patterns from jet plow burial of the connecting cables; assessing the cumulative effects of the turbine pile array on the waves, currents and sediment transport; and evaluating potential cable exposure from migrating sand waves.
- Directed a study to acquire environmental data via a multi component field program and perform an environmental characterization of a site of a proposed wave energy system off the south coast of Rhode Island. An assessment was performed on the environmental impacts of the deployment and operation of the floating structure.

Liquefied Natural Gas (LNG)

- Directing modeling studies of the effects of the thermal discharges from proposed LNG regasification facilities located on Cartagena Bay in Colombia and Sokhna Port in Egypt.
- Directed a study for a proposed LNG terminal on the St. Croix River in Maine. The project involved preparing estimates of potential flooding at the site due to storm surge for various return periods, seiches, and tsunamis from regional and large scale events.
- Directed a modeling study of the discharge and effluent dilution from LNG Shuttle and Regas Vessels (SRV) for a site offshore Tampa Bay, FL. The SRV discharge was modeled with a near field computer model to assess the extent of the thermal plume under different operational and environmental conditions.
- Managed a study of the environmental effects of a deep water port on a constructed island off the coasts of New York and New Jersey designed to receive, store and regasify LNG. The analyses included assessing the environmental

effects of suspended sediment and subsequent deposition from jet plowing the connecting pipeline into the ocean floor and the effects of the discharge of process water and wastewater from the terminal.

- Directed a study to evaluate the potential biological effects of dredging a channel and turning basin for a proposed LNG facility in the Taunton River in Massachusetts. The study included a month-long field program and applications of a hydrodynamic model to predict the currents, a dredged sediment transport model to estimate water column sediment concentrations and deposition patterns, and a biological model to calculate doses and effects to categories of marine species and their life stages.

Thermal Effluent Discharges

- Managing the application of a baroclinic hydrothermal model to assess the effects of future buildout of Jubail Industrial City on the Arabian Gulf in Saudi Arabia.
- Performed a technical review of a thermal plume mapping and modeling study for the once through cooling water discharge from a coal-fired facility located on the Mississippi River in Missouri.
- Directed a mixing study based on field data collected in the thermal plume downstream of a nuclear powered electric generating facility on the Connecticut River in Vermont.
- Managed a modeling study to evaluate the downstream thermal effects in a dammed pool on the Connecticut River located in Massachusetts below a nuclear-powered facility.
- Oversaw mapping of the thermal plume from a fossil-fueled plant on the Providence River in Rhode Island.
- Directed the hydrothermal modeling for a fossil-fueled power plant on the Merrimack River in New Hampshire. Three-dimensional modeling included simulation of the thermal structure of the discharge canal and the dammed pool in the River.
- Oversaw the thermal modeling of the discharge canal from a fossil-fueled power plant in Mt. Hope Bay, MA during phased conversion of the four units from once-through cooling to cooling towers. Also evaluated the effects of increased salinity discharge from cooling towers.
- Directed an extensive, multi-year field program planning and hydrothermal modeling study for a nuclear facility on the Hudson River in New York in support of discharge permit renewal. Additional tasks included review of documents and providing expert witness testimony.
- Oversaw the study of thermal effects for a proposed upgrade to a power plant on Lake Maracaibo in Venezuela. The primary focus was to optimize the location of intake and discharge structures to minimize recirculation of heated effluent and to efficiently disperse the thermal plume to minimize environmental impacts.
- Directed a study to assess the thermal effects on a pool in the Connecticut River in Vermont from a cooling water discharge. The study included a field program to measure existing temperatures and included a three dimensional application of a hydrothermal model in support of a §316(a) demonstration.
- Oversaw the study of the thermal effects of increasing flow from a power plant in Jubail Harbor, Saudi Arabia. The study included a thermal mapping survey to develop a model calibration data set and a modeling study to evaluate the extent of possible temperature increases in the harbor and surrounding waters.
- Critically reviewed the three-dimensional hydrothermal modeling performed in support of a permit for a New England electrical generating facility. The review was part of a due diligence study for a possible buyer.
- Directed a study analyzing the thermal effects of a large electrical generating plant on the circulation and thermal structure in Mt. Hope Bay, MA. The study included an extensive field program and a three-dimensional model application. Later studies included simulation of the discharge canal thermal structure.
- Directed the analysis of thermal impacts from a proposed expansion at an electrical generating facility located on the Cape Cod Canal, Sandwich, MA. The study included application and calibration of a three-dimensional model to the canal and adjacent waters to estimate the increase in plume size with greater heat discharge.

Wastewater Discharges

- Performed an analysis of the potential effects of increasing the discharge from an oyster processing plant in Willapa Bay, WA.
- Directed a receiving water quality benefits modeling analysis of the final phase of the planned combined sewer overflow system upgrade for the Seekonk and Providence Rivers and Upper Narragansett Bay.
- Managed a study to evaluate the water quality impacts of an upgrade of a wastewater treatment facility upgrade from secondary to tertiary treatment that included a hydrodynamic and pollutant transport model of Tarut Bay, Saudi Arabia.
- Directed a critical review of a Massachusetts Estuary Program nutrient loading and receiving water impact analysis for the Nauset Harbor Embayment System on Cape Cod.

- Directed a study to evaluate the optimal location for a wastewater treatment facility discharge from a proposed mixed use development at Weaver Cove in the East Passage of Narragansett Bay, RI that included a field program collecting physical and chemical and a flushing analysis to determine the effects of a proposed wave fence protecting the development marina.
- Managed a series of studies of the effects of the Portsmouth, Kittery and South Berwick individual municipal wastewater treatment facility discharges on the Great Bay / Piscataqua River system in New Hampshire to determine their relative role s in adding nutrients that impact water quality.
- Reviewed potential environmental impacts from proposed Botnia paper / pulp mill on River Uruguay, an estuarine river, between Uruguay and Argentina in support of a lawsuit between the countries
- Directed a review of RIDEM's assessment of the nutrient reductions necessary to achieve water quality protection and enhancement in Green Hill Pond in South Kingstown and Charlestown, RI which found that smaller reductions in nutrient loading could still achieve water quality goals. An analysis was also performed to increase flushing rates in Green Hill Pond with the creation of a breachway.
- Managed a peer review of New Hampshire state documents establishing numeric nutrient criteria for wastewater discharge from the Town of Portsmouth, NH treatment facility to Piscataqua River and Great Bay.
- Directed a critical review of a Massachusetts Estuary Program nutrient loading analysis for the Town of Fairhaven, MA relative to its discharge into New Bedford Inner Harbor.
- Managed a study to evaluate wastewater discharge alternatives for the Town of Portsmouth, RI. The study focused on evaluating the potential water quality impacts at two alternative sites, one in the East Passage of Narragansett Bay and the other in the Sakonnet River.
- Managed a study to estimate the likely elevated levels of pathogens from the proposed new offshore outfall for the Sanitary Districts of Los Angeles County. A particle based Lagrangian model was used in the calculation with hydrodynamics supplied by an extensive current meter field program conducted by LACSD.
- Directed a study to develop a hydrodynamic and pollutant transport model for Salem Sound in Massachusetts for use by state regulators. The model was applied to a wastewater treatment plant outfall to assess its effects on the sound.
- Directed a study to evaluate temporary ocean discharge from a barge of squid processing wastes into Rhode Island Sound while a facility upgrade was constructed.
- Directed a study analyzing characteristics of receiving water quality impacts of various combined sewer overflow design alternatives for Fall River, Massachusetts system. A hydrodynamic and pollutant transport model system was applied to Mt. Hope Bay and the lower Taunton River supported by a field program.
- Directed a series of studies to evaluate the water quality benefits of a series of combined sewer overflow design alternatives for the Providence River and upper Narragansett Bay. The study included modeling of hypothetical load reductions for various alternatives and two one-year simulations of receiving water quality based on the preferred alternatives

Sediment Dispersion from Cable/Pipeline Embedment and Dredging

- Consulted on dredging-induced sediment dispersion from the proposed installation of downstream oil pipelines by side cast and back filling and dredging vessel access channels at Berri Islands, Saudi Arabia.
- Directed a hydrodynamic and sediment dispersion modeling effort to assess the effects of a proposed buried electrical cable crossing of Little Bay, a component of the Great Bay Estuarine System in New Hampshire.
- Directed a multifaceted modeling and analysis study to evaluate the environmental impacts of construction and operation of a maritime yard (construction and maintenance) on the Arabian Gulf coast of Saudi Arabia. Components of the study included hydrodynamics, flushing and dilution, channel and harbor dredging and disposal, and the resulting biological effects.
- Oversaw a sediment dispersion modeling study evaluating the construction impacts of a lateral pipeline tie in to an offshore gas pipeline in Massachusetts.
- Directed an analysis of the potential sedimentation effects of a proposed bottom located screened intake for once through cooling water for a nuclear powered facility on the Hudson River.
- Managed a modeling study to evaluate the transport and fate of suspended sediment from dredging operations related to installation of a natural gas pipeline across the Hudson River in New York. Sensitivity analyses were conducted to ascertain the effects of different hydrodynamic effects and sediment loading estimates.
- Directed a study to evaluate the potential biological effects of dredging a channel and turning basin for a proposed LNG facility in the Taunton River in Massachusetts. The study included a field program and applications of a hydrodynamic model to predict the currents, a dredged sediment transport model to estimate water column

sediment concentrations and deposition patterns, and a biological model to calculate doses and effects to categories of marine species and their life stages.

- Managed a study in the Thames River, CT to evaluate the environmental effects (elevated sediment and pollutant levels) from disposal of dredged material from a U.S. Navy submarine berth. Project used hydrodynamic, dredged sediment transport and pollutant transport models.
- Directed a study to assess the dredged material plume created from dredging operations for a berth deepening project at a U.S. Navy pier in Sandy Hook Bay in New Jersey. The study included applications of a hydrodynamic model, a dredged sediment transport model and a pollutant transport model.
- Directed a study to evaluate the environmental suitability of two potential disposal sites in Buzzards Bay, MA. Primary emphasis was on the long term stability and transport of disposed material under a variety of storm conditions.
- Co-directed a study to estimate suspended sediment concentrations, deposition patterns and erosion potential along a proposed route from Connecticut to Long Island for a gas pipeline.
- Co-directed a multi-phase study to estimate the deposition of suspended sediment from jet plow operations between Connecticut and Long Island for a proposed cable replacement project. The study also included a new cable installation to a different landfall on Long Island.
- Directed a modeling study to assess the suspended sediment and contaminant concentrations from disposal of dredged material taken from the channel in New Bedford Harbor.
- Co-directed a study to estimate the water column concentrations and deposition of suspended sediment from jet plow operations in the lower Hudson River for a proposed electrical cable crossing between New Jersey and Manhattan.
- Directed a modeling study to estimate the circulatory and sediment effects of various bridge replacement configurations in Missisquoi Bay on Lake Champlain.
- Directed a study of the deposition of suspended material from jet plow operations in New Haven Harbor for a proposed electrical cable to determine effects on adjacent leased oyster beds.
- Directed a modeling study of the plume from proposed dredging operations in the Providence River and upper Narragansett Bay. The purpose of the study was to estimate suspended sediment concentration levels in relation to biologically based environmental windows.
- Performed a modeling study of a proposed dredging project in Inner Boston Harbor. The analysis provided estimates of the resulting concentrations in Boston Harbor of suspended sediment.
- Directed a modeling study to evaluate changes in hydrodynamics due to disposal operation at a series of proposed dredged material disposal sites in central Narragansett Bay, RI for the Corps of Engineers.
- Directed a modeling study to assess the hydrodynamic environment at potential disposal sites in Narragansett Bay for the RI Coastal Resources Management Council.
- Directed a study to develop a PC-based dredged material management system for New York City. The system combines Corps of Engineer fates models with data display capabilities.
- Assessed the impacts of a proposed dredging project in the Thames River, Groton, CT. The influence on circulation in the river was investigated using a series of analytical models to estimate longitudinal changes and a numerical model was employed to estimate lateral changes.

Pollutant Transport and Water Quality (Pathogens, Brine, Nutrients)

- Managing the application of hydrodynamic and water quality models to assess the impacts of future buildout of Jubail Industrial City on the Arabian Gulf in Saudi Arabia.
- Consulted on the water quality and biological impacts of the discharge from a road salt storage and distribution facility on Newark Bay, NJ
- Managed a technical review of a critical nitrogen loading threshold analysis the Nauset Harbor Embayment System for the towns of Orleans and Eastham, MA
- Directed a hindcast modeling study of a lampricide release and into the Missisquoi River and eventual transport and dilution in Missisquoi Bay at the northern end of Lake Champlain, VT. The study successfully predicted the trend and timing of the plume evolution based on data collected by the state.
- Managed a field and modeling study to determine the potential changes in salinity from discharging treated water to Sag Harbor Cove on Long Island, NY from a proposed remediation project.
- Directed a study to evaluate the water quality impacts from the trap shooting range in Middletown, RI that launches targets into Rhode Island Sound. A hydrodynamic and pollutant transport model system was used to predict circulation in the area and the resulting concentrations of iron and sulphate.

- Directed a study to evaluate the transport and extent of a high concentration brine discharge into the Gulf of Mexico from the proposed construction of an oil storage facility in an underground salt cavern. A particle based Lagrangian model was used in the calculation to simulate the saline plume.
- Managed a study to estimate the stormwater impacts on Scarborough Beach in Narragansett, RI under present conditions and for a series of collection and disposal scenarios to prevent beach closures from bacterial contamination.
- Managed an integrated field program and hydro and pollutant transport modeling system application to identify the location and evaluate the distribution of bacteria sources responsible for closure of recreational shellfish beds in Southport Harbor, CT. Both forward and backward-in-time modeling was performed to establish likely pollutant sources.
- Directed a field and modeling study to assess the effects on the salinity structure in the Palmer River of water withdrawal and brine discharge related to a desalinization facility for Swansea, MA.
- Co-directed a field study to assess water quality in the Madaket Harbor / Long Pond system on Nantucket Island. A hydrodynamic and flushing model was developed to determine flushing times for various components of the system.
- Directed a circulation and flushing study of a series of proposed marina designs in Yarmouth, MA assessing the configuration of the marina connection to the Parker River.
- Directed a field and modeling study of water withdrawal and brine discharge on the Taunton River in Dighton, MA for a proposed desalinization facility.
- Oversaw a modeling study in support of a nutrient TMDL for the Providence River in upper Narragansett Bay that included a baroclinic hydrodynamic model and an eutrophication model.
- Directed a field and modeling study to estimate flushing times in the Parker and Swan Rivers and Lewes Bay on Cape Cod as part of a larger study to estimate critical nutrient loading to the water bodies.
- Oversaw a modeling study in support of a nutrient and pathogen TMDL for Greenwich Bay in Rhode Island that included baroclinic hydrodynamic, pollutant transport and full eutrophication models
- Performed a modeling study using CORMIX to optimize the dilution of brine from a proposed desalinization facility submerged multiport diffuser to the Mediterranean Sea in Gaza.
- Directed a study to evaluate the flushing of the Acushnet River Estuary. The study included measurements of the salinity distribution and a dye study and resulted in a comparison of flushing estimates by alternative techniques.
- Managed a study to develop conceptual design plans for a small brine discharge for a proposed desalinization project in the Sakonnet River. The study used CORMIX to optimize the design of a multiport submerged diffuser.
- Analyzed water quality effects of the proposed Rhode Island Central Energy Facility at Quonset Point, Rhode Island. Thermal and chemical impacts were analyzed for both the once through cooling design and the stack emissions.
- Directed a field program and water quality modeling study of the Blackstone River, Rhode Island, to assess potential impacts of withdrawal of water for cooling of an electrical generating facility.
- Analyzed water quality data for the Thames River, Connecticut and recommended a research and modeling strategy to reduce eutrophication in the estuary.

Litigation Support

- Provided technical support for expert witness testimony by others in permit proceedings relative to a proposed installation of an electrical cable crossing beneath a portion of the Great Bay Estuary System in New Hampshire.
- Provided expert witness deposition in legal proceedings relative to the once-through cooling water discharge from a nuclear powered electrical generating facility located on the Hudson River in New York. Worked with technical consulting team to review technical documents and develop strategy against opposing parties.
- Testified as an expert witness in a legal proceeding in the Vermont Environmental Court on the effects of thermal discharge from the Vermont Yankee power plant on the Connecticut River. Worked with attorneys and technical team on technical approach before and during hearings.
- Served as an expert witness in a legal suit to concerning discharge of hydrocarbons to a tidally influenced Penobscot River in Maine.
- Testified before the Connecticut Siting Council on model-predicted deposition effects of sediment transport and deposition from jet plow technology to bury an electrical cable in New Haven Harbor.
- Directed an analysis of water quality effects of the proposed Rhode Island Central Energy Facility at Quonset Point, Rhode Island. Thermal and chemical impacts to Frys Pond and Narragansett Bay were analyzed from both the once through cooling design and the stack emissions under dry and wet conditions. Provided expert testimony at Rhode Island Department of Environmental Management hearings on the technical aspects of the project.

- Assessed the water quality impacts of a large marina development at Weaver's Cove in Narragansett Bay, Portsmouth, RI. An analysis of flushing in the marina and the conceptual design of a breakwater were performed. Provided testimony before the Rhode Island Coastal Resources Management Council.
- Assessed the impacts of three wastewater treatment plans on the Pawtuxet River in Rhode Island. Provided expert testimony at public hearing.

Data Management, Mapping and Analysis

- Oversaw planning of a multi-year field program to assess the physical characteristics of the tidal estuary portion of the Hudson River, NY. The program consisted of three fixed bottom ADCPs, six CTDs and 400 thermistors on multiple moorings as well as mobile ADCP and thermistor surveys. Two two-month deployments occurred in 2009 and 2010. Data analysis included quality control, time series analyses, and interpretation of data, including public sources of meteorological and oceanographic monitoring.
- Managed a large field and modeling program for Mt. Hope Bay, MA. Oversaw the quality control, data management and interaction of data use with models.

Publications:

Dr. Swanson has authored or co-authored 15 journal articles or book chapters, 47 conference proceeding papers and over 100 technical reports.

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