


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	Progress Energy Florida, Inc. (Levy County Nuclear Power Plant, Units 1 and 2)
	ASLBP #: 09-879-04-COL-BD01
	Docket #: 05200029 05200030
	Exhibit #: NRC005-00-BD01
	Admitted: 10/31/2012
	Rejected: Other:
	Identified: 10/31/2012 Withdrawn: Stricken:

JOSEPH PEYTON DOUB, CEP, PWS
ENVIRONMENTAL SCIENTIST
US NUCLEAR REGULATORY COMMISSION
OFFICE OF NEW REACTORS, DIVISION OF SITE AND ENVIRONMENTAL REVIEWS

EDUCATION: M.S., Botany, University of California at Davis, 1984
B.S., Plant Sciences, Cornell University, 1982

CERTIFICATIONS: Certified Environmental Professional (CEP), No. 96050338; October 1996
Professional Wetland Scientist (PWS), No. 000358; July 1995
Forest Conservation Act Qualified Professional, Md., December 2004
Wetland Delineator, COE Baltimore, WDGP93MD0510029B, June 1993
NRC Certified Environmental Technical Reviewer, April 2009

TRAINING: Introductory Health Physics, NRC TTC, November 14-18, 2011
Cooling Towers 101, SPX Cooling Technologies, Inc., August 26-27, 2010
Current & Emerging Issues in Environ. Policy, Duke/NRC, Aug. 17-21, 2009
Reactor Concepts, NRC PDC, October 15-16, 2008
Site Access Training, NRC PDC, October 7-8, 2008
Project Management Level 2, Tetra Tech, April 12-14, 2007
ITRC Internet Course, "Jump Starting Ecological Restoration", Sep. 8, 2005
Cornell Home Study Course in Bird Biology, March - August 2005
Principles of DoD Partnering, The Management Edge, June 14-15, 2005
ITRC Internet Course, "Wastewater Treatment Wetlands", March 30, 2004
ITRC Internet Course, "Phytotechnologies", December 9, 2003
OSHA 1910.120 40-Hour HAZWOPER; May 1991 & refreshers to 2008
Due Diligence at Dawn (Phase I ESAs), EDR, Inc.; December 1999
Risk Assessment for Superfund, US EPA; October 1996 and May 2004
Project Management, Brown & Root Environmental, May 1995
Wetlands Identification and Delineation, Penn State C. Ed.; June 1990
Wetlands Delineation, Maryland DNR; July 1988

SECURITY CLEARANCE: L, Active

EXPERIENCE SUMMARY:

Currently serving as an environmental scientist/terrestrial ecologist with the NRC, Mr. Doub has over 20 total years of professional experience in environmental science, environmental planning, and natural resource management. He has performed wetland delineations and other natural resource investigations in over 15 states in all regions of the United States since 1988. He has also prepared wetland mitigation plans for tidal and nontidal wetlands and designed restorations of streams and other sensitive natural habitats in most of the mid-Atlantic, southeastern, and northeastern states and in California. He has lead, or contributed natural resources expertise to, dozens of environmental assessments (EAs) and environmental impact statements (EISs) prepared in accordance with the National Environmental Policy Act (NEPA) by the Air Force, Navy, Coast Guard, Forest Service, and Department of Energy. He has also prepared Phase I environmental site assessments (ESAs) and environmental baseline surveys (EBSs) for Army, Navy, and Air Force installations and for private property proposed for construction of cellular communications towers. He has published or presented more than a dozen papers emphasizing

methods for improving and streamlining NEPA, wetland science, and natural resource management.

PRESENT POSITION: Environmental Scientist/Terrestrial Ecologist
US Nuclear Regulatory Commission, NRO-DSER-RENV
June 23, 2008 – Present
T-7J5, Mail Stop T-7F27; (301) 415-6703

SPECIFIC ACTIVITIES:

Lead Author; Preparation of Revision 2 to Regulatory Guide 4.11, Terrestrial Environmental Studies for Nuclear Power Stations, July 2008 to Present. Expanded and updated Regulatory Guide last revised in 1977 that provides guidance to license applicants on preparing terrestrial ecological studies in support of license applications. Made guide more relevant to terrestrial ecology issues and challenges faced by applicants in today's regulatory environment. Specific topics included mapping and describing terrestrial habitats and wetlands, performing flora and fauna inventories and rare species surveys, and assessing impacts such as salt drift effects on vegetation and noise effects on terrestrial wildlife. Circulated draft revision to other ecologists in NRC and incorporated comments and suggestions. Coordinated with NRC Research to produce Draft Guide (DG) 4016. Presented draft revision to ACRS Radiation Protection and Nuclear Safety Subcommittee on December 16, 2009 and to ACRS Full Committee on March 4, 2010. Published for public comment on August 12, 2011. Presently preparing document for final publication.

Terrestrial Ecology Technical Reviewer; Combined License (COL) and Early Site Permit (ESP) Applications for New Reactors; July 2008 to Present. Serving as NRC technical reviewer for Terrestrial Ecology for the following applications (the dates in parentheses refer to my involvement in the application review):

- VC Summer Units 2 and 3 COL (September 2008 to May 2011)
- Levy Units 1 and 2 COL (September 2008 to Present)
- Comanche Peak Units 3 and 4 COL (December 2009 to May 2011)
- Bell Bend (September 2008 to Present)
- WS Lee Units 1 and 2 (September 2008 to Present)
- Shearon Harris Units 2 and 3 (September 2008 to Present)
- Turkey Point Units 6 and 7 (July 2009 to Present)
- Fermi Unit 3 (November 2008 to Present)

Activities involve participation in the acceptance review, site audit, development of requests for additional information (RAIs), review of RAI responses, review of contractor-prepared draft EIS text, participation in public scoping and DEIS public comment processes, and issuance of final EISs.

Land Use Technical Reviewer; Combined License (COL) and Early Site Permit (ESP) Applications for New Reactors; July 2008 to Present. Serving as NRC technical reviewer for Land Use for the following applications:

- VC Summer Units 2 and 3 COL (September 2008 to May 2011)
- Comanche Peak Units 3 and 4 COL (December 2009 to May 2011)

- Bell Bend(September 2008 to Present)
- WS Lee Units 1 and 2 (September 2008 to Present)
- Shearon Harris Units 2 and 3 (September 2008 to Present)
- Turkey Point Units 6 and 7 (July 2009 to Present)
- Fermi Unit 3 (November 2008 to Present)

Activities involve participation in the acceptance review, site audit, development of requests for additional information (RAIs), review of RAI responses, review of contractor-prepared draft EIS text, participation in public scoping and DEIS public comment processes, and issuance of final EISs.

Instructor; NRC Wetlands Orientation Session to Pacific Northwest National Laboratory; November 14, 2008. Prepared one-day presentation addressing wetland issues relevant to new reactor licensing. Topics included wetland delineation, wetland mitigation, wetland functional assessment, Clean Water Act jurisdiction and Section 404 permits, Rivers and Harbors Act, and recent changes in wetland jurisdiction under the Clean Water Act. Delivered all topics with a focus on nuclear power plant licensing.

PAST POSITION: Senior Environmental Scientist
Tetra Tech NUS, Inc. (Formerly Halliburton NUS Corp. and NUS Corp.)
August 19, 1989 – June 20, 2008

SPECIFIC ACTIVITIES:

Terrestrial Ecology Task Leader; Environmental Report for Proposed UniStar Nuclear Calvert Cliffs Units 3 and 4; Lusby, Maryland; UniStar Nuclear Energy (Subcontract to Bechtel); May 2006 to June 2008. Planned and conducted field investigations, wrote supporting background papers, and prepared terrestrial ecology text sections for Environmental Report (ER) supporting Constellation's combined license application (COLA) to the Nuclear Regulatory Commission (NRC). Field investigations included a wetland delineation, flora survey, fauna survey, and rare plant survey for an undeveloped tract of approximately 500 acres on the 2,200-acre Calvert Cliffs Nuclear Power Plant (CCNPP) Site. The wetland delineation was followed the methodology for a routine onsite delineation in the 1987 Corps of Engineers (COE) Wetlands Delineation Manual. Mapped and characterized plant communities and generated comprehensive plant list. Listed each mammal, bird, reptile, amphibian, and insect species observed over more than 10 site visits spread over the entire 2006 growing season as well as the 2006-2007 winter season. Investigated potentially suitable habitats at appropriate times during the growing season for more than 30 rare plants identified as occurring in Calvert County by the Maryland Natural Heritage Program. Identified locations of 4 rare plants discovered by the survey efforts. Prepared mitigation plan for restoring approximately 2,000 square feet of forest to compensate for the disturbance of forest-interior bird (FIB) habitat in the Chesapeake Bay Critical Area. Accompanied Baltimore District COE to site to obtain Clean Water Act Jurisdictional Determination.

Wetlands Permitting Task Leader; Environmental Services for Proposed Exelon Nuclear Texas Project; Matagorda and Victoria Counties, Texas; Exelon Nuclear, Inc.; June 2007 to June 2008. Planned and conducted wetland delineation to support environmental permitting and combined license application (COLA) to the Nuclear Regulatory Commission (NRC) for new

nuclear generation facility proposed for coastal Texas. Performed delineations at 7,000-acre primary site in Victoria County in January 2008 and at 600-acre alternate site in Matagorda County in August 2007. The wetland delineations followed the methodology for routine onsite delineation in the 1987 Corps of Engineers (COE) Wetlands Delineation Manual. Mapped and characterized plant communities and listed each wildlife species observed over two site visits to the Matagorda County site in June and August 2007 and the Victoria County Site in December 2007 and January 2008. Prepared wetland report and draft Jurisdictional Determination forms addressing issues raised in *SWANCC v. United States* and *Rapanos v. United States*.

Task Leader; Community Environmental Response Facilitation Act (CERFA) Reports for BRAC PMO Northeast Closing Bases; Various Locations; US Navy BRAC Project Management Office Northeast, Philadelphia, Pennsylvania; September 2006 to June 2007). The project involved preparing reports identifying and documenting uncontaminated real property environmentally suitable for immediate transfer out of Government ownership within 6 Navy or Marine Corps bases identified for closure in the 2005 Base Realignment and Closure Act (BRAC) list. Served as lead author for reports for the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania and the Instructor-Inspector Staff, Marine Corps Reserve Center West Trenton, New Jersey. Directed team of 3 scientists visiting Willow Grove for a week to review file data, conduct visual site inspections, and conduct interviews. Inspected over 50 buildings on more than 910 acres, including hangars, laboratories, runways, administrative buildings, on-base and off-base military housing, and raw land. Conducted research independently for smaller West Trenton property. Prepared preliminary draft reports on expedited 6-week schedule following the site visits and draft reports on expedited 2-week schedule to meet fast-track schedule established in the 2005 BRAC round.

Task Leader; Phase I Environmental Baseline Survey (EBS)/Environmental Condition of Property Survey (ECOP) for GM-38 Tract; Bethpage, New York; NAVFAC Atlantic; January 2007 to February 2007). Prepared report characterizing the environmental condition of a tract of approximately 1 acre in a residential area situated down-gradient of the former Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage. The Navy proposed to construct and operate a groundwater pump and treat facility on the site for 10 years to remediate a plume of contaminated groundwater originating at NWIRP Bethpage and other aircraft manufacturing facilities formerly operated by Northrop Grumman Corporation. Conducted visual site inspection on January 12, 2007; searched environmental databases, conducted interviews, and wrote report.

Project Manager; Forest Stand Delineation and Forest Conservation Plan for Fort George G. Meade Uncontrolled Waste Site; Anne Arundel County, Maryland; January 2007 to February 2007). Prepared forest stand delineation (FSD) and forest conservation plan (FCP) for the Uncontrolled Waste Site, which was formerly associated with Fort Meade and is now located within the North Tract of the Patuxent Research Refuge (on land excessed by Fort Meade in early 1990s). Measured basal area, stem density, canopy closure, and shrub and groundcover cover in representative tenth-acre circular plots in forest areas subject to clearing in order to excavate and remove debris and contaminated soils. Used plot data as basis for designing plans and specifications for restoring forest vegetation to disturbed areas. Restoration involved soil stabilization, seeding, and planting tubelings of native trees and shrubs.

Task Manager; Wetland Delineation of Raven Rock Mountain Complex; Adams County, Pennsylvania; U.S. Army; February 2006 to June 2006. Delineated wetlands under jurisdiction of the Federal Clean Water Act on a tract of approximately 720 acres in the Blue Ridge Physiological Province in south-central Pennsylvania. Followed procedures for a routine onsite wetland delineation in the 1987 *Corps of Engineers Wetlands Delineation Manual*. Flagged the boundaries of 10 wetland occurrences. Collected vegetation, soil, and hydrology data needed to complete field data forms documenting the rationale for placement of each wetland boundary. Used hand-held GPS unit to record coordinates of points on each wetland boundary for entry into GIS layer. Also wrote two EAs for minor construction projects on RRMC.

Task Manager; Ecological Communities Survey and Terrestrial Mammal Survey; Engineer Proving Ground, U.S. Army Garrison, Fort Belvoir, Virginia; Baltimore District, U.S. Army Corps of Engineers; June 2006 to September 2006. Quantitatively characterized ecological communities (terrestrial habitats) by measuring basal area, stem density, canopy cover, and other forest metrics in more than 100 random twentieth-acre circular quadrats on a forested tract of more than 600 acres. Calculated importance values for each tree and shrub species by summing relative dominance, relative density, and relative frequency data. Recorded sightings and sign (e.g., scat, calls, or distinctive vegetation chewing) of terrestrial mammals at ten monitoring stations. Wrote reports summarizing data and management recommendations.

Task Leader; Ecological Risk Assessment for Aberdeen Proving Ground (APG) Open Burn (OB) and Open Detonation (OD) Units; Aberdeen, Maryland; US Army Corps of Engineers, Mobile District; February 2005 to December 2007. Wrote Ecological Risk Assessment for inclusion in application for RCRA Subpart X Permit. Reviewed available ecological documentation for APG and selected 15 representative locations where emissions from OB and OD operations could adversely affect sensitive ecological receptors. Described ecological conditions at each location, which included estuarine aquatic, tidal wetland, forested wetland, and forested upland habitats. Developed problem formulation and presented it to APG and regulatory staff. Directed modelers using software to generate emissions, fate and transport, and exposure data. Developed risk characterization and presented data and tentative conclusions to APG and regulatory staff.

Task Manager; Monitoring of Wetland Mitigation Projects on Naval District Washington, West Area, Dahlgren Site; J.M. Waller Associates; Dahlgren, Virginia; November 2003 to June 2008. Monitored wetlands constructed on six Installation Restoration (IR) Program sites cleaned up by the Navy. Developed monitoring plan in 2002 in consultation with the EPA Region III Biological Technical Advisory Group (BTAG). The plan called for annual Spring and Fall site visits, beginning in November 2003 and continuing until October 2007, to evaluate how the constructed wetlands are meeting specific performance criteria. Accompanied by biologists from J.M. Waller, visited each site in November 2003, April and October 2004, and April and October 2005 to record vegetation data (percent cover and woody stem counts), hydrology data (soil inundation or saturation), and wildlife use observations. Proposed interim recommendations to control patches of the invasive plant *Phragmites (Phragmites australis)*. Prepared annual reports and oral briefings summarizing data from each of 2003, 2004, and 2005.

Wetlands Task Leader; Wetland Delineation and Mitigation Design for Installation Restoration (IR) Program Site 37 on Naval Support Facility Dahlgren; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; Dahlgren, Virginia; July 2004 to December 2005. Delineated wetlands on more than 1,000 feet of tidal shoreline. Gun butt sand used at an adjoining ammunition firing range had been deposited over many years on the shoreline. Followed routine wetland delineation procedures in the *Corps of Engineers Wetlands Delineation Manual* (1987), completed field data sheets, and flagged the boundary for survey. Characterized the vegetation, soils, and hydrology of the delineated wetlands and evaluated the functions and values of the wetlands using the *Highway Methodology* developed by the U.S. Army Corps of Engineers (July 2004). Designed plan to restore approximately 2,600 square feet of temporarily disturbed tidal wetlands and to establish approximately 12,800 square feet of tidal wetland vegetation over the top of a polymeric marine mattress and within interstices of riprap used to cover and stabilize the gun butt sand.

Task Manager; Environmental Baseline Surveys for Transfer (EBSTs) for IR Parcels on Former Naval Weapons Industrial Reserve Plant (NWIRP) Calverton; Calverton, New York; November 2004 to December 2005. Wrote EBST reports addressing the environmental condition of multiple parcels of real property that were retained by the Navy for purposes of environmental investigation and remediation following the transfer of the remainder of NWIRP Calverton to non-federal ownership. Followed guidance in ASTM D 6008-96. Conducted visual site inspections, interviewed persons involved in environmental activities, and reviewed environmental documentation. Updated information relevant to the parcels from the Basewide EBS completed in 1997. Completed reports for the Zone II agricultural area (approximately 5.8 acres) in December 2004, for Parcel D (IR Sites 1 and 9, approximately 145 acres) in January 2005, and for Site 10A (approximately 1 acre with former Jet Fuel Systems Laboratory Building) in December 2005.

Task Manager; Benthic Macroinvertebrate Investigation of Constructed Wetlands at Naval Support Facility Dahlgren; Dahlgren, Virginia; April 2005 to June 2006. Compared benthic macroinvertebrate communities in four constructed tidal wetland projects against those in adjoining undisturbed tidal wetlands (reference wetlands). Collected sediment samples from random representative locations in each constructed wetland and corresponding reference wetland and passed the samples through a 500-micron mesh to collect benthic macroinvertebrates. Shipped the organisms overnight on ice to a laboratory for taxonomic analysis (to the lowest practicable taxonomic level). Prepared tables quantifying the numbers of each taxon at each site and calculated similarity indices (SIs) comparing each constructed wetland against its corresponding reference site. Reported the findings in a written report and in an oral briefing to the Navy Partnering Team.

Task Leader, Ecological Characterization of NASA Wallops Island Flight Center Site 15; Engineering Field Activity North; Wallops Island, Virginia; October 2003 to December 2004. Described natural habitats on site contaminated by photographic solution tank. Developed a comprehensive list of plants and wildlife and identified jurisdictional wetland boundaries. Habitats included upland pine-oak forest, tidal high marsh, and tidal low marsh. Performed functional assessment of the wetlands using the Highway Methodology and the Wetland Evaluation Technique, Version 2.0.

Task Leader; Wetland Delineation and Mitigation Plan for NCBC Gulfport Site 8 and Off-Base Properties; Southern Division, Naval Facilities Engineering Command; Gulfport, Mississippi; October 2002 to September 2005. Conducted wetland delineation of 50 acre forested site situated down-gradient to the installation. The site, which supported a mixture of pine flatwoods and cypress-gum forest, had experienced pesticide contamination originating on the base and is slated for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Staked the wetland boundary, completed data sheets, and reported the delineation in a report (December 2002). Prepared a mitigation plan describing restoration of natural forest habitat in the wetlands following the cleanup (April 2003). Met with local representatives of conservation parties in June 2005 to discuss wetland mitigation.

Instructor; Tetra Tech NUS Internal Brown Bag Seminars on Environmental Topics; Germantown, Maryland; March 2002 to February 2005. Delivered five one-hour seminars to co-workers in multiple Tetra Tech office using multimedia technology. Topics include Phytoremediation (March 25, 2002); Phase I Environmental Site Assessments and Environmental Baseline Surveys (August 5, 2002); NEPA (June 16, 2003); Wetland Delineation and Mitigation (December 1, 2003); and Non-Native Invasive Plants (February 28, 2005).

Environmental Scientist; Visual Site Inspection of Solid Waste Management Units on Fort Belvoir; Fort Belvoir, Virginia; US Army Corps of Engineers, Mobile District; September 1, 2005 to October 31, 2005. Conducted visual site inspections of 44 contaminated sites on the 800-acre former Fort Belvoir Engineer Proving Grounds as well as 20 inactive landfill sites on the Fort Belvoir Main Base. Prior to each inspection, reviewed previous environmental documentation for each site, including available information from earlier RCRA Facility Assessments and RCRA Facility Investigations as well as agency correspondence. Summarized current environmental status of each SWMU, described the potential for remaining contamination, and developed specific recommendations for further investigation. Developed inspection protocol and trained other Tetra Tech personnel to conduct similar visual site inspections for over 250 other SWMUs on the Fort Belvoir Main Base. Work performed on an expedited basis so that the Army could address environmental contamination throughout Fort Belvoir in anticipation of receiving missions called for under the 2005 round of the Base Realignment and Closure Act (BRAC).

Environmental Scientist; Phase II Environmental Baseline Survey for Abandoned Military Structure on Fort Detrick – Site R; U.S. Army; Undisclosed Location; March 2005 to May 2005. Conducted Phase II sampling activities to investigate potential environmental concerns identified in Phase I report prepared in 2004. Specific concerns addressed by the sampling included potential POL contamination in groundwater in the basement of the structure, potential lead-based paint on interior and exterior walls, potential lead contamination in soil adjoining exterior painted surfaces, and potential asbestos-containing material in interior pipe wrap. Prepared sampling work plan, directed sampling crews, and prepared report.

Instructor; Introductory Risk Assessment Guidance for Superfund (IRAGS); U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response; Various Locations; May 2004 to May 2005. Served as a member of a team of instructors offering a three-day class introducing students to the principles of performing risk assessments for

contaminated sites following guidance developed by the EPA. Classes were offered free of charge monthly to EPA employees and employees of other federal and state agencies and for a fee to other personnel (e.g., contractor employees). Two instructors plus the Course Director were assigned to teach at each course offering; Mr. Doub was assigned to classes on June 22-24, 2004; October 19-21, 2004; February 1-3, 2005; and April 19-21, 2005. Presented lectures on data collection and evaluation and ecological risk assessment, exposure assessment, toxicity assessment, and risk characterization.

Task Leader; Wetland Design for Site 5 (L-04) – Old Batch Plant at Marine Corps Base (MCB) Quantico; Naval Facilities Engineering Command Washington; Quantico, Virginia; April 2004 – September 2005. Prepared plans and specifications for a 4,000-square foot tidal wetland where a ditch carrying stormwater runoff entered the tidal Potomac River. The ditch carried surface runoff from the former location of a concrete mixing plant as well as discharges from several storm sewers draining adjoining developed areas. Electrical transformers had been stored on an exterior pad at the concrete mixing plant in the 1970s and had released low concentrations of PCBs to the storm sewers. The wetland was designed to capture and treat the runoff before it reaches the Potomac River. Assessed the geometry of the ditch and its watershed; evaluated chemical and physical parameters of water samples; estimated bankfull flow and other hydraulic properties of the ditch, and prepared a white paper summarizing the results and proposing a wetland to treat the runoff. Developed a grading and planting plan and specifications for the wetland. Inspected the wetland following construction and planting to evaluate whether design objectives were met.

Wetland Scientist; Technical Review of Durakon Industries Wastewater Treatment Wetland; Durakon Industries, Inc. (Subcontract to Geotrans, Inc.); Flint Michigan; May 2005. Reviewed operational assessment of wastewater treatment wetland and developed recommendations for improving treatment performance. The wetland, which was constructed in 2000, receives process and sanitary wastewater from a facility that manufactures truck bed liners and discharges the water to the Flint River via an NPDES-permitted outfall. The chief problem with the wetland has been poor treatment performance during winter months. Recommended reducing the water depth to allow replacement of non-persistent wetland vegetation whose tops decompose over the winter with persistent wetland vegetation whose tops remain standing (and hence capable of detaining and filtering wastewater) over the winter.

Wetland Scientist; Conceptual Design for Treatment Wetlands and Phytoremediation at Ammunition Burning Ground at NSWC Crane; Southern Division, Naval Facilities Engineering Command; Crane, Indiana; November 2004 to January 2005. Developed concepts for establishing treatment wetlands and phytoremediation plantings to treat RDX-contaminated groundwater originating at ammunition burial ground. Visited the site, developed four treatment alternatives, and presented sketches depicting each alternative to Navy personnel. Some of the alternatives involved constructing wetlands directly over springs that discharge contaminated groundwater, and others involved directing stream flow into adjoining wetland treatment cells. All alternatives were based on combining the ability of wetland plants to detain and filter surface water (as in traditional treatment wetlands) with the ability of certain plant species reported in the scientific literature as capable of accumulating and sequestering RDX molecules (a form of phytoremediation termed phytoaccumulation).

Curriculum Developer; Ecological Risk Assessment Lectures for Introductory Risk Assessment Guidance for Superfund (IRAGS); U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response; No Specific Location; December 2004.

Worked with Course Director to revise ecological risk assessment lecture modules in the course, which is offered monthly to EPA employees and other interested individuals. The course previously included an overview lecture module on ecological risk assessment and two consecutive 1.5-hour lecture modules covering specifics of EPA's Ecological Risk Assessment for Superfund (ERAGS) document. The revision consisted of replacing the latter two modules with three one-hour lecture modules. The first new module focused on ERAGS Steps 1 and 2, the Screening Level Ecological Risk Assessment (SLERA). The second focused on ERAGS Steps 3, 4, 5, and 6, consisting of refining the contaminants of potential ecological concern followed by the design and conduct of a Baseline Ecological Risk Assessment (BERA). Specific BERA activities discussed included toxicity tests, bioaccumulation and field tissue residue studies, and population and community evaluations. The third new module focused on ERAGS Steps 7 and 8, including risk characterization and risk management.

Environmental Scientist; Phase I Environmental Baseline Survey for Abandoned Military Structure on Fort Detrick – Site R; U.S. Army; Undisclosed Location; August 2003 to December 2005.

Served as lead author of report investigating the environmental condition of a Cold War era military structure at an undisclosed location in Pennsylvania. The investigation followed ASTM D 6008-96 using environmental condition of property classifications in ASTM D 5746-98. Conducted a visual site inspection of the structure and surrounding property on August 12, 2004 and interviewed personnel familiar with the operational history of the structure. Reviewed historical as-built drawings of the structure. Because of the structure's history of classified operations, few other relevant records were available. The report outlined specific recommendations for further environmental investigation and management activities, including formal closure of an undocumented underground storage tank, closure of a septic system, and sampling of the structure's interior for asbestos, lead-based paint, and radon.

Wetland Scientist; Design of Treatment Wetlands for Landfill A at Westover Air Reserve Base; Air Force Center for Environmental Excellence; Chicopee, Massachusetts; June 2003 to September 2003.

Prepared plans and specifications for establishing approximately 1.0 acre of wetlands designed to treat runoff and leachate from a capped landfill and to restore approximately 1.9 acres of forested wetland disturbed by capping activities. The treatment wetland was designed to pass water through a series of basins densely planted with common cattail (*Typha latifolia*), separated by baffles planted with regionally indigenous grasses, trees, and shrubs. The restored wetlands were designed to be planted with indigenous wetland trees and shrubs and seeded with a mix of regionally indigenous wetland grasses, sedges, and rushes.

Ecologist; Conceptual Design of Truxton Park Marina; City of Annapolis; Annapolis, MD; May 2004 to July 2004.

Served as wetland scientist on multidisciplinary Tetra Tech team reviewing conceptual plans for upgrading a public marina in a city park on Spa Creek (part of the Chesapeake Bay). Summarized required natural resource permits, including permits under Section 404 of the Clean Water Act, the Maryland Tidal Wetlands Act, the Maryland Non-Tidal Wetlands Protection Act, the Maryland Forest Conservation Act, the City of Annapolis

Chesapeake Bay Critical Area, and the City of Annapolis Tree Ordinance. Prepared matrix comparing permit requirements and ease of permitting for three conceptual design alternatives.

Deputy Project Manager; Updated Environmental Baseline Survey for Naval Industrial Reserve Operations Plant (NIROP) Fridley; Southern Division, Naval Facilities Engineering Command; Minneapolis, Minnesota; July 2004 – October 2004. Lead professional for updating an environmental baseline survey for a weapons manufacturing facility operated by United Defense, Inc. Reviewed Navy records since the previous EBS (1997), performed an updated visual site inspection of the property, and interviewed United Defense personnel who had managed shops on the property since 1997. Evaluated environmental cleanup actions completed since 1997, including closure and cleanup of an electroplating shop, excavation of contaminated surface soils from an exterior storage area, and pumping and treatment of groundwater. Assigned updated environmental condition of property ratings to each part of the property following ASTM D 5746-98. Prepared report following ASTM D 6008-96.

Deputy Project Manager; Environmental Condition of Property Report; U.S. Navy Nebraska Avenue Complex; Naval Facilities Engineering Command Washington; Washington, DC; January 2004 – June 2004. Lead team of three environmental professionals assessing the environmental condition of property on the former Naval Security Station campus, which was slated for transfer to the Department of Homeland Security. Reviewed environmental records, interviewed site employees, and conducted a visual site inspection of over 30 buildings. Evaluated completed cleanup actions, including excavation of PCB-contaminated sediments in two stream reaches and lead-contaminated soil at one location. Assigned environmental condition of property ratings to each part of the campus using ASTM D 5746-98.

Project Manager; Environmental Assessment (EA) for Non-Native Invasive Plant Control on the Ottawa National Forest; U.S. Forest Service; Bessemer, Michigan; October 2003 to March 2005. Served as Project Manager for a subcontract to a small business, Environmental Planning and NEPA Services, Inc. (EPNS), who was tasked by the Forest Service to write an EA for controlling non-native invasive plants on approximately 987,000 acres of federal forest land. The Proposed Action consisted of mechanical, chemical (herbicide), and biological control of invasive plants such as garlic mustard (*Alliaria petiolata*), glossy buckthorn (*Rhamnus frangula*), purple loosestrife (*Lythrum salicaria*), and introduced honeysuckles (*Lonicera* spp.). Researched the ecological and toxicological impacts from specific mechanical, chemical (herbicide), and biological control agents; wrote sections of the EA addressing biological resources; and served as lead author for a biological evaluation (assessment) assessing impacts on rare, threatened, and endangered species. The biological evaluation served to comply with Section 7 of the federal Endangered Species Act as well as Forest Service internal directives. It addressed 3 mammal, 10 bird, 1 amphibian, 1 reptile, 3 fish, 4 mollusk, 7 insect, 54 plant, and 4 lichen species.

Wetlands Task Leader; Remedial Design for NSWC Indian Head Sites 12 and 42; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; Charles County, Maryland; July 1999 to February 2004. Performed wetland evaluation and design tasks for investigation and remedial design for two landfill sites on military base on the Potomac River near Washington, DC. Tasks included wetland delineation, Joint Permit Application, and design of onsite wetland mitigation. Both wetland mitigation projects consisted of planting regionally

indigenous grasses, graminoids, and forbs along the water-ward edge of the landfills following installation of the caps. The wetlands were designed to help stabilize the landfill cap edges, slow and filter surface runoff, and provide enhanced aquatic and terrestrial wildlife habitat.

Wetland Scientist; Wetland Delineation of NAS Cecil Field Site 15; Southern Division, Naval Facilities Engineering Command; Jacksonville, Florida; September 2003 to December 2003. Delineated wetlands under Federal and state jurisdiction on a roughly 100-acre site in the pine flatwoods of a closed military base. Used methodologies recognized by the U.S. Army Corps of Engineers and the St. John's Water Management District. Flagged six wetland occurrences and prepared wetland delineation report. The report included an assessment of the delineated wetlands using Florida's Wetland Rapid Assessment Procedure (WRAP).

Co-Instructor; NEPA Advanced Tools Training Class; 28th Annual Conference of the National Association of Environmental Professionals (NAEP), San Antonio, Texas; Volunteer; June 22, 2003. Assisted Mr. Charles Eccleston in teaching a class introducing innovative tools and techniques to streamline and improve the NEPA decision-making process. Examples included the Sufficiency Test, a flowchart-like process for determining whether adding additional detail to a NEPA document is appropriate, and the Smithsonian Solution, a process for determining whether a NEPA document must be supplemented when elements of the action are changed subsequent to the Record of Decision. A key concept in the course is "Decision-Based Scoping", a process that uses Value Engineering principles to define the decisions that must be made and the range of reasonable alternatives. Mr. Doub used the class as an opportunity to introduce a proposed new tool, the Specialized Expertise Tool, developed for ascertaining the need for specialized expertise when addressing issues in a NEPA document. The tool was published in the December 2003 issue of *Environmental Practice*.

Task Leader; Environmental Baseline Survey (EBS) of Military Family Housing Area, Fort Drum, New York; U.S. Army Corps of Engineers, Mobile District; Watertown, New York; July 2003 to September 2003. Served as task leader for evaluating 15 parcels of undeveloped land totaling over 1,000 acres of mostly forested undeveloped land slated for new privately-sponsored residential development under the Army's Residential Communities Initiative (RCI) to privatize military housing. Reviewed historical aerial photographs and environmental records, conducted interviews with base personnel, and wrote EBS sections.

Wetland Scientist; Wetland Delineation and Mitigation for Naval Weapons Station Earle Site 13 – Defense Property Disposal Office Yard; Engineering Field Activity North, Naval Facilities Engineering Command; Colts Neck, New Jersey; April 2003 to July 2003. Conducted wetland delineation of 20-acre site slated for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Followed the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (1989), which is still required by the New Jersey Department of Environmental Protection (NJDEP). Identified two wetland features, including a seasonally saturated palustrine forested wetland dominated by red maple and black gum and a ditch qualifying as a state open water. Staked wetland boundaries and completed field data sheets and report. Developed recommendations for re-vegetating the wetlands and adjoining transition areas following disturbed during implementation of the remedy.

Ecologist, Level I Ecological Risk Assessment (ERA) for Naval Weapons Industrial Reserve Plant (NWIRP) Toledo; Southern Division, Naval Facilities Engineering Command, Toledo, Ohio; March 2003 to April 2003. Wrote report characterizing ecological habitats, receptors, stressors, and exposure pathways on 29-acre industrial site in Toledo. Although the facility consisted only of buildings, paved areas, and lawns, it adjoined forested habitats to the north. Documented the absence of potentially significant exposure pathways affecting ecological receptors.

Deputy Project Manager; Route Selection for Proposed Oakland Park-Conservation 230kV Electric Transmission Line; Florida Power and Light; Broward County, Florida; February 2003 to May 2003. Used aerial photographs, field observations, and published geographic and environmental data to develop candidate routes for constructing a 230kV electric transmission line across a predominantly suburban landscape. Developed a network of nearly 150 "links", linear segments potentially suitable for transmission line construction, across a study area of more 30 square miles. Each sequence of links connecting the proposed endpoint substations constituted a potential route. Tetra Tech used the links to compile a geographic information system (GIS) identifying specific environmental opportunities and constraints throughout the study area.

Project Manager; Environmental Assessment (EA) for Managing Flight Obstructions To Preserve Safety at Andrews AFB; U.S. Air Force Air Mobility Command (AMC); Prince Georges County, Maryland; November 2000 to January 2003. Developed and evaluated alternative actions for removing trees encroaching into imaginary flight surfaces at the ends of two runways. Most of the trees requiring attention were located on the Suitland Parkway, a scenic roadway into Washington, DC that is administered by the National Park Service (NPS). Worked with AMC and the NPS to prepare a statement of purpose and need and a description of the proposed action and alternatives (DOPAA). The alternatives differed with respect to various vegetation management strategies and possible reconfigurations of the runways. Assisted in the preparation of a script, slides, and visuals for a public scoping hearing to foster public involvement in the Air Force environmental impact analysis process. Wrote Draft EA for publication. Prepared responses to comments received on the Draft EA during a 30-day comment period. Coordinated a subcontractor preparing a Phase IA archaeological survey.

Task Leader; Functional Assessment and Permit Application for Wetlands at West Gate Landfill and Rubble Disposal Area; Engineering Field Activity North, Naval Facilities Engineering Command; South Weymouth, Massachusetts; December 2002 to August 2003. Prepared written assessment of the functions and values of wetlands at two sites undergoing cleanup of hazardous materials on a former naval installation closed under the Base Realignment and Closure Act (BRAC). Used the *Wetland Functions and Values Descriptive Approach* developed as part of the Highway Methodology by the New England District of the U.S. Army Corps of Engineers. Functions assessed included groundwater recharge and discharge, floodflow abatement, shoreline stabilization, sediment/toxicant retention, nutrient removal, production export, and wildlife habitat. Values assessed included aesthetics, recreation, educational/scientific value, uniqueness/heritage, and endangered species habitat. Visited the wetlands in January 2003 to collect field observations and review of published data sources.

Task Leader, Screening-Level Ecological Risk Assessment (ERA) for Valmont Trichloroethylene (TCE) Site; US Environmental Protection Agency Region III; Hazleton, Pennsylvania; September 2002 to April 2004. Inspected the site of suspected TCE contamination and prepared a technical memorandum describing terrestrial, wetland, and aquatic habitats. Obtained written consultations from the US Fish & Wildlife Service and state agencies responsible for threatened and endangered species. Prepared screening level ecological risk assessment (Steps 1 and 2, and the screening refinement stage of Step 3 of the EPA ecological risk assessment process). Addressed terrestrial plant, soil invertebrate, terrestrial wildlife, sediment invertebrate, and small fish endpoints. Performed food chain modeling addressing mammalian and avian herbivorous and insectivorous wildlife.

Task Leader; Environmental Baseline Survey (EBS) of Harry S. Truman Animal Import Center on NAF Key West; Southern Division, Naval Facilities Engineering Command; Key West, Florida; June 2002 to October 2002. Wrote EBS report following ASTM D 6008-96 and Navy guidance for a 15-acre animal quarantine facility on Fleming Key, a man-made island. The facility had been leased from the Navy to the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS). Researched the environmental history of the property, reviewed historic aerial photographs, interviewed current and past Navy and APHIS employees, reviewed Navy and APHIS files, and conducted a visual site inspection of buildings and grounds.

Task Leader; Ecological Risk Assessment (ERA) for Northeast Ordnance Site; U.S. Environmental Protection Agency, Region 3; Northeast, Maryland; February 1998 to October 2002. Inventoried ecological resources on roughly 60-acre site formerly used by ordnance manufacturing operation. The site included three streams, forested areas, widely scattered small buildings, and overgrown fields. Mapped and characterized values and functions of wetlands and upland habitats on the site and generated plant and wildlife species lists. Performed food chain modeling to estimate contaminant doses to mammals and birds. Wrote screening-level ERA identifying ecological receptors and exposure pathways and comparing exposure data against ecotoxicological benchmarks.

Wetland Scientist and Ecologist; Design of Landfill Consolidation Remedial Action at Operable Unit 2 (Sites 1 and 2) at Former NSWC White Oak; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; February 2001 to September 2002. Prepared plan to restore approximately 500 feet of a first-order, nontidal stream channel adjoining two abandoned landfills. Characterized baseline conditions such as channel geometry, watershed, bank condition, and substrate (using a Wohlman pebble count). Outlined use of live stakes, rooted cuttings, seedlings, and other bioengineering techniques (February 2001 to March 2001). Developed similar plan for restoring approximately 1,000-feet of another first-order, nontidal stream on NSWC White Oak (Site 47) that required excavation of contaminated sediments (November 2001 to December 2001). Inspected the planted sites in September 2002 as part of a follow-up monitoring program.

Task Leader; Wetland Delineation of Town of Dudley, Massachusetts Wastewater Treatment Plant Site; Boyle Engineering; Dudley, Massachusetts; May 2002 to July 2002. Conducted wetland delineation of a 15-acre tract occupied by sewage treatment facilities and undeveloped buffer grounds. Followed Federal and Commonwealth of Massachusetts wetland

delineation guidance. Staked the boundaries of wetlands and ordinary high water marks, completed wetland delineation data sheets, and wrote wetland delineation report. Investigated wetlands permitting requirements for upgrading and expanding the sewage facilities.

Environmental Scientist; Review of Environmental/NEPA Compliance Checklists; U.S. Air Force; August 2001 to February 2002. Served on a team of environmental scientists tasked to review electronic checklists developed to standardize environmental and NEPA compliance at two Department of Defense (DoD) installations. Proposed recommendations for expanding the scope of the checklists for national application. The two checklists selected for the review had each been developed independently by the Patuxent Naval Air Station in Maryland and Warner-Robbins Air Force Base in Georgia. The checklists prompted users for “yes” or “no” responses to a chain of electronic questions and uses the responses to automatically identify specific environmental compliance requirements. Where appropriate, questions include links to geographic information system (GIS) map layers containing data on wetlands, cultural resources, rare or endangered species locations, and other environmentally sensitive resources. The team interviewed the personnel who developed the checklists, conducted “dry runs” of the checklists, and proposed approaches for transforming the checklists into a “national checklist” that could be implemented at any military installation within the United States.

Task Leader; Tier I Ecological Risk Assessment (ERA) for Fort Knox Open Burn/Open Detonation (OB/OD) Site; U.S. Army Corps of Engineers, Mobile District; Fort Knox, Kentucky; January 2002 to February 2002. Wrote Tier I (screening level) ERA in accordance with guidance developed by Region IV of the U.S. Environmental Protection Action (EPA) and national guidance developed by the EPA Office of Solid Waste for hazardous waste combustion facilities.

Task Leader, Screening Level Ecological Risk Assessment (ERA) for Open Burn/Open Detonation (OB/OD) Site, Tooele Army Depot; U.S. Army Corps of Engineers, Mobile District; Tooele, Utah; June 1999 to March 2002. Reviewed draft screening-level ERA prepared by another author in 1999 and responded to EPA comments. Wrote final SLERA following guidance provided by EPA. Used computer model to estimate chemical concentrations in soils, sediment, and water affected by emissions from OB/OD operations and to predict exposures through the food chain to various functional feeding guilds of birds and mammals.

Task Leader; Environmental Baseline Survey for Transfer (EBST) and Finding of Suitability to Transfer (FOST) for Plant 20 Transportation Maintenance Facility at NWIRP Bethpage; Engineering Field Activity North, Naval Facilities Engineering Command; Bethpage, New York; December 2001 to February 2002. Wrote an EBST and FOST supporting the transfer of a 4.5-acre vehicle maintenance facility from the U.S. Navy to Nassau County, New York in accordance with CERCLA Section 120(h). Conducted new visual site inspection of Plant 20 and updated relevant information in Phase I and Phase II Basewide EBS reports for NWIRP Bethpage.

Task Leader; Joint Permit Application for Installation Restoration (IR) Program Sites on Naval Surface Warfare Center Dahlgren Site; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; Dahlgren, Virginia; July 2001 to December 2002. Prepared Joint Permit Application for wetland impacts resulting from remediation of 6 contaminated sites on a Navy base in Northern Virginia. Four of the sites contained tidal wetlands bordering tributaries of the Potomac River and two of the sites contained nontidal wetlands. The application summarized wetland impacts and the proposed mitigation projects for each site in the permit application. The permit application quantitatively tracked losses and gains of wetlands. Contributed to Habitat Equivalency Analysis (HEA) performed by the National Oceanographic and Atmospheric Administration (NOAA) to model the appropriate level of wetland mitigation accounting for past and projected future losses of wetland services.

Project Manager; Freshwater Wetlands Permit Application for Remediation of Former Calgon Corporation Metasol Plant; Merck and Company; Hawthorne, New Jersey; April 2001 to October 2001. Prepared application to the New Jersey Department of Environmental Protection (NJDEP) for statewide general freshwater wetlands permit and stream encroachment permit for impacts resulting from excavation of contaminated soils on abandoned industrial site. The project involved temporary disturbance of approximately 0.4 acre of freshwater wetlands and approximately 2.5 acres in the 100-year floodplain. Completed forms, coordinated drawings and public notification, documented compliance with applicable terms and conditions established by NJDEP for Statewide General Freshwater Wetland Permit #4, and wrote an environmental report supporting the request for a stream encroachment permit. Permit received 2002.

Task Leader; Biological Assessment (BA) for Lower Meramec Basin Wastewater Management Plan; St. Louis, Missouri; U.S. Environmental Protection Agency Region 7; February 2001 to April 2001. Prepared BA under Section 7 of the Endangered Species Act for a proposed regional wastewater treatment plant project. The BA addressed the proposed right-of-way for a 1-mile buried water discharge line crossing the floodplains of the Meremac and Mississippi Rivers. The BA specifically addressed the running buffalo clover, Indiana bat, bald eagle, and American bittern (the latter is not federally listed but is designated as endangered by the State of Missouri). Conducted pedestrian survey, described habitats, assessed habitat suitability for each species considered, and developed recommendations for minimizing impacts.

Project Manager, Multiple Environmental Baseline Survey (EBS) Reports for Andrews AFB; Air Force Center for Environmental Excellence; Prince Georges County, Maryland; September 2000 to March 2001. Wrote five EBS reports for five properties on Andrews AFB that were scheduled for leases to other government agencies. Properties addressed included a hangar, a garage, a credit union, an office building, and a tract of land in an area containing wetlands and several rare, threatened, and endangered plants. Followed procedures in AFI 32-7066, which included conducting visual site inspections, interviews, and records reviews.

Task Leader; Conceptual Plan for Landfill Shoreline Stabilization Using Constructed Tidal Marshes; Portsmouth Naval Shipyard; Northern Division, Naval Facilities Engineering Command; Kittery, Maine; March 2000 to September 2000. Developed conceptual plan for using constructed tidal marshes to stabilize the shoreline where a landfill abuts the estuarine Piscataqua River. The conceptual plan evaluated the feasibility, advantages, and disadvantages of using tidal wetlands alone, tidal wetlands plus a rock breakwater, or riprap to stabilize the subject areas. Presented the conceptual plan at a public meeting on August 3, 2000.

Botanist; Preliminary Phytoremediation Analysis of Contaminated Site at NIROP Fridley; Fridley, Minnesota; Southern Division, Naval Facilities Engineering Command; September 2000 to October 2000. Evaluated the possible use of phytoremediation to clean up groundwater contaminated by trichloroethylene (TCE). Concluded that phytoremediation may not be a good alternative to traditional remedies for this site because of the high depth to groundwater and small land area available for planting phreatophytic trees and other plants.

Task Leader; Land Suitability Studies for Davidsonville Transmitter Station and Brandywine GLOBECOM Receiving Station; Mobile District, Corps of Engineers; Anne Arundel and Prince Georges Counties, Maryland; October 1999 to June 2000. Prepared letter reports assessing the environmental suitability of two tracts for outleasing for purposes such as grazing, agriculture, mining, urban development, and recreation. The tracts were outparcels containing communications facilities associated with nearby Andrews AFB. The various towers and other facilities were clustered in fields in the center of each parcel surrounded by large buffers of forestland. The sizes of the parcels were approximately 1,100 and 1,600 acres, respectively. Sensitive environmental resources on each parcel included wetlands, threatened and endangered plants, and steep and erodible soils.

Task Leader; Design of Interim Removal Action for Site 3 at Former NSWC White Oak; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; December 1999 to December 2001. Prepared plan for restoring approximately 250 feet of first-order, nontidal stream channel adjoining abandoned landfill. The stream had been temporarily diverted through a diversion ditch or pipe to allow for excavation of a landfill directly abutting the channel. The plan called for returning the stream to a reconfigured channel stabilized using live stakes, rooted cuttings, seedlings, and other bioengineering techniques. The Navy implemented the plan in November 2000.

Wetlands Discipline Lead; EA for Disposal and Reuse of Grand Junction Office; U.S. Department of Energy (DOE); Grand Junction, Colorado; September 1999 to January 2000. Wrote sections addressing wetlands, floodplains, and ecological resources. Conducted ecological risk assessment (ERA) using DOE procedures. The EA was included as one of three sample EA reports presented as appendices in the textbook *Effective Environmental Assessments: How to Manage and Prepare NEPA EAs* by Charles H. Eccleston.

Task Leader; Wetland Delineation and Permit Application for Drum Burial Sites on Martin State Airport; Lockheed Martin, Inc.; Baltimore, Maryland; June 1999 to September 1999. Performed wetland delineation and completed permit application for grading necessary to investigate possible contamination from buried drums on an active airfield. The delineation

identified the boundaries of nontidal and tidal wetlands and other regulated areas. Completed Joint Permit Application for submittal to the US Army Corps of Engineers and Maryland Department of the Environment. Prepared an application for a variance under Baltimore County codes dealing with Chesapeake Bay critical areas.

Task Leader; Environmental Assessments (EAs) for Station Port Huron and Station Ashtabula; U.S. Coast Guard; Port Huron, Michigan and Ashtabula, Ohio; April 1999 to August 1999. Assisted preparing an EA for construction of a new station building at Station Port Huron and served as the lead author of a separate EA covering the closure of existing station facilities at Station Ashtabula and construction of a new modular station at a nearby location. Key issues in both EAs included potential impacts to aquatic and benthic biota, threatened and endangered species, historic and archaeological resources, and urban planning issues. Coordinated consultations with the U.S. Fish & Wildlife Service, State Natural Heritage Programs, and State Historic Preservation Officers.

Task Leader; Phytoremediation Design for NSWC Dahlgren Site 17; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; King George County, Virginia; January 1999 to November 2000. Developed phytoremediation plan addressing groundwater contaminated with mercury at abandoned landfill facility on a Navy base in northern Virginia. The plan involved planting hybrid poplar and other trees on a capped landfill to increase transpiration of groundwater contaminated by mercury. The intent was to thereby reduce the migration of mercury-contaminated groundwater into adjoining streams and wetlands. Reviewed the phytoremediation literature to identify tree species that are deep-rooted, fast-growing, and have high rates of transpiration. In contrast to phytoremediation projects that use uniform stands of a single species, designed a planting scheme that utilized mixed stands of high-transpiration species that also simulated the ecological structure and functions of natural forests. Also performed a wetland delineation of the site and integrated wetland mitigation into the phytoremediation design. Formed basis of presentation titled "Integration of Phytoremediation, Wetland Mitigation, and Ecological Restoration" at the 26th Annual Conference of the National Association of Environmental Professionals.

Environmental Scientist; Environmental Baseline Survey (EBS) for Naval Weapons Industrial Reserve Plant (NWIRP) St. Louis; Southern Division, Naval Facilities Engineering Command; St. Louis, Missouri; November 1998 to February 1999. Served on six-member team of professionals preparing an EBS following methodology in ASTM D 6008 and associated Navy guidance. Spent two weeks at the plant reviewing environmental records, conducting visual site inspections, and interviewing current and former Navy and contractor (Boeing) staff who worked at the plant. The EBS addressed a large aircraft manufacturing plant and several ancillary structures owned by the Navy within a larger manufacturing complex owned by Boeing, Inc. The Navy planned to transfer the plant to Boeing. Contributed to writing the EBS report, especially sections addressing the main aircraft manufacturing plant. The Phase I EBS was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h), as amended by the Community Environmental Response Facilitation Act (CERFA).

Wetland Scientist; Clean Water Act Assessment for Golf Course Addition on Andrews AFB; Mobile District, Corps of Engineers; Prince Georges County, Maryland; June 1998 to October 1999. Mapped and characterized ten wetland occurrences on a recently completed 18-hole extension to the Andrews golf course, conducted functional assessment of each wetland, and developed management recommendations for each wetland. The recommendations focused on minimizing bird-aircraft strike hazards (BASH) in addition to the normal objectives of wetland management, such as water quality protection and improving wetland habitat. The Air Force ultimately included the plan as a component volume to the Integrated Natural Resources Management Plan (INRMP) for Andrews AFB.

Task Leader; Ecological Risk Assessment (ERA) for Crossley Farm Site; U.S. Environmental Protection Agency, Region 3; Huffs Church, Pennsylvania; June 1998 to June 2001. The Crossley Farm site consists of over 200 acres of agricultural land and deciduous forests on highlands adjoining a series of sloping springs. Drums of organic solvents had been buried on the site and had resulted in groundwater contamination. Visited the site, described and sketched the approximate boundaries of natural habitats, and wrote a technical memorandum that inventoried ecological resources on roughly 200-acre site formerly used to bury drums of industrial solvents (completed September 1998). As part of the field effort, mapped and characterized the values and functions of wetlands associated with springs and seepages on the site. Mapped ecological habitats on the site and generated species of plants and wildlife. Used data from the technical memorandum to identify ecological receptors and exposure pathways. Performing food chain modeling for representative mammalian and avian herbivores, insectivores, and carnivores. Wrote screening-level ERA report using soil, sediment, and surface water data generated by Tetra Tech for a Remedial Investigation (RI) of the site.

Environmental Scientist; National Pollutant Discharge Elimination System (NPDES) Permit Application for AES Warrior Run Cogeneration Plant; AES Warrior Run, Inc.; Cumberland, Maryland; May 1998 to August 1998. Prepared application to the Maryland Department of the Environment for AES to discharge wastewater generated by operation of a 180-MW coal-fired electric power plant. Wastewater sources included cooling tower blowdown water, demineralizer system regeneration wastes, and industrial and coal pile runoff. All wastewater was to be recycled to the extent possible and any remaining wastewater was to be extensively pretreated in new, state-of-the-art facilities prior to discharge.

Environmental Scientist; Environmental Baseline Surveys for Transfer (EBSTs) for Naval Air Station Dallas; Southern Division, Naval Facilities Engineering Command; Dallas, Texas; January 1998 to December 1999. Served on a team of environmental professionals evaluating the environmental condition of property on a Navy base closed under the Base Closure and Realignment Act (BRAC). The base included an airfield, flight line operations buildings, construction and maintenance shops, and administration buildings. The team wrote separate EBSTs for each of six areas of the base termed "Categories A through F". Assisted the team in reviewing environmental records, conducting visual site inspections, and interviewing base personnel. Each EBST served to update portions of a basewide EBS prepared by another contractor in 1994; thus the emphasis of the EBSTs was on the period from 1994 to 1999.

Ecologist; Ecological Risk Assessment (ERA) for Former Naval Ordnance Station Louisville; Southern Division, Naval Facilities Engineering Command; Louisville, Kentucky; January 1998 to January 1999. Prepared a report documenting the lack of significant ecological receptors at the densely developed industrial station. Reviewed information on threatened and endangered species and obtained verification from US Army Corps of Engineers that there are no wetlands on the station. Evaluated the potential for transmission of contaminants through the food chain to predators that incidentally visit a series of drainage ditches on the station.

Task Leader; Ecological Validation Study for Aerojet Open Burn Facilities; GenCorp Aerojet, Inc.; Sacramento, California; December 1997 to June 1999. Conducted ecological risk validation study for open burn activities on 8,000-acre Aerojet facility. Evaluated a preliminary (Tier I) ERA prepared by another contractor, identified assumptions requiring validation, and designed and implemented a field sampling program to generate data validating the assumptions. Wrote report presenting the findings of the validation effort.

Task Leader; Phase I Environmental Site Assessments (ESAs) for Fort Wingate Depot Activity; Bureau of Land Management; Gallup, New Mexico; November 1997 to March 2000. Wrote Phase I ESAs for discreet parcels within former Army depot closed under the Base Closure and Realignment Act (BRAC). Parcels included a 5,600-acre tract of forest land formerly used for missile test launches, an area of former workshops used to service explosives, clusters of explosives storage igloos, and several tracts of buffer land. Followed procedures from ASTM E 1527-97 to identify recognized environmental conditions for the parcels. Presented a paper titled *Conducting Environmental Baseline Surveys for Large Manufacturing Facilities and Large Tracts of Undeveloped Land* at the 1999 Annual Meeting of the National Association of Environmental Professionals based, in part, on experiences from this project.

Environmental Scientist; Phase I Environmental Site Assessment (ESA) Reports for Telecommunications Sites in Philadelphia Metropolitan Area; Sprint PCS; August 1997 to December 1997. Completed Phase I ESAs on selected sites in southeastern Pennsylvania and central New Jersey proposed for construction of monopoles and other telecommunications equipment. Conducted visual site inspections, interviews, and record searches following ASTM E 1527-94. Obtained and reviewed series of historical aerial photographs covering each site.

Task Leader; Ecological Risk Assessment (ERA) of Naval Weapons Industrial Reserve Plant (NWIRP) Calverton; Northern Division, Naval Facilities Engineering Command; Calverton, New York; May 1997 to October 1997. Characterized habitats at four Installation Restoration (IR) sites in naturally vegetated areas of a closed Navy base in eastern Long Island. Delineated and characterized wetlands on each site. Described ecological receptors and exposure pathways at each site and prepared screening-level ecological risk analyses. Collected and screened sediment samples for benthic macroinvertebrates, preserved and shipped organisms to a laboratory for taxonomic identification, and evaluated diversity of the benthic macroinvertebrate community.

Wetlands Task Leader; Remedial Design for NSWC Dahlgren Site 9; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; King George County, Virginia; June 1997 to January 1999. Designed a wetland mitigation plan for creating approximately 0.9 acres of tidal wetlands in an area adjoining an abandoned landfill (Site 9) on the banks of Gambo Creek, a tidal tributary to the Potomac River. The wetlands served to offset the loss of approximately 2.3 acres of tidal wetlands that had to be permanently filled in order to cap contaminated sediment. The plan also called for planting native warm season grasses and shrubs on the cap to enhance wildlife habitat. Investigated a series of alternative locations on NSWC Dahlgren that could potentially be suitable for restoring or creating additional wetlands. Wrote a technical memorandum proposing a wetland mitigation bank to cover wetland losses on Site 9 and other contaminated sites requiring remediation. The memorandum presented a short-list of sites that could potentially be used to restore or create wetlands.

Task Manager; Basewide Environmental Baseline Survey (EBS) of Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage; Northern Division, Naval Facilities Engineering Command; Bethpage, New York; February 1997 to January 1998. Coordinated the preparation of an EBS following methodology in ASTM D 6008, which includes a review of public records, interviews with site and agency representatives, and visual site inspection. The EBS addressed over 100 industrial and administrative buildings on NWIRP Bethpage, including a large aircraft manufacturing building, various warehouses and laboratories, an industrial wastewater treatment plant, a vehicle maintenance facility, and other buildings and land areas. The EBS was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h), as amended by the Community Environmental Response Facilitation Act (CERFA). As Task Manager, planned and coordinated field work by a four-person team and served as primary author of draft and final reports.

NEPA Analyst; Telecommunications Sites in Philadelphia Metropolitan Area; Sprint PCS; Philadelphia, Pennsylvania; February 1997 to December 1997. Visited selected sites in southeastern Pennsylvania and central New Jersey to assess whether construction of monopoles and other telecommunications equipment complied with siting criteria established by the Federal Communications Commission under the National Environmental Policy Act (47 CFR 1.1307 et seq.). Wrote letter reports addressing each site. The reports provided information on wilderness areas, wildlife preserves, threatened and endangered species; cultural resources; floodplains and wetlands, surface waters; Indian religious sites; and high-intensity lighting.

Project Manager; Design of Fernald Ecological Restoration Park; Fluor-Daniel Fernald, Inc.; Cincinnati, Ohio; January 1997 to December 1998. Prepared plans and specifications for establishing a 1-acre park demonstrating the types of natural vegetation that could be established following remediation of contaminated soils at a closed U.S. Department of Energy nuclear materials production facility undergoing environmental cleanup. The park consists of a mulched nature trail passing through small areas of restored vegetation types indigenous to southwestern Ohio, including tallgrass prairie, old field scrub, deciduous forest, and nontidal wetlands. Following completion of the plan, Assisted Fluor-Daniel Fernald in overseeing construction of the park. Voluntarily developed an unofficial website to publicize the park: <http://members.aol.com/jpeytond/fernpark.html>. Also contributed to conceptual plan for

ecological restoration of the entire Fernald site and updated an ecological risk assessment (ERA) started by other staff in 1994.

Wetlands Task Leader; PCB Removal Action Design for Naval Security Station; Engineering Field Activity Chesapeake; Washington, DC; December 1995 to August 1996. Designed a plan for restoring riparian vegetation to two freshwater stream segments in a forested stream valley east of the Naval Security Station in northwest Washington, DC. The stream valley was within Glover Archbold Park, administered by the National Park Service. Sediments in both stream segments were contaminated by PCBs originating from the Naval Security Station. Delineated wetlands and waters of the United States and obtained Jurisdictional Determination from the U.S. Army Corps of Engineers. Mapped trees over 4 inches in diameter at breast height in accordance with National Park Service procedures. Prepared plans and specifications for reconstructing the stream channel and replanting native trees and shrubs.

Task Manager; Mapping of Wetlands, Playas, and Other Waters of the United States on Sierra Army Depot; HAZWRAP; Herlong, California; September 1995 to April 1996. Developed sitewide map of areas regulated under the Clean Water Act on 96,421-acre installation. Analyzed 1:10,000 color infrared aerial photographs and then organized two 2-man field teams to ground truth the photographs over a 2-week period. The teams collected data necessary to complete field data forms from the 1987 Corps of Engineers Wetlands Delineation Manual. Features delineated included a desert saltgrass dominated wetland bordering the seasonally dry Honey Lake, several riparian areas, a seep, and numerous salt-encrusted playas (seasonally inundated depressions). Assisted Depot staff in obtaining a Jurisdictional Determination from Sacramento District of U.S. Army Corps of Engineers. Subsequently developed a publication in a peer-reviewed journal based on this work.

Environmental Scientist; Basewide Environmental Baseline Survey (EBS) of Naval Ordnance Station Louisville; Southern Division, Naval Facilities Engineering Command; September 1995 to May 1996. Served as one of eight professionals who reviewed records, conducted interviews, and visually inspected real property to prepare an EBS following methodology in ASTM D 6008. The EBS addressed over 100 industrial and administrative buildings on an intensively developed 144-acre site. The EBS was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h), as amended by the Community Environmental Response Facilitation Act (CERFA).

Ecologist; Marine Mammal Incidental Take Permit Application for Rocket Launches at Vandenberg AFB; Air Force Center for Environmental Excellence; June 1995 to September 1995. Contributed to permit application for "incidental take" of marine mammals due to noise impacts from rocket launching activities. The trajectories of launches from Vandenberg AFB sometimes pass over offshore islands that provide habitat for large numbers of marine mammals. "Incidental take" referred to indirect impacts to the populations from noise, not to direct efforts to kill or remove individual specimens.

Task Leader; Burton Mesa Chaparral (BMC) Restoration Plan; Air Force Center for Environmental Excellence; Lompoc, California; May 1995 to January 1996. Developed a conceptual plan for restoring rare chaparral vegetation to compensate for losses due to expansion

of military family housing. BMC harbors several rare, threatened, and endangered species. Analyzed preliminary plans for the military housing project and recommended adjustments to the construction footprint that reduced impacts to BMC by several acres. Researched the scientific literature to assess the potential for success for planting BMC plant species in areas of disturbed annual grassland. Developed a conceptual plan and planting specifications for restoring over 40 acres of BMC.

Task Manager; Basewide Environmental Baseline Survey (EBS) of Naval Weapons Industrial Reserve Plant (NWIRP) Calverton; Northern Division, Naval Facilities Engineering Command; Calverton, New York; March 1995 to January 1997. Coordinated preparation of an EBS following methodology in ASTM E 1527, which includes a review of public records, interviews with site and agency representatives, and visual site inspection. The EBS addressed over 80 industrial and administrative buildings and over 6,000 acres of mostly wooded lands. It was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h), as amended by the Community Environmental Response Facilitation Act (CERFA). As Task Manager, planned and coordinated field work by a six-person team and served as primary author of draft and final reports.

Wetland Scientist; Land Use and Land Cover Mapping for Suwannee River Water Management District; subcontract to WOOLPERT; Live Oak, Florida; February 1995 to October 1996. Served as the lead wetland scientist and technical reviewer on a team responsible for mapping land cover and land uses throughout more than 7,000 square miles in northern Florida. The project involved delineating and classifying residential, commercial, industrial, agricultural, and natural vegetation land uses and land cover using 1:40,000-scale color infrared aerial photography. Led the completion of a pilot area to identify usable photosignatures and refine project procedures. Assisted in administering a training program for a team of 8 photointerpreters tasked with completing the project. Served as one of two senior technical reviewers for the project.

Ecologist; Ecological Risk Assessment (ERA) for Charleston Air Force Base; Air Force Center for Environmental Excellence; Charleston, South Carolina; February 1995 to January 1997. Characterized ecological resources at two dumping sites near the base's airfield designated as Solid Waste Management Units (SWMUs) 74 and 144. Visited both sites to inspect for threatened and endangered species, develop a list of ecological receptors, and identify wetland boundaries. Wrote screening-level ERA. Submitted consultation letters to natural resource trustees and designed a mitigation plan for restoring wetland soils and vegetation after excavation of partially buried drums and other debris.

Wetlands Scientist and Ecologist; Remedial Design for Dump Site, Marine Corps Air Station Cherry Point; Northern Division, Naval Facilities Engineering Command; Cherry Point, North Carolina; February 1995 to June 1995. Delineated existing wetlands and designed a wetland mitigation plan for restoring a roughly 10-acre dump site following cleanup. The site bordered a tidal tributary to the Neuse River. The mitigation design emphasized restoration of zoned natural vegetation including bald cypress swamp, mixed wetland hardwood swamp, Atlantic white cedar swamp, and a pine flatwood buffer. Prepared plans and specifications for the wetland restoration.

Wetlands Scientist and Ecologist; Remedial Design for Site 4 Landfill, Marine Corps Combat Development Command at Quantico; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; Quantico, Virginia; November 1994 to August 1995. Mr. Doub delineated existing wetlands and designed a wetland mitigation plan for remediation of an abandoned landfill bordering a tidal reach of the Potomac River. Wrote wetland delineation report and prepared a Joint Permit Application to the U.S. Army Corps of Engineers. Prepared plans and specifications for restoring over an acre of tidal wetlands as part of the remedy. Inspected the completed wetland in September of 2002 as part of Tetra Tech's 5-year review of the remedy and noted that the wetlands had developed in general accordance with the design. Inspected the wetlands again in November of 2003 to inspect for possible damage from a hurricane and noted that the wetlands had successfully weathered several feet of temporary inundation from a tidal storm surge.

Ecologist and Wetland Scientist; EAs for Military Construction Projects on Vandenberg AFB; Air Force Center for Environmental Excellence; Lompoc, California; September 1994 to January 1996. Prepared sections addressing wetlands and vegetation for eight EAs for minor construction projects. The projects included several road upgrades, pipeline replacements, a combat training facility, a consolidated firehouse, and reconstruction of military family housing. Inspected and characterized vegetation on each project site, mapped the locations of rare or endangered plants, and delineated wetlands and other waters of the United States.

Ecologist and Wetlands Scientist; Remedial Investigation and Feasibility Study (RI/FS) for Melville North Landfill; Northern Division, Naval Facilities Engineering Command; Newport, Rhode Island; September 1994 to January 1995. Delineated tidal and nontidal wetlands at abandoned landfill on Narragansett Bay. Mapped and characterized wetland and upland vegetation and completed functional assessment of wetlands using the WET 2.0 computer model.

Environmental Scientist; Environmental Assessment (EA); Riverbank Stabilization at Landfill, Philadelphia Naval Shipyard; Northern Division, Naval Facilities Engineering Command; Philadelphia, Pennsylvania; April 1994 to September 1994. Served as project ecologist for an EA outlining potential environmental impacts from alternative practices for stabilizing an eroding riverbank at a landfill site on a tidal reach of the Schuylkill River. Practices considered included use of rock armor, gabions, a concrete retaining wall, metal sheet piles, and vegetative stabilization. Key issues were protection of tidal mudflats and nearby habitat used by the (then) Federally-listed peregrine falcon (*Falco peregrinus*). Visited the site, characterized habitats and species present, reviewed key records, and contributed related sections to the EA. The Navy ultimately issued the EA as an "Environmental Permits Report".

Project Manager; Wetland Delineation and Forest Inventory of National Security Agency Campus; National Security Agency; Fort George G. Meade, Maryland; March 1994 to December 1995. Flagged the boundaries of 37 wetland occurrences on the 660-acre campus; coordinated a land survey of the wetland boundaries; and coordinated the establishment of an electronic database depicting regulated wetlands on the campus. The wetlands included several forested wetlands bordering streams and a series of forested hillside seeps. For the forest inventory, collected data from over 200 representative tenth-acre quadrats, one per acre of forest

cover on the site. Wrote the forest inventory report in the form of a comprehensive baseline inventory of flora and fauna on the site. Developed vegetation management recommendations for the campus.

Environmental Scientist; Environmental Assessment (EA) for Ship Scrapping Operations; U.S. Department of Transportation, Maritime Administration; Various International Locations; January 1994 to September 1994. The EA addressed potential environmental impacts from moving mothballed ships in Fort Eustis, Virginia; Port Arthur, Texas; and Suisan Bay, California to scrapping operations in Mexico, India, and China. Wrote sections assessing potential impacts to biological and water resources. The EA was written on the basis of literature research and interviews only; the scope of work did not involve visiting the affected sites.

Environmental Scientist; Basewide Environmental Baseline Survey (EBS) of Williams Air Force Base; Air Force Center for Environmental Excellence; Mesa, Arizona; July 1993 to November 1993. Served on a team of six environmental professionals preparing a basewide EBS using methodology in ASTM E 1527 (the more directly relevant ASTM D 6008 for EBSs had not yet been published). The EBS addressed over 100 industrial and administrative buildings on the 4042-acre base. Collected and reviewed environmental records, interviewed base employees, and conducted visual site inspections of buildings and land areas on the base. The EBS was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h), as amended by the Community Environmental Response Facilitation Act (CERFA).

Environmental Scientist; Environmental Impact Statement (EIS) for Waste Management Facilities at Oak Ridge Reservation; U.S. Department of Energy (DOE); Oak Ridge, Tennessee; March 1993 to January 1994. Authored land use sections of EIS addressing alternative practices and locations for the disposal and management of low-level radioactive waste. Reviewed proposed action and alternatives for consistency with land use plans and policies developed by DOE and the City of Oak Ridge. Inspected visited multiple sites on the reservation to map and characterize wetlands to support biological analyses in the EIS.

Ecologist; Supplemental Environmental Impact Statement (EIS) for Indiana Harbor and Canal Maintenance Dredging and Disposal Activities; U.S. Environmental Protection Agency, Region 5; Chicago, Illinois; January 1993 to May 1993. Authored biological resources sections of a Supplemental EIS addressing maintenance dredging operations in a navigable canal near Lake Michigan. The key potential for biological impacts involved resuspension of contaminated sediments in aquatic habitats.

Deputy Project Manager; Sitewide Environmental Assessment (EA) for Continued Development of Naval Petroleum Reserve No. 3; Fluor-Daniel, Inc.; Casper, Wyoming; December 1992 to March 1993. Led preparation of an EA addressing alternatives for continued oil extraction activities on a 9,000-acre site jointly administered by the U.S. Navy and U.S. Department of Energy. Authored sections dealing with wetlands and floodplains, vegetation, soils, and water resources. Directed authors of other sections. The EA was included as one of three sample EA reports presented as appendices in the textbook *Effective Environmental Assessments: How to Manage and Prepare NEPA EAs* by Charles H. Eccleston.

Environmental Scientist; Programmatic Environmental Impact Statement (EIS) for Ballistic Missile Defense Program; Ballistic Missile Defense Organization (BMDO); November 1992 to June 1994. Authored water resources sections of an EIS addressing alternatives for establishing a national missile defense program. As a programmatic EIS, the EIS focused primarily on general issues and controversies associated with establishment of the program. It was intended to serve as a basis for future tiered NEPA documentation for specific actions under the program. Also served as Environmental Consequences Chapter Lead. Authored an introduction to the chapter and assembled input from team of 14 separate technical authors.

Task Manager; Delineation of Wetlands at Runoff Basin, Palo Verde Nuclear Generating Station; Arizona Public Service Company; May 1992 to August 1992. Delineated and characterized wetlands that had formed in a runoff basin resulting from surface runoff from the power plant. Completed wetland delineation data sheets and wrote wetland delineation report.

Deputy Project Manager; Environmental Assessment (EA) for Hartwell Power Plant Complex; Transco, Inc.; Lake Hartwell, Georgia; May 1992 to October 1992. Managed a team tasked to prepare an EA for a Federal water allocation and land easement for a proposed power plant project on a reservoir on the Savannah River in northern Georgia. The EA was funded by the private developer of the power plant project, but the EA was prepared for publication by the Savannah District of the Corps of Engineers. Served as the wetland specialist and terrestrial ecologist on the team and supervised other team members including a hydrologist, aquatic ecologist, soil scientist, archaeologist, planner, architect, and engineer. Served as the primary author of the EA. Performed a wetland delineation of the 215-acre site and obtained a Section 404 permit for construction impacts to wetlands.

Wetland Scientist; Remedial Investigation/Feasibility Study for Kearsarge Metallurgical Site; U.S. Environmental Protection Agency, Region 1; South Conway, New Hampshire; May 1992 to October 1992. Delineated wetlands and inventoried vegetation on a 10-acre site in central New Hampshire that had been contaminated by an abandoned metallurgical facility. Modeled wetland values and functions using the Wetland Evaluation Technique (WET 2.0).

Ecologist and Wetland Scientist; Environmental Assessment (EA) for Astrotech Payload Processing Facility on Vandenberg AFB; Astrotech Space Operations Limited Partnership; Lompoc, California; March 1992 to December 1992. Served as the wetlands and vegetation lead on an EA for construction of a privately funded facility on federal property on Vandenberg AFB. Reviewed alternative sites on and off the base to assist in siting facility to avoid or minimize impacts to wetlands, vernal pools, and other sensitive natural resources. Delineated two vernal pools on the selected site and assisted in positioning the footprint of the facility to avoid encroachment and minimize runoff into the vernal pools. Wrote EA sections on wetlands and biological resources.

Project Manager; Wetland Delineation of Transmission Line for Beaver Falls Cogeneration Plant; Commonwealth Associates, Inc.; March 1992 to January 1993. Under subcontract to Commonwealth Associates, Inc., performed a wetland delineation for a 7.3-

mile right-of-way for a 115 kV electric transmission line. Wrote wetland delineation report. Suggested routing adjustments to reduce wetland impacts. The right-of-way was mostly forested.

Ecologist; Ecological Risk Assessment (ERA) for Storage Yard 2, Annapolis Naval Station; Engineering Field Activity Chesapeake, Naval Facilities Engineering Command; Annapolis, Maryland; March 1992 to January 1993. Delineated tidal and nontidal wetlands and mapped forest stands on a roughly 75-acre site on the Severn River. Collected sediment samples to characterize benthic macroinvertebrate populations.

Ecologist; Environmental Assessment (EA) for Consolidation of Nonnuclear Manufacturing Operations; U.S. Department of Energy; January 1992 to April 1993. Wrote sections on biological resources, threatened and endangered species, and wetlands for an EA addressing the proposed consolidation of non-nuclear manufacturing activities within the U.S. nuclear weapons complex. The EA addressed alternatives for consolidating activities at the Kansas City Plant, the Mound Plant in Ohio, the Pinellas Plant in Florida, the Rocky Flats Plant in Colorado, the Savannah River Site in South Carolina, the Oak Ridge Reservation in Tennessee; the Pantex Plant in Texas; and the Los Alamos National Laboratory in New Mexico.

Ecologist and Wetlands Scientist; Environmental Impact Statements (EISs) for Disposal and Reuse of Williams and Lowry Air Force Bases; Air Force Center for Environmental Excellence; Mesa, Arizona and Denver, Colorado; December 1991 to June 1993. Mapped vegetative cover, performed rare plant survey, and completed delineation of wetlands (and other waters of the United States) for each base and wrote EIS sections addressing vegetation and wetlands in the EISs. Obtained wetland Jurisdictional Determinations for each base.

Task Leader; Environmental Permitting for AES Warrior Run Electric Transmission Line; AES Warrior Run, Inc.; Cumberland, Maryland and Cispark, West Virginia; September 1991 to June 1992 and December 1997 to January 1998. Prepared applications for environmental permits required for 6-mile, 230 kV electric transmission line connecting proposed 180 MW power plant to the Allegheny Power grid. Assisted the client in selecting a route that would minimize environmental impacts and facilitate permit acquisition. Performed wetland delineation of the selected route. Completed applications and environmental analyses for Public Service Commission approval, a Joint Permit Application for wetlands impacts and a Potomac River crossing, and applications for local approvals (1991-1992). Performed tree inventory of the proposed right-of-way where it traversed Cispark, West Virginia to comply with municipal ordinance. Designed tree screen for where the transmission line would cross a public road in Cispark (1997-1998).

Wetland Scientist; Appraisal of Wetland Protection on Savannah River Site (SRS); U.S. Department of Energy; Aiken, South Carolina; June 1991 to September 1991. Served on a six-member panel of experts evaluating wetland protection policies and procedures on a nuclear weapons site encompassing over 300 square miles. The panel interviewed selected contractors responsible for construction activities on the SRS. Co-authored report documenting the panel's findings, observations, and recommendations.

Wetland Scientist; Wetland Delineation of Saco Tannery Waste Pit Site; U.S. Environmental Protection Agency, Region 1; Saco, Maine; May 1991 to April 1992. Delineated wetlands and described plant communities on a 200-acre forested site in southeastern Maine containing a series of abandoned waste pits that had been contaminated with chromium and other metals from a past tanning operation. Contributed to planting plan for establishing 2 acres of forested wetlands to offset wetlands unavoidably lost during the remediation of the site.

Environmental and Wetland Scientist; Site Evaluation Study for Proposed Cogeneration Facility; Duke Energy Corporation; Kent County, Delaware; May 1991 to March 1992. Contributed to a site selection study for a proposed power plant in coastal Delaware. Researched permitting requirements. Performed wetland delineation of the selected site and obtained a Jurisdictional Determination from the U.S. Army Corps of Engineers. Assisted in performing a drain field analysis of the selected site.

Task Leader; Wetland Mitigation Plan for AES Warrior Run Cogeneration Plant; AES Warrior Run, Inc.; Cumberland, Maryland; February 1991 to January 1993. Designed wetland mitigation plan for constructing approximately 4.1 acres of palustrine emergent and palustrine forested wetlands on the site of a proposed 180-MW power plant on a floodplain terrace of the North Branch Potomac River. The plan outlined efforts to avoid, minimize, and compensate for wetland impacts. Developed plans and specifications. Assisted the client in obtaining approval of the wetland mitigation plan from the Baltimore District of the Corps of Engineers and Maryland Department of the Environment. Assisted the client in selecting a landscape contractor to construct and plant the wetlands. Inspected the finished wetlands in 1996 and 1997 and determined that they were developing in general accordance with the design.

Wetlands Task Leader; Environmental Permitting for AES Warrior Run Cogeneration Plant; AES Warrior Run, Inc.; Cumberland, Maryland; November 1990 to May 1992. Completed applications for permits related to wetlands, floodplains, and biological resources for proposed 180-MW power plant in western Maryland. Delineated wetlands on proposed 65-acre power plant site and proposed water discharge pipeline right-of-way. Applied for and obtained individual Section 10/404 permit for 1.8 acres of wetland impacts and reconfiguration of a discharge structure in the channel of the North Branch Potomac River. Inspected river floodplain area for white trout lily (*Erythronium albidum*), a rare plant species in Maryland (to assess potential impacts to rare, threatened, and endangered species).

Deputy Project Manager; Environmental Assessment (EA) for Commonwealth Cogeneration Plant; Commonwealth Cogeneration Limited Partnership; Hurt, Virginia; April 1990 to May 1991. Led the writing of an EA for construction of a 130-MW power plant on the Roanoke River in southcentral Virginia. Served as the wetland specialist and terrestrial ecologist on the EA team and coordinated work by other team members including a hydrologist, aquatic ecologist, soil scientist, archaeologist, planner, architect, and engineer. Served as the primary author of EA. Performed wetland delineation of the proposed 160-acre power plant site and a proposed 2-mile pipeline right-of-way and obtained Jurisdictional Determination from the U.S. Army Corps of Engineers. Inspected the site for the presence of *Nestronia umbellata*, a rare plant known to occur in close proximity (to assess impacts to rare, threatened, and endangered species). Coordinated a subcontractor performing a Phase I

archaeological survey of the power plant site and Phase II deep trenching where pipeline right-of-way crossed the Roanoke River floodplain.

Wetlands Task Leader; Environmental Permitting for AES Cohansey Cogeneration Plant; AES Cohansey, Inc.; Bridgeton, New Jersey; March 1990 to April 1992. Completed applications for permits related to wetlands, floodplains, and biological resources for the proposed site for a 300-MW power plant and an associated 230 kV transmission line. Delineated wetlands on 100-acre power plant site and 10-mile transmission line right-of-way. Applied to the New Jersey Department of Environmental Protection and Energy (NJDEPE) for a Transition Area Waiver and Statewide General Freshwater Wetlands Permit. Inventoried existing trees and standing timber on the site and transmission line right-of-way to assist AES in complying with the City of Bridgeton tree ordinance. Designed a reforestation plan for the site using indigenous tree and shrub species to compensate for tree losses during construction of the power plant. Inspected the site for the presence of the rare plant Swamp Pink (*Helonius bullata*). The project was ultimately tabled by the client for reasons not related to environmental planning.

Deputy Project Manager; Environmental Assessment (EA) for Mecklenburg Cogeneration Plant; Mecklenburg Cogeneration Limited Partnership; Clarksville, Virginia; January 1990 to December 1991. Led the writing of an EA for a Federal water allocation and land easement for a proposed power plant project on a reservoir on the Roanoke River in southcentral Virginia. The work was funded by a limited partnership of private developers who were building the project, but the EA was written for publication by the Wilmington District of the Corps of Engineers. Served as the wetland specialist and terrestrial ecologist on the team. Directed a project team comprising a hydrologist, aquatic ecologist, soil scientist, archaeologist, planner, architect, and engineer. Mr. Doub served as the primary author of EA. Completed a wetland delineation of the proposed 65-acre power plant site and 1.5-mile pipeline right-of-way in support of the EA.

Wetlands Task Leader; Wetland Delineation of Proposed Amoco Cogeneration Plant; Amoco, Inc.; Yorktown, Virginia; December 1989 to January 1990. Conducted wetland delineation of a 30-acre forested site in tidewater Virginia proposed for a power plant project. The project was subsequently cancelled due to non-environmental factors.

Wetlands Task Leader; Environmental Permitting for Proposed Meade Paper Cogeneration Plant; O'Brien Energy, Inc.; South Lee, Massachusetts; January 1990 to July 1990. Prepared applications for permits related to wetlands, floodplains, and biological resources for a proposed 60-MW power plant in Berkshire County, Massachusetts. Contributed to selection of routes for a 1-mile steam line and 1.5-mile, 69 kV transmission line that minimized environmental impacts and permitting difficulties. Wrote sections of an Environmental Impact Report (EIR) addressing biological resources and wetlands impacted by the power plant project. Presented wetland impacts to the Town of Lee Conservation Committee.

Wetland Scientist; Wetland Assessment of Nyanza Dye Works Site; U.S. Environmental Protection Agency, Region 1; Framingham, Massachusetts; October 1989 to January 1990. Visited, and described the physical and biological characteristics of, each wetland occurring on a 10-mile reach of the Sudbury River downstream of an abandoned dye works in the western

suburbs of Boston. Sediments in the river were suspected of being affected by heavy metals and other contaminants originating at the dye works. Wrote qualitative functional assessment.

Environmental Scientist; Siting/Permitting Assessment for New Jersey Cogeneration Projects; Fluor-Daniel, Inc.; Various Locations in New Jersey; August 1989 to December 1989. Participated in site selection study for proposed power plant projects in New Jersey. The study analyzed permitting problems associated with four sites in various parts of the state. Interacted with regulators from the New Jersey Department of Environmental Protection and Energy (NJDEPE) and U.S. Army Corps of Engineers.

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