

DEFINING ENVIRONMENTAL TECHNOLOGY



Advanced Technology
**Environmental and
Energy Center**

DEFINING ENVIRONMENTAL TECHNOLOGY

A REPORT OF THE DEFINING ENVIRONMENTAL TECHNOLOGY FORUM
MARCH 26 AND 27, 2014

Acknowledgments

The Advanced Technology Environmental and Energy Center (ATEEC) would like to acknowledge and thank the environmental technology professionals who generously shared their time and expertise in defining the environmental technology career field. Their professional insights are critical to developing environmental education and training programs that clarify occupations and meet workforce needs. The forum participants are listed at the end of this report.

© 2014 ATEEC



TABLE OF CONTENTS

Introduction.....	2
The Issues	2
A Next Step.....	3
The Forum.....	5
The Results	7
Defining the Water Management Field—Occupational Chart	8
Occupational Categories, Titles, and Functions	10
Air Quality.....	11
Emergency Preparedness and Response.....	12
Energy Technologies and Services.....	14
Environmental Information Collection and Analysis.....	15
Environmental Laboratory Services.....	16
Environmental Site Management.....	17
Natural Resources Management	18
Safety and Health.....	20
Solid and Hazardous Waste Management	22
Sustainability.....	24
Wastewater Management.....	25
Water Supply and Treatment.....	27
Watershed Management.....	29
Cross-Cutting Knowledge and Skills.....	30
Emerging Areas and Future Trends.....	31
Community College Responsibilities	32
Fastest-Growing Jobs in the Environmental Technology Field	33
Acknowledgments	34
Forum Participants.....	34
Forum Coordination and Report Production.....	36

THIS PROJECT WAS SUPPORTED, IN PART, BY
THE ADVANCED TECHNOLOGICAL EDUCATION
PROGRAM AT THE NATIONAL SCIENCE
FOUNDATION UNDER GRANT NO. DUE-1204958.
THE OPINIONS EXPRESSED IN THIS REPORT ARE
THOSE OF THE FORUM PARTICIPANTS AND DO
NOT NECESSARILY REPRESENT NSF POLICY.

**Additional copies of this
report can be
downloaded at ATEEC's
website:
www.ateec.org.**



INTRODUCTION

THE ISSUES

The field of environmental technology affects nearly every facet of our lives, from the utilities we use to the air we breathe. Environmental technicians manage our natural resources, provide our water and electricity, process our waste, and protect our habitat.

These technologies change every day, and every new technology leaves an environmental footprint. As natural resources become more and more scarce, the development of green technologies becomes more and more important. The Bureau of Labor Statistics (BLS) reports an increasing need for environmental workers at the technician level. Citing growing public awareness and concern for environmental health, as well as demands on the environment by population growth, the BLS projects a 19 percent increase in the number of environmental technician jobs by 2022.

Environmental technology is thus a field that is both expanding and changing. Workers need education and training to enter the field, and will also most likely need consistent retraining to keep pace with the rapid changes they will encounter. Colleges training tomorrow's workforce need specific, relevant data defining the environmental technology field in order to establish effective curricula.

A NEXT STEP

On March 26th and 27th in 2014, the Advanced Technology Environmental and Energy Center (ATEEC) conducted a national forum for defining the environmental technology field. The forum goal was to validate and update occupational information from ATEEC's 2008 report titled "Defining Environmental Technology." The environmental technology industry has continually evolved since the original "Defining Environmental Technology" report in 1996 and the updates in 2001 and 2008. The advent of new technology, the increase in national and regional regulatory compliance requirements, and the changing demands of industry call for a realignment of academia, industry, business, and government. New environmental technology career categories are emerging, and skill sets traditionally associated with environmental technology are cutting across many industries.

The 2014 forum's main objectives included validating, revising, and/or updating the following:

- Title and definition of the field of environmental technology,
- Definition of technician,
- Environmental technology occupational categories,
- Technician-level occupational titles, and
- Job functions typically performed in each occupation.

INTRODUCTION (cont)

ATEEC collaborated with the Partnership for Environmental Technology Education (PETE) to select participants for the forum. ATEEC invited experienced practitioners and educators in environmental technology with a broad perspective of the various occupational areas included in this field. The participants who attended the forum included business, industry, and government agency representatives, as well as two- and four-year college environmental technology educators. ATEEC attempted to gather as broad a regional representation of the country as possible, a variety of environmental technology areas, and industries that would employ environmental technicians.

The audience for the 2014 Defining Environmental Technology report includes:

- Counselors, faculty, and administrators of academic institutions at all levels but particularly in two-year colleges and high schools;
- Technicians and employers of technicians (e.g., companies, government agencies);
- Leaders of professional societies; and
- Federal, state, and local government officials responsible for the quality and quantity of the nation's technical workforce.

A primary purpose of this report is to enhance counselor, teacher, and student awareness of environmental careers at the technician level. Ultimately, the report should contribute to addressing the workforce development needs of business, industry, and government by providing educators with information needed to develop relevant curriculum that prepares students for environmental technology careers.

The report is also being used to provide direction for ATEEC, a Center of Excellence partially funded through a grant from the National Science Foundation. The Center brings together institutions from across the nation to promote and assist environmental technology programs. ATEEC's core partners are the Partnership for Environmental Technology Education, the University of Northern Iowa, and the National Science Foundation.

THE FORUM

The 2014 Defining Forum participants reviewed the 2008 report, "Defining Environmental Technology," prior to the forum workshop and considered these questions:

- Does the "environmental technology" title and definition still accurately describe the field? If not, how would you revise it?
- What definition of "technician" accurately describes the position?
- How would you categorize occupations in the environmental technology field?
- What specific technician-level occupations are typically found in each occupational category?
- What technician-level job functions are typically performed in each occupational category?
- What are the knowledge and skills that cut across the different categories?
- What are the emerging employment trends in the environmental field?
- What is the role of community colleges in technician education and training?



The forum began on March 26th at the O'Hare Sheraton hotel in Chicago. Participants were welcomed and presented with information on ATEEC's mission and goals. The group then reviewed the agenda, objectives, and work processes for the forum.

The first action item was the participants' review of the 2008 "environmental technology" definition; minor revisions were made to that definition. Additionally, the participants decided to narrow the focus of the "technician" term to the more specific "environmental technician." It was noted that credentials (certifications or licenses) may be required for certain occupations.

INTRODUCTION (cont)

Next, the participants worked to validate or revise each of the environmental technology occupational categories listed in the 2008 report. Consensus was reached on the following occupational categories. The category of Sustainability, which had been identified in the 2008 report as an emerging category that was not yet fully defined, has since been established as a standard occupational category.

- Air Quality
- Emergency Preparedness and Response
- Energy Technologies and Services
- Environmental Information Collection and Analysis
- Environmental Laboratory Services
- Environmental Site Management
- Natural Resources Management
- Safety and Health
- Solid and Hazardous Waste Management
- Sustainability
- Wastewater Management
- Water Supply and Treatment
- Watershed Management



The participants then began working in small groups, where they felt their specific expertise would be of most value. The majority of the small-group work was spent in creating, validating, updating, and refining technician-level job titles and broad job functions. Again, the 2008 report was used as a basis for validation. The groups then shared their results and reached a large-group consensus in those areas.

Additionally, during the large-group discussion, the participants identified “cross-cutting” areas—functional areas that cut across most environmental technology occupational categories. For example, many environmental technology jobs require a background in geospatial sciences, so that technicians can collect, manage, and integrate spatial and attribute data using geographic information systems (GIS).

Following the forum in Chicago, participants went online to spend further time in reviewing and revising the materials they had developed. Additional experts in the field were then invited to review and comment on the initial documentation from the forum, resulting in a validation and consensus of expert opinions.

THE RESULTS

The next section of this document contains the occupational chart for “Defining Environmental Technology,” providing a valuable snapshot of the field. Included on the chart are the environmental technology definition and technician definition, as well as representative technician-level job titles for each of the occupational categories. Following the chart are more detailed listings of many of the occupational areas and general job functions within each. The last section of the report presents the identified cross-cutting areas, emerging trends, community college responsibilities, and the fastest-growing jobs in the environmental technology field.

As previously stated, as an initial step, this report intentionally reflects mainly business and industry input. Educational or training institutions will take this base data and other types of research (e.g., labor market assessments, institutional research) and expand upon them to make decisions about their individual curricula. After using this report to identify the desired occupations in the new/revised Environmental Technology program, the next logical step is to hold a specific occupational analysis. This most often takes the form of a DACUM (Developing A CURriculum) or Job Task Analysis (JTA) workshop. An occupational analysis workshop is a quick, effective, relatively low-cost method to develop competency- and performance-based, learner-centered curriculum and instructional materials. Led by a trained facilitator, experts in an occupation in business & industry come together in a two-day workshop to provide input on the specific tasks, equipment, knowledge, skills, and abilities required to perform the targeted job. During the workshop, the experts develop these lists and a chart as a graphical representation of their input.

The process continues by using the tasks identified in the workshop to create learning or performance objectives. The objectives are the keystone of a learning framework upon which to base the design, development, or modification of the curriculum for an educational or training program.



Advanced Technology

**Environmental and
Energy Center**

DEFINING ENVIRONMENTAL



Emergency Preparedness & Response

- Emergency Planning Specialist (All Hazards)
- Emergency Preparedness & Response Trainer
- First Responder (Police/Fire/EMS/Security)
- Hazardous Materials Tech
- Hazardous Materials Trainer
- Homeland Security Specialist

Air Quality

- Air Process Tech
- Air Quality Tech
- Ambient Air Monitoring Tech
- Geospatial Tech
- Greenhouse Gas Emissions Specialist
- Indoor Air Quality Tech
- Instrumentation Tech
- Mobile Monitoring Tech (Vehicle Emissions)
- Source Sampling Tech

Energy Technologies & Services*

- Buying & Selling Energy Tech
- Energy Assessment Tech
- Energy Efficient Building Construction, Project Engineering, & Implementation Tech
- Exploration & Extraction Tech
- Generation & Utility-Scale Construction Tech
- Regulatory Compliance Tech
- Transmission & Distribution Tech
- Transportation (Mobile) Services Tech

Environmental Information Collection & Analysis

- Environmental Education & Outreach Tech
- Environmental Database Tech
- Environmental Compliance Tech
- Geospatial (GIS, GPS, RS) Tech
- Logistics Tech

Environmental Laboratory Services

- Biofuels Tech
- Biological/ Microbiological Lab Tech/Analyst
- Chemist/Analytical Lab Tech
- Instrumentation Tech
- Quality Assurance/ Quality Control (QA/QC) Specialist
- Sample Collection & Preparation Tech
- Soil/Geotechnical Properties Tech/ Analyst

Environmental Site Management

- Asbestos Tech (Inspector, Abatement Worker, Supervisor)
- Compliance Tech
- Environmental Site Assessor
- Field Services Tech (e.g., Sampling, Monitoring)
- Geology Tech
- Geospatial Tech
- Hazardous Materials Tech
- Land Survey Tech
- Land Use Planning/ Redevelopment Tech
- Lead Tech (Inspector, Abatement Worker, Supervisor)
- Mining Reclamation Tech
- Mold Remediation Tech
- Pollution Prevention Tech
- Remediation Tech
- Underground Storage Tank Tech

Natural Resource Management

- Aquatic/Marine Habitat Tech
- Botany Tech
- Coastal Zone Management
- Conservation
- Cultural Resource Management
- Fire Resource
- Fisheries Tech
- Forestry Tech
- Habitat Restoration Tech
- Geology Tech
- Geospatial
- Horticulture/Landscape
- Hydrogeology
- Irrigation Tech
- Naturalist
- Noise Monitoring Tech
- Parks & Recreation Tech
- Precision Agriculture Specialist
- Rangeland
- Regulatory Compliance Specialist
- Soil Conservation Tech
- Survey Tech
- Urban Ecology
- Vet Tech (e.g., Animal)
- Wetlands Management
- Wildlife/Trapping Habitat Tech



What is Environmental Technology?

Environmental Technology is a career field that applies the principles of math, science, technology, engineering, communication, economics, and law to ensure the health and safety of the worker and community, and protection of the environment. This career field encompasses the management and conservation of natural resources, regulatory compliance, and sustainability.

What is an Environmental Technician?

An environmental technician communicates and applies knowledge, skills, and abilities, and is qualified to perform scientific, technical, and regulatory tasks. Local, state, federal, and/or professional credentials (certifications or licenses) may be required for certain occupations.



ENVIRONMENTAL TECHNOLOGY

Resources

Marine Tech
Ch
ch
ne
ent Tech
on Officer
source
ent Tech
rces Tech
ech
ech
storation
ech
Tech
e/
Tech
ogy Tech
Tech
itoring Tech
creation

Safety & Health

- Chemical Hygiene Officer
- Compliance Officer
- Hazardous Materials Tech
- Health & Safety Tech
- Health Physics/Radiation Safety Tech
- Loss Control/Prevention Tech
- Industrial Hygiene Specialist (e.g., Indoor, Air, Noise)
- Industrial Nurse
- Risk Manager
- Safety & Health Auditor
- Safety & Health Coordinator
- Safety & Health Specialist
- Safety & Health Trainer/Industrial Trainer
- Site Safety & Health Manager

Solid & Hazardous Waste Management

- Biohazard Tech
- Hazardous Waste Tech
- Household Hazardous Waste Tech
- Landfill Tech
- Nuclear Waste Handling/Disposal Tech
- Recycling Tech
- Solid Waste Tech
- Treatment, Storage, & Disposal Facility Tech
- Waste Reduction Tech
- Waste-to-Energy Tech

Sustainability

- Climate Change Adaptation Specialist
- Climate Change Mitigation Analyst
- Ecological Footprint Analyst
- Efficient Landscaping Tech
- Energy Resource Mgr
- Global Equity Specialist
- Green Product Specialist
- LEED Tech
- Lifecycle Analysis/Product Stewardship Tech
- Permaculture Design Tech
- Smart Growth Tech
- Sustainability Coordinator
- Sustainability Educator/Trainer
- Sustainability Systems Analyst
- Sustainable Design Tech
- Sustainable Process & Procedures Manager
- Transportation & Logistics Specialist
- Urban Agriculture Tech

Wastewater Management**

- Biosolids Management Tech
- Cross-Connection Control Tech
- Decentralized Treatment System Operator
- Fats/Oils/Grease (FOG) Tech
- Graywater Systems Treatment Operator
- Industrial Pretreatment Coordinator
- Industrial Wastewater Treatment Operator
- Instrumentation Tech
- Laboratory Tech
- Land Application Tech
- Municipal Wastewater Treatment Operator
- Plant Maintenance Tech
- Regulatory Compliance Specialist
- Waste-to-Energy Tech
- Wastewater Collection System Operator

Water Supply & Treatment**

- Desalination Tech
- Drinking Water Lab Tech
- Industrial Water System Operator
- Instrumentation Tech
- Municipal Water Treatment Plant Operator
- Plant Maintenance Tech
- Public Educator
- Regulatory Compliance Specialist
- Source Water Protection Specialist
- Water Conservation Specialist
- Water Distribution System Operator
- Water Meter Tech
- Water Rights Tech
- Water Security & Emergency Preparedness Specialist
- Well Drilling Tech

Watershed Management**

- Equipment Maintenance Tech
- Erosion Sediment Control Tech
- Geospatial Tech
- Ground Water Remediation Systems Tech
- Habitat Restoration Tech
- Heavy Equipment Operator
- Hydrology Tech
- Interbasin Transfer Specialist
- Modeling Tech
- Nutrient Management Specialist
- Permitting Specialist
- Public Educator
- Stormwater Management Tech
- Taxonomy Specialist
- Water Quality Monitoring Tech
- Wetlands Delineation Tech





OCCUPATIONAL CATEGORIES, TITLES, AND FUNCTIONS

Important Note: All occupations must 1) adhere to all health and safety procedures (including selection and use of proper personal protective equipment) and 2) follow applicable standard operating procedures (SOPs).

- Collect and analyze indoor and outdoor air samples.
- Install, calibrate, operate, troubleshoot, decontaminate, repair, and maintain air sampling and monitoring equipment.
- Collect and assess meteorological information.
- Label, preserve, and store samples.
- Develop and follow Standard Operating Procedures (SOPs).
- Follow established quality control procedures.
- Follow chain-of-custody procedures for sample collection and handling.
- Select and use proper personal protective equipment and safety procedures.
- Generate, calculate, validate, and interpret air sampling and monitoring data.
- Maintain accurate records of air sampling, monitoring, repair, and calibration of equipment.
- Prepare reports of air sampling and monitoring activities for customers and/or regulatory agencies.
- Assist in air permit application preparation and compliance reporting.
- Apply appropriate local, state, and federal environmental regulations to specific projects.
- Evaluate and monitor health and safety conditions.
- Initiate emergency response actions.
- Calculate air emissions of facility or process.
- Conduct greenhouse gas emissions inventories, calculate carbon footprint, and implement measures to reduce emissions.
- Construct process flow diagrams.
- Input data to modeling programs.
- Conduct facility air emissions inventory.
- Investigate fugitive air emissions.
- Research air pollution prevention alternatives.
- Operate and maintain air pollution control devices.
- Determine efficiency of air pollution control devices.
- Initiate corrective action for operational malfunctions of air monitoring and/or pollution control equipment.
- Maintain inventory of supplies for air monitoring and/or pollution control equipment.

Occupational Titles

- Air Process Technician
 - Air Quality Technician
 - Ambient Air Monitoring Technician
 - Geospatial Technician
 - Greenhouse Gas Emissions Specialist
 - Indoor Air Quality Technician
 - Instrumentation Technician
 - Mobile Monitoring Technician (vehicle emissions)
 - Source Sampling Technician
- Properly dispose of wastes generated by air monitoring and/or air pollution control equipment.
 - Perform literature searches.
 - Assist in recommending/implementing practices to reduce or eliminate air pollutants.
 - Train employees in air sampling/monitoring techniques, and health and safety issues.
 - Develop and maintain customer/community relationships.
 - Maintain professional certifications.
 - Interpret indoor air quality assessments, determine possible resulting health impacts, and recommend mitigation options.

EMERGENCY PREPAREDNESS AND RESPONSE

Occupational Titles

- Emergency Planning Specialist (all hazards)
- Emergency Preparedness and Response Trainer
- First Responder (police/fire/EMS/security)
- Hazardous Materials Technician
- Hazardous Materials Trainer
- Homeland Security Specialist

- Respond to hazardous materials incidents and emergencies.
- Assess, contain, control, and clean up hazardous/regulated material spills and releases.
- Evacuate affected areas.
- Assess meteorological conditions.
- Use the “buddy” system.
- Select and use proper personal protective equipment.
- Maintain and inspect personal protective equipment.
- Install, calibrate, operate, troubleshoot, maintain, and repair sampling and monitoring equipment.
- Interpret monitoring data.
- Operate heavy equipment and tools.
- Assist in the set-up, use, and dismantling of decontamination facility.
- Assist in containerizing materials.
- Dispose of hazardous/regulated material spill wastes.
- Complete hazardous materials incident reports.
- Activate and/or perform assigned duties within the incident command system.
- Interact with regulatory authorities, other emergency response organizations, and the public.
- Recognize chemical and physical properties of hazardous materials.
- Recognize incompatible materials.

- Label, package, and transport hazardous materials.
- Develop and manage spatial and attribute database/map.
- Collect inventory data and track regulated materials.
- Submit reports to off-site personnel and regulatory agencies.
- Apply appropriate local, state, and federal environmental regulations to specific projects.
- Conduct facility inspections.
- Assess facility processes for potential vulnerability, and plan corrective measures.
- Develop emergency action plans.
- Train employees on emergency action plan contents and emergency response actions.
- Conduct emergency response drills.
- Serve as a member of an emergency response team.
- Maintain professional certifications.
- Maintain awareness of all hazards and threats (e.g., spills and releases, security breaches, fire, explosions, natural disasters, structural collapse, and workplace violence).
- Develop county all-hazard plans.
- Update existing training programs and materials to include applicable information on bioterrorism, terrorism, pandemic, weapons of mass destruction, personal safety/preparedness, etc.
- Develop interoperability of all agencies to prepare, plan, respond, and recover from all hazards.
- Develop and exercise crisis management, business continuity, and continuity of operations plans.
- Develop programs to address workplace violence threats including processes, procedures, and training.
- Conduct vulnerability analysis for workplace risk or hazards.

- Ensure plans are consistent with National Incident Management Framework.
- Plan for post-traumatic stress disorder assistance and counseling.
- Develop mutual aid agreements with appropriate agencies and vendors as needed to ensure multi-agency coordination.
- Develop and implement mass communication systems with appropriate agencies
- Use geospatial technologies as appropriate for emergency preparedness and response.
- Train/instruct others in the proper use of personal protective equipment.
- Safely store hazardous materials.
- Maintain documentation related to health and safety issues.
- Conduct Just-in-Time (JIT), site-specific training.
- Use online resources.
- Use effective communications in crisis environments.



ENERGY TECHNOLOGIES AND SERVICES*

Occupational Titles

- Buying and Selling Energy Technician
- Energy Assessment Technician
- Energy Efficient Building Construction, Project Engineering, and Implementation Technician
- Exploration and Extraction Technician
- Generation and Utility-Scale Construction Technician
- Regulatory Compliance Technician
- Transmission and Distribution Technician
- Transportation (mobile) Services Technician

***REFER TO ATEEC'S "DEFINING ENERGY TECHNOLOGIES AND SERVICES" REPORT FOR FURTHER BREAKDOWN OF OCCUPATIONS AND FUNCTIONS.**



ENVIRONMENTAL INFORMATION COLLECTION AND ANALYSIS

- Input data.
- Collect, compile, analyze, and archive environmental data and records.
- Record and manage laboratory data.
- Implement and review quality assurance/quality control practices and guidelines.
- Document and report best practices.
- Collect documentation and metadata (e.g., employee training, health and safety issues, job performance).
- Perform basic statistical analysis.
- Develop and maintain inventory tracking systems for environmental equipment and supplies, and regulated/hazardous materials.
- Update and transmit environmental information to customers and/or regulatory agencies.
- Identify most appropriate information management technologies.
- Use automated information management systems.
- Search Web sites, Internet directories, and literature for relevant environmental information.
- Maintain security and integrity of proprietary and/or public information resources.
- Collect, manage, use, and integrate spatial and attribute data using geographic information systems (GIS), remote sensing (RS) systems, and global positioning systems (GPS).
- Create and interpret hard copy and digital maps.
- Determine appropriate data, projections, and coordinate system.
- Perform imagery geo-referencing.
- Identify and apply basic educational principles to information management.
- Analyze and identify environmental impact.
- Analyze and identify pollution prevention, waste management, and remediation strategies.
- Use and maintain databases.
- Recognize appropriate environmental regulations for information management.

Occupational Titles

- Environmental Compliance Technician
- Environmental Database Technician
- Environmental Education and Outreach Technician
- Geospatial (GIS, RS, GPS) Technician
- Logistics Technician

ENVIRONMENTAL LABORATORY SERVICES

Occupational Titles

- Biofuels Technician
- Biological/Microbiological Lab Technician/Analyst
- Chemical/Analytical Lab Technician
- Instrumentation Technician
- Quality Assurance/Quality Control (QA/QC) Specialist
- Sample Collection and Preparation Technician
- Soil/Geotechnical Properties Technician/Analyst

- Collect air, water, wastewater, soil, sludge, or other samples for laboratory analysis.
- Receive laboratory samples and ship sampling containers to customers.
- Instruct customers in proper sampling, preservation, and shipping techniques.
- Label, preserve, store, and prepare samples for analysis.
- Install, calibrate, operate, troubleshoot, repair, and maintain laboratory equipment.
- Maintain maintenance records for laboratory equipment.
- Select and use proper laboratory glassware.
- Measure, weigh, composite, and dilute samples.
- Perform wet chemistry procedures.
- Titrate, extract, and digest samples.
- Prepare laboratory standards and solutions.
- Operate basic laboratory instrumentation (e.g., pH, conductivity, colorimetric, specific ion meters).
- Operate advanced laboratory instrumentation (e.g., spectrophotometer, gas chromatograph, high performance liquid chromatography, mass spectrometer).
- Operate microscope.
- Prepare microbiological media.
- Qualify and quantify organisms or contaminants.

- Operate laboratory fermenters, stills, and dryers.
- Wash, decontaminate, or sterilize laboratory equipment.
- Label and dispose of laboratory waste.
- Maintain inventory of laboratory supplies.
- Operate computers and software.
- Generate, calculate, validate, interpret, and record laboratory data.
- Document laboratory procedures and results.
- Follow established quality control procedures/SOPs.
- Follow chain-of-custody procedures for sample collection and handling.
- Prepare laboratory reports and compliance paperwork for customers and regulatory agencies.
- Apply local, state, and federal environmental regulations to specific projects.
- Testify in court proceedings.
- Develop and comply with chemical hygiene/safety plan.
- Perform literature searches.
- Implement laboratory HazMat plan.
- Develop and maintain customer relationships.
- Train other employees in laboratory procedures and techniques.
- Maintain laboratory technician/analyst certifications as appropriate.
- Select and use proper personal protective equipment for work environment.
- Identify and implement good laboratory practices.
- Maintain laboratory equipment calibration program.
- Maintain laboratory procedures to current approved standard methods and/or other regulatory approved methods.

ENVIRONMENTAL SITE MANAGEMENT

- Conduct abatement and remediation activities for soil, ground water, surface water, asbestos, and lead.
- Install, calibrate, operate, troubleshoot, repair, and maintain sampling and remediation equipment.
- Collect and analyze air, water, soil, and other media specific samples using field or mobile laboratory equipment.
- Label, preserve, store, and ship samples and hazardous materials.
- Assist in constructing site sampling plan; modify as necessary due to site conditions.
- Decontaminate sampling and remediation equipment.
- Handle investigative and remediation wastes properly.
- Restore site to pre-investigative conditions.
- Assess and document site hydrologic and geologic conditions, and human-made features.
- Confirm underground utility locations.
- Confirm underground hazards.
- Identify, respond to, and mitigate biological and environmental hazards.
- Drill boreholes for environmental investigation.
- Purge underground storage tanks of materials and vapors.
- Remove underground storage tanks using heavy equipment and power tools.
- Evaluate and monitor health and safety conditions.
- Assist in preparation of site health and safety plan.
- Select and use proper personal protective equipment.
- Assist in site exposure monitoring.
- Initiate emergency response actions.
- Apply appropriate geospatial technologies (e.g., GIS, GPS, RS).
- Survey property boundaries, features, and sampling locations using GPS or rod and transit.
- Construct and interpret blueprints/maps.
- Record site conditions, sampling protocol, and field notes.
- Photograph site conditions and activities.
- Prepare written reports of site conditions and activities.
- Identify physical and chemical properties of hazardous materials.
- Identify incompatible materials.
- Determine applicable local, state, and federal environmental regulations.
- Interact with contractors, property owners, site managers, regulatory agencies, and the public.

Occupational Titles

- Asbestos Technician (inspector, abatement worker, supervisor)
 - Compliance Technician
 - Environmental Site Assessor
 - Field Services Technician (e.g., sampling, monitoring)
 - Geology Technician
 - Geospatial Technician
 - Hazardous Materials Technician
 - Land Survey Technician
 - Land Use Planning/Redevelopment Technician
 - Lead Inspector
 - Lead Technician (inspector, abatement worker, supervisor)
 - Mining Reclamation Technician
 - Mold Remediation Technician
 - Pollution Prevention Technician
 - Remediation Technician
 - Underground Storage Tank Technician
-
- Research site history and investigate potential for environmental contamination.
 - Support redevelopment/land use activities.
 - Collect and apply environmental, economic, and social impact data related to redevelopment.
 - Develop and follow SOPs.
 - Follow established quality control procedures.
 - Follow chain-of-custody procedures for sample collection, handling, and maintaining records.
 - Train site workers in SOPs, and health and safety issues.
 - Maintain professional certifications.
 - Maintain chain-of-custody records for all samples.

NATURAL RESOURCES MANAGEMENT

Occupational Titles

- Aquatic/Marine Habitat Technician
- Botany Technician
- Coastal Zone Maintenance Technician
- Coastal Zone Management Technician
- Conservation Officer
- Cultural Resource Management Technician
- Fire Resources Technician
- Fisheries Technician
- Forestry Technician
- Habitat Restoration Technician
- Geology Technician
- Geospatial Technician
- Horticulture/Landscape Technician
- Hydrogeology Technician
- Irrigation Technician
- Naturalist
- Noise Monitoring Technician
- Parks and Recreation Technician
- Precision Agriculture Specialist
- Rangeland Technician
- Regulatory Compliance Specialist
- Soil Conservation Technician
- Survey Technician
- Urban Ecology Technician
- Vet Technician (e.g., animal rescue)
- Water Resources Technician
- Wetlands Management Technician
- Wildlife/Terrestrial Habitat Technician

- Inventory, evaluate, and assist in development of resource management strategies for areas with unique scenic, recreational, historical, cultural, geological, habitat, species, or other resource values.
- Assist in development of plans for the protection, maintenance, rehabilitation, or enhancement of natural resources.
- Assist in operational forestry.
- Assist in forest nursery programs.
- Inventory forest stands.
- Develop and implement prescribed burning plans.
- Carry out prescribed burning activities.
- Assist in development of fire management plans.
- Fight forest fires.
- Assist in laying out timber sales (e.g., marking trees to be logged).
- Compile, verify, and analyze timber appraisals.
- Cruise timber (i.e., measure height and circumference of trees).
- Scale (i.e., measure) and cut logs.
- Conduct and interpret surface and ground water inventories, studies, and watershed analyses.
- Assess and interpret water quality and quantity from streams and aquifers.
- Implement plans to improve aquatic habitats.
- Implement farm pond management techniques.
- Sample and identify organisms.
- Implement wetland restoration and construction activities.
- Operate boats, all-terrain vehicles, and heavy equipment.
- Perform fish population studies using seining, trawling, and electroshock equipment.
- Operate and maintain fish hatchery/aquaculture equipment.
- Practice techniques of aquaculture.
- Stock lakes and streams with fish.

- Participate in tag/release and tracking studies for fish and wildlife.
- Identify and participate in the introduction of rare/endangered species to an ecosystem.
- Implement urban wildlife management strategies.
- Rehabilitate injured wildlife for release.
- Trap and relocate wildlife.
- Calculate rates of sediment production.
- Determine soil and bedrock types and characteristics.
- Identify fossil and rock samples.
- Implement soil conservation practices.
- Implement erosion control strategies.
- Create geo-reference imagery.
- Collect, manage, and integrate spatial and attribute data using applicable geospatial technologies.
- Determine appropriate map projections and coordinate systems.
- Use aerial photography and RS techniques.
- Use geological maps and reports.
- Conduct land surveys.
- Assist in habitat restoration.
- Propagate and plant woody and non-woody plant species.
- Perform ecosystem sampling and monitoring.
- Install, calibrate, operate, maintain, troubleshoot, and repair equipment.
- Analyze and interpret sampling and monitoring data.
- Decontaminate sampling and monitoring equipment.
- Label, preserve, store, and ship samples.
- Follow chain-of-custody procedures for sample collection and handling.
- Follow established quality control procedures.
- Develop interpretive signs, exhibits, and programs.
- Perform park maintenance.
- Develop and deliver public information and environmental education programs.
- Participate in the assessment of environmental impact of proposed development projects.
- Apply appropriate local, state, and federal environmental regulations to specific projects.
- Enforce local, state, and federal natural resource regulations.
- Assist in making recommendations to federal, state, local, and private organizations.
- Assist in preparation of environmental documents.
- Select and use proper personal protective equipment.
- Compile field notes, maintain records, and write reports.
- Perform literature searches.
- Develop and follow SOPs.
- Inventory and assess critical natural resources.
- Assist in identification and delineation of wetlands based on plant/animal species, hydrology, and soils.
- Identify and control noxious weeds and other invasive species.
- Handle and apply pesticides and herbicides according to established protocols.
- Measure ground water levels and flow direction.
- Measure stream flow characteristics.

Occupational Titles

- Chemical Hygiene Officer
- Compliance Officer
- Hazardous Materials Technician
- Health and Safety Technician
- Health Physics/Radiation Safety Technician
- Loss Control/Prevention Technician
- Industrial Hygiene Specialist (e.g., indoor, air, noise)
- Industrial Nurse
- Risk Manager
- Safety and Health Auditor
- Safety and Health Coordinator
- Safety and Health Specialist
- Safety and Health Trainer/Industrial Trainer
- Site Safety and Health Manager

- Identify and evaluate workplace hazards, including unsafe acts and conditions.
- Implement control of workplace hazards through engineering practices, personal protective equipment, and policy changes.
- Develop and implement written plans (e.g., SOPs, sampling plans, safety and health plans, corrective action plans, lockout/tagout procedures, confined-space entry procedures).
- Conduct workplace air quality testing and monitoring for indoor air pollutants.
- Monitor noise levels in workplace.
- Monitor radiation levels in workplace.
- Assist in worker exposure monitoring (e.g., asbestos, lead, radiation, and toxic substances).
- Develop a working knowledge of industrial hygiene.

- Install, calibrate, operate, troubleshoot, repair, and maintain sampling and monitoring equipment.
- Interpret monitoring data.
- Maintain records and write reports for use internally or by regulatory authorities.
- Follow established quality control procedures.
- Follow chain-of-custody procedures for sample collection and handling.
- Select facility equipment and materials based on regulatory standards and health and safety concerns.
- Select proper personal protective equipment for workplace tasks.
- Maintain and inspect personal protective equipment.
- Conduct respirator fit testing.
- Assist in managing facility's medical monitoring program including maintaining HBV inoculations, spirometry, and audiometric testing.
- Instruct coworkers on environmental, safety, health, and ergonomic issues.
- Conduct and/or participate in safety meetings and on safety committee.
- Coordinate employee first aid/CPR and Automated External Defibrillator (AED) training.
- Serve as a member of facility emergency response team.
- Conduct workplace safety and health audits.
- Develop a working knowledge of facility's ventilation system.
- Determine which process materials and wastes are hazardous and investigate nonhazardous substitutions.
- Manage workplace hazardous materials and wastes, including shipping, receiving, labeling, storage, and disposal.
- Maintain chemical inventory and approve chemicals for use at facility.
- Implement facility's Hazard Communication program.

- Maintain and interpret Safety Data Sheets.
- Interact with regulatory authorities and public health and safety officials.
- Maintain facility compliance with safety and health standards.
- Develop a working knowledge of environmental management systems and certification programs.
- Assess and monitor ergonomic conditions in workplace.
- Implement ergonomics solutions in workplace.
- Investigate workplace incidents and accidents, and workers compensation claims.
- Track trend statistics for incidents and accidents.
- Champion and model safety practices through benchmarks.
- Maintain professional and AED certifications.
- Implement continuous process and improvement for health and safety based on new technology and research findings.
- Develop waste minimization plans, calculating return on investment.
- Integrate globally harmonized systems of classification and labeling of chemicals into hazard communication procedures.
- Develop emergency action plans and coordinate stocking of all emergency supplies.
- Maintain compliance with applicable state and federal health/safety regulations.
- Infuse health and safety training within the multi-cultural workforce.
- Manage biohazardous materials.
- Promote awareness of employee assistance programs for drug and alcohol support.
- Promote awareness of employee off-work injury and the impact to workplace productivity.
- Understand the National Incident Management System (NIMS).
- Ensure products, parts, and components are Restriction of Hazardous Substances (RoHS) compliant.
- Ensure recycled materials are Waste Electrical and Electronic Equipment (WEEE) compliant.
- Maintain OSHA log.
- Ensure regulatory notices (e.g., annual OSHA, worker compensation) are posted.
- File all regulatory reports, permits, and site licenses.
- Coordinate initial and refresher safety training including new employee orientation.
- Oversee (or manage) contractor safety program including confined space program.
- Maintain facility compliance with environmental programs (e.g., designated Underwater Storage Tank operator; Spill Prevention, Control, and Countermeasures (SPCC); stormwater and wastewater permits).
- Perform vulnerability or risk assessments.
- Assist in the development of a continuity of operations plan.
- Assist in the development of a workplace violence plan (may be part of the emergency action plan).
- Understand the National Incident Management System (NIMS).
- Submit workers compensation claims.
- Coordinate medical care/treatment for injured workers.
- Facilitate "light-duty" return-to-work programs.
- Interact with workers compensation insurers' loss control and claims representatives.
- Maintain fire systems (e.g., fire extinguishers, alarms, sprinklers) per applicable codes.
- Assist with development of job descriptions with specific physical and chemical hazards for each job, and list potentially unsafe acts, conditions, etc. as previously itemized.

SOLID AND HAZARDOUS WASTE MANAGEMENT

Occupational Titles

- Biohazard Technician
- Hazardous Waste Technician
- Household Hazardous Waste Technician
- Landfill Technician
- Nuclear Waste Handling/Disposal Technician
- Recycling Technician
- Solid Waste Technician
- Treatment, Storage, and Disposal Facility Technician
- Waste Reduction Technician
- Waste-to-Energy Technician

- Identify applicable or potentially applicable environmental permits related to air, water, recycling of materials, and management of waste.
- Promote recycling and re-use of materials from the receiving dock through the shipping center, including the employee lunch rooms and lounges.
- Act as liaison with Local Emergency Preparedness Commission (LEPC) personnel.
- Interact with regulatory authorities and public health and safety officials.
- Work with professional staff to determine life-cycle costs associated with equipment upgrades and process modifications to ensure costs associated with improved safety and health are factored on top of potential energy savings, reduced waste, reduced labor costs, and other potential cost savings.
- Train/inform others on the proper use of personal protective equipment.
- Identify, inventory, characterize, and sort solid and hazardous waste streams.
- Label, package, store, dispose of, and/or recycle facility wastes.

- Collect samples of waste streams, using SOPs.
- Conduct facility audits and evaluate facility processes and materials for waste minimization potential.
- Recommend and implement practices to reduce or eliminate pollutants and waste from facility processes.
- Conduct cost-benefit analyses.
- Train employees in pollution prevention strategies.
- Train employees in hazardous waste handling and management.
- Assist in development and implementation of environmental management system for facility.
- Coordinate material recycling/waste exchange program.
- Investigate alternative markets and reuse potentials for waste materials.
- Install, calibrate, operate, troubleshoot, repair, and maintain equipment and pollution control devices.
- Operate waste handling equipment including heavy equipment, balers, compactors, grinders, separation and conveyance systems, and incinerators.
- Initiate corrective action to remedy operational malfunctions.
- Collect samples from landfill leachate and/or gas recovery system.
- Label, preserve, store, and ship samples.
- Decontaminate sampling equipment.
- Characterize wastes as hazardous or nonhazardous.
- Prepare shipping manifests.
- Maintain records of waste storage, shipping, and disposal.
- Apply appropriate local, state, federal, and international regulations for transportation of solid and hazardous materials.

- Identify, respond to, and mitigate hazards related to temperature extremes.
- Identify, respond to, and mitigate biological and environmental hazards.
- Select and use proper personal protective equipment.
- Develop and follow SOPs.
- Follow established quality control procedures.
- Follow chain-of-custody procedures for sample collection and handling.
- Manage household hazardous waste.
- Educate the public about solid/hazardous waste disposal and recycling options.
- Operate computers and software.
- Perform literature searches.
- Prepare reports.
- Maintain professional certifications.
- Apply appropriate NRC regulations for storage and containment of nuclear waste.
- Recognize safety issues and apply contingency plans associated with nuclear waste.
- Manage source materials suitable for waste-to-energy process.
- Apply applicable ISO requirements to manage environmental systems.
- Ensure products, parts, and components are RoHS compliant.
- Ensure recycled materials are WEEE compliant.
- Identify local, state, and regional emergency response and reporting requirements.
- Adhere to Department of Transportation regulations as they pertain to packing and transporting hazardous waste.
- Collect recyclable materials.
- Evaluate materials for secondary use in production processes.
- Mass balance scenarios for regulated waste materials to equate or compare volumes purchased with volumes (weights) of product sold and production waste.
- Document compliance with appropriate local, state, and federal regulations for regulated and hazardous materials.
- Review plans for process modification with engineering and management personnel to determine impacts, if any, on waste streams.
- Identify applicable environmental permits and SOPs associated with waste management.
- Evaluate industrial waste recycling options periodically.
- Review potential for purchase or sale of materials in local, state, and federal recycling markets.



Occupational Titles

- Climate Change Adaptation Specialist
- Climate Change Mitigation Analyst
- Ecological Footprint Analyst
- Efficient Landscaping Technician
- Energy Resource Manager
- Global Equity Specialist
- Green Product Specialist
- LEED Technician
- Lifecycle Analysis/Product Stewardship Technician
- Permaculture Design Technician
- Smart Growth Technician
- Sustainability Coordinator
- Sustainability Educator/Trainer
- Sustainability Systems Analyst
- Sustainable Design Technician
- Sustainable Process and Procedures Manager
- Transportation and Logistics Specialist
- Urban Agriculture Technician

- Educate public in sustainability principles and practices.
- Keep current with sustainability literature, design, and conferences.
- Apply and utilize cost benefit analysis to sustainability decisions.
- Incorporate knowledge of environmental, economic, and social systems interactions into sustainable practices.
- Train employees on sustainability principles and practices.
- Research and advocate the use of sustainable products.
- Apply sustainability principles to urban planning.
- Perform emissions inventories, calculate and evaluate impacts, and communicate results.
- Identify the basics of LEED certification criteria.
- Identify the basics of home energy rating systems.
- Identify the basics of permaculture design.
- Apply appropriate ISO requirements to manage environmental systems.
- Ensure products, parts, and components are RoHS compliant.
- Ensure recycled materials are WEEE compliant.
- Assist in development of sustainability policies and plans for facilities, communities, and regions.

- Use Quantitative Risk Assessment (QRA) to plan for sustainable resource management.
- Use life cycle analysis techniques to map resource use and product stewardship.
- Apply geospatial technologies to identify risks, create plans, propose solutions, and track progress.
- Apply sustainability metrics (environmental, economic, and social).
- Maintain appropriate certifications.
- Develop and maintain community relationships and partnerships to promote sustainability.
- Promote social equity and environmental justice in conjunction with economic viability/balance.

WASTEWATER MANAGEMENT**

- Collect surface water, ground water, wastewater, and process wastewater samples.
- Label, preserve, and store samples.
- Analyze samples for physical, chemical, and biological parameters.
- Interpret sample analysis results.
- Monitor flow rates and tank levels by reading gauges, meters, and charts.
- Recognize and correct system upsets by adjusting process equipment.
- Decontaminate sampling equipment.
- Install, calibrate, operate, troubleshoot, repair, and maintain equipment.
- Operate heavy equipment/vehicles, hand/power tools, and boats.
- Operate industrial wastewater pretreatment equipment.
- Operate and maintain RS equipment.
- Operate water filtration, aeration, disinfection, and purification equipment.
- Label and dispose of treatment by-products and wastes.
- Select and use proper personal protective equipment.
- Practice proper confined-space entry techniques.
- Handle hazardous chemicals.
- Initiate emergency response actions.
- Maintain chemical and supply inventory.
- Document site or process conditions, prepare reports, and maintain accurate records.
- Develop and follow SOPs.
- Follow established quality control procedures.
- Follow chain-of-custody procedures for sample collection and handling.
- Apply local, state, and federal environmental regulations to specific projects.
- Assist in preparation of a site stormwater pollution prevention plan.
- Assist with development of written plans (e.g., sampling, health and safety, lockout/tagout).
- Investigate, maintain, and repair wastewater collection systems.
- Conduct lake studies.

Occupational Titles

- Biosolids Management Technician
 - Cross-Connection Control Technician
 - Decentralized Treatment System Operator
 - Fats/Oils/Grease (FOG) Technician
 - Graywater Systems Treatment Operator
 - Industrial Pretreatment Coordinator
 - Industrial Wastewater Treatment Operator
 - Instrumentation Technician
 - Laboratory Technician
 - Land Application Technician
 - Municipal Wastewater Treatment Operator
 - Plant Maintenance Technician
 - Regulatory Compliance Specialist
 - Waste-to-Energy Technician
 - Wastewater Collection System Operator
-
- Assist with environmental drilling and monitoring well installation.
 - Measure ground water levels and flow direction.
 - Collect, treat, and dispose of contaminated ground water.
 - Monitor ground water remediation efforts.
 - Apply and incorporate biosolids to land.
 - Communicate effectively with contractors, customers, site owners, municipal officials, regulatory agencies, and the public.

WASTEWATER MANAGEMENT (cont)

- Maintain professional certifications.
- Apply geospatial technologies.
- Use Supervisory Control and Data Acquisition (SCADA) for system operation.
- Plan and deploy security measures.
- Apply Total Preventive Maintenance (TPM) to deploy predictive, preventive, and corrective maintenance.
- Implement and monitor industrial pre-treatment program.
- Notify regulatory agencies and public of non-compliance of licensing and permitting violations.
- Participate and advise water boards, commissions, and utilities.
- Understand budgeting and finance/asset management (both municipal and private sector).
- Evaluate physical, chemical, and biological characteristics of raw sewage and treated wastewater.
- Monitor, evaluate, and adjust wastewater treatment process.
- Calculate chemical addition rates.
- Calculate excess solids wasting rates.
- Operate and maintain biosolids handling equipment.
- Use stream flow measurements.
- Operate pumps and motors.
- Implement OSHA and other appropriate safety protocols.
- Operate and maintain sewage lift station equipment and instrumentation.

****REFER TO ATEEC'S "DEFINING WATER MANAGEMENT" REPORT FOR FURTHER BREAKDOWN OF OCCUPATIONS AND FUNCTIONS.**



WATER SUPPLY AND TREATMENT**

- Comply with provisions of the Safe Drinking Water Act.
- Implement OSHA and other appropriate safety protocols.
- Collect surface water, ground water, process water, and drinking water samples.
- Label, preserve, and store samples.
- Analyze samples for physical, chemical, and biological parameters.
- Interpret sample analysis results.
- Monitor flow rates and tank levels by reading gauges, meters, and charts.
- Recognize and correct system upsets by adjusting process equipment.
- Decontaminate sampling equipment.
- Install, calibrate, operate, troubleshoot, repair, and maintain equipment.
- Operate heavy equipment, power tools, and boats.
- Operate water treatment plant equipment.
- Use and maintain RS equipment.
- Operate water filtration, aeration, disinfection, and purification equipment.
- Label and dispose of treatment by-products and wastes.
- Select and use proper PPE.
- Practice proper confined-space entry techniques.
- Handle hazardous chemicals.
- Initiate emergency response actions.
- Maintain chemical and supply inventory.
- Operate computers and software.
- Document site or process conditions, prepare reports, and maintain accurate records.
- Develop and follow SOPs.
- Follow established quality control procedures.
- Follow chain-of-custody procedures for sample collection and handling.
- Apply local, state, and federal environmental regulations to specific projects.
- Assist with development of written plans (e.g., sampling, health and safety, lockout/tagout).
- Investigate, maintain, and repair water collection and distribution systems.

Occupational Titles

- Desalination Technician
- Drinking Water Lab Technician
- Industrial Water System Operator
- Instrumentation Technician
- Municipal Water Treatment Plant Operator
- Plant Maintenance Technician
- Public Educator
- Regulatory Compliance Specialist
- Source Water Protection Specialist
- Water Conservation Specialist
- Water Distribution System Operator
- Water Meter Technician
- Water Rights Technician
- Water Security and Emergency Preparedness Specialist
- Well Drilling Technician

- Measure stream flow characteristics.
- Conduct lake studies.
- Measure ground water levels and flow direction.
- Maintain professional certifications.
- Implement a public education program.
- Operate, monitor, and maintain well drilling equipment and appropriate logs.
- Develop cooperative agreements with water utilities.
- Operate and maintain well fields.
- Participate and advise water boards and commissions.
- Apply basic biological and chemical principles.

WATER SUPPLY AND TREATMENT (cont)

- Troubleshoot operational errors and make corrective decisions.
- Apply rate paying and budgeting principles.
- Analyze data, trends, reports, consumption, and/or test results to determine adequacy of facilities and system performance to include regulatory compliance.
- Comply with state backflow preventer programs to separate drinking water supply from industrial use and re-use supplies.
- Monitor the water level/drawdown rates for the various aquifers at or near your facility.
- Hold public informational sessions to advise and participate with citizens and private sectors regarding long-term, high-quality water supplies.
- Plan and deploy security measures.
- Communicate effectively with contractors, customers, site owners, municipal officials, regulatory agencies, and the public.
- Notify regulatory agencies and public of non-compliance of licensing and permitting violations.
- Properly dispose of treatment plant residuals.
- Track and monitor emerging contaminants of concern.

****REFER TO ATEEC'S "DEFINING WATER MANAGEMENT" REPORT FOR FURTHER BREAKDOWN OF OCCUPATIONS AND FUNCTIONS.**



WATERSHED MANAGEMENT**

- Conduct lake studies.
- Assess stormwater runoff characteristics.
- Investigate erosion problems and assist in implementation of solutions.
- Perform ditch and culvert inspections and repairs.
- Measure stream flow characteristics.
- Identify and delineate wetlands based on plant/animal species, hydrology, and soils.
- Assist in determining boundaries of a watershed.
- Assess soil, fill, and bedrock characteristics.
- Assist with environmental drilling and monitoring well installation.
- Measure ground water levels and flow direction.
- Collect, treat, and dispose of contaminated ground water.
- Monitor ground water remediation efforts.
- Communicate effectively with contractors, customers, site owners, municipal officials, regulatory agencies, and the public.
- Maintain professional certifications.
- Implement stormwater management program.
- Monitor performance and maintenance of MS4 components.
- Apply geospatial technologies.
- Participate and advise water boards, commissions, and utilities.
- Understand budgeting and finance/asset management.
- Identify organisms to the appropriate taxonomic level.
- Identify the need for and obtain appropriate state/federal permits.
- Maintain flood control systems.
- Run and interpret hydrologic models.
- Develop nutrient management plans.
- Assist in development of plans for the protection, maintenance, rehabilitation, or enhancement of natural resources.
- Conduct and interpret surface and ground water inventories, studies, and watershed analyses.
- Assess and interpret water quality and quantity from streams and aquifers.
- Implement plans to improve aquatic habitats.
- Sample and identify organisms.
- Implement wetland restoration and construction activities.
- Perform fish population studies using seining, trawling, and electroshock equipment.
- Calculate rates of sediment production.
- Implement soil conservation practices.
- Implement erosion control strategies.
- Collect, manage, and integrate spatial and attribute data using applicable geospatial technologies.

Occupational Titles

- Equipment Maintenance Technician
- Erosion Sediment Control Technician
- Geospatial Technician
- Ground Water Remediation Systems Technician
- Habitat Restoration Technician
- Heavy Equipment Operator
- Hydrology Technician
- Interbasin Transfer Specialist
- Modeling Technician
- Nutrient Management Specialist
- Permitting Specialist
- Public Educator
- Stormwater Management Technician
- Taxonomy Specialist
- Water Quality Monitoring Technician
- Wetlands Delineation Technician

- Assist in habitat restoration.
- Install, calibrate, operate, maintain, troubleshoot, and repair equipment.
- Analyze and interpret sampling and monitoring data.
- Label, preserve, store, and ship samples.
- Follow chain-of-custody procedures for sample collection and handling.
- Follow established quality control procedures.
- Develop and deliver public information and environmental education programs.
- Apply appropriate local, state, and federal environmental regulations to specific projects.
- Enforce local, state, and federal natural resource regulations.
- Assist in preparation of environmental documents.
- Select and use proper personal protective equipment.
- Compile field notes, maintain records, and write reports.
- Develop and follow SOPs.

****REFER TO ATEEC'S "DEFINING WATER MANAGEMENT" REPORT FOR FURTHER BREAKDOWN OF OCCUPATIONS AND FUNCTIONS.**



CROSS-CUTTING KNOWLEDGE AND SKILLS

In addition to the specific technical skills listed on the preceding chart, the following list of knowledge and skills has been identified as cutting across many of the technician jobs identified in this report.

- Business fundamentals (economics/finance/entrepreneurship)
- Communication
- Computer hardware and software use
- Data management/documentation
- Education and outreach
- Emergency management principles
- Environmental information management systems
- Geospatial technology
- Health and safety
- Instrumentation and technology
- Logistics
- Permitting/compliance
- Pollution prevention/waste minimization
- Quality Assurance/Quality Control (QA/QC)
- Sampling and monitoring
- Science, technology, engineering, and math
- Sustainability
- Teamwork
- Troubleshooting/problem solving/critical thinking/research
- Workplace ethics

EMERGING AREAS AND FUTURE TRENDS

- Biomimickry
- Emerging pollutants of concern
- Four-year degrees at community colleges
- Healthy homes intervention (energy, lead, rodent/pest control, asthma triggers)
- Maintaining, developing, and rebuilding infrastructure
- Nanotechnology
- Succession planning
- Workforce demographics
- Workforce mobility
- Zero waste



COMMUNITY COLLEGE RESPONSIBILITIES

- Arrange apprenticeships, internships, on-the-job training, and service learning opportunities.
- Develop 2+2+2 articulation agreements with high schools & four-year institutions.
- Develop a program graduate survey tool to stay in touch with past graduates to assess changing job skills.
- Develop active program advisory committees.
- Develop and implement outcomes assessment.
- Develop curricula to accommodate potential emerging trends.
- Develop/foster relationships with local industry.
- Develop shared program offerings with high schools for credit.
- Facilitate the development of student portfolios.
- Include environment/sustainability/energy as a capstone course &/or infuse in other program offerings on campus.
- Integrate sustainability as a core competency throughout all programs.
- Lead by example (e.g., practice what you preach, walk the talk).
- Promote lifelong learning.
- Promote and support professional development for all college staff in regards to emerging trends/technologies (e.g., staff development through internal workshops, faculty development through venues like the SEET Technology Workshops & ATEEC Fellows Institutes).
- Provide career services and job placement support.
- Provide community outreach on sustainability issues.
- Provide energy and environmental training for new career pathways.
- Provide stackable credentials.
- Survey community and industry to assess emerging trends and business needs.
- Train & retrain technicians.
- Upgrade technicians to professional status.

FASTEST-GROWING JOBS IN THE ENVIRONMENTAL TECHNOLOGY FIELD

Top Five:

- Environmental Health and Safety Technician
- Homeland Security Specialist (a.k.a., Emergency Preparedness and Response Coordinator, Water and Energy Security Specialist)
- Watershed/Water Resources Specialist
- Energy Conservation and Efficiency Technician
- Water/Wastewater Operator

Up and Coming:

- Environmental Compliance Technician
- Green Buildings Technician
- Oil and Gas Exploration Technician
- Smart Grid Specialist (a.k.a., Electrical Infrastructure Upgrader)
- Sustainability Coordinator
- Environmental Geospatial Technician
- Natural Resources Technician
- Pipeline Installer (utility infrastructure)
- Solar PV Technician
- Hydrofracturing Technologist
- Asbestos, Lead, and Mold Remediation Worker
- Biotechnologist
- Carbon offset/Trading Specialist
- NEPA (National Environmental Policy Act) Technician
- Renewable Systems Technician (operation/ installation/maintenance)

ACKNOWLEDGMENTS

FORUM PARTICIPANTS

Kathy Alfano

Director
NSF ATE CREATE Renewable
Energy Center
Santa Clarita, CA

Cindy Baldwin

Senior Industrial Hygienist
Terracon Consultants, Inc.
Cedar Rapids, IA

Deborah Bayer

Dean of Division of Public Service
and CREST
Oakland Community College
Auburn Hills, MI

Maureen Clayton

Associate Professor
University of Northern Iowa
Cedar Falls, IA

Mike DeSpain

Director, OEPP
Mechoopda Indian Tribe
Chico, CA

Margaret Doss

Compliance Manager
Columbia County Water Utility
Augusta, GA

Dave Elias

Landfill/Wastewater
Superintendent
City of Iowa City
Iowa City, IA

Douglas Feil

Consultant
Partnership for Environmental
Technology Education
Cedar Rapids, IA

Steven Fenton

Consultant
Fenton & Associates
Snoqualmie, WA

Ann B. Johnson

Associate Director, Co-PI
NSF ATE GeoTech Center
Salmon, ID

Joseph Konrade

Energy Technology Program
Specialist
U.S. Department of Energy
Washington, DC

Kirk J. Laflin

Executive Director
Partnership for Environmental
Technology Education
South Portland, ME

Bill Nash

Fort Riley Dean of Technical and
Military Outreach
Barton Community College
Grandview Plaza, KS

Ted Outwater

Program Administrator, WETP
National Institute of
Environmental Health Sciences
Research Triangle Park, NC

John Perrone

Director
Homeland Security Management
Institute
Rochester, NY

Julie Plummer

Area Resource Specialist, Iowa
Waste Exchange
Eastern Iowa Community Colleges
Davenport, IA

Michael Schmidt

Operations Manager
Mechanical Dynamics & Analysis,
WindIngen Division
Fort Collins, CO

Art Shanks

Executive Director
Cypress Mandela Training Center
Oakland, CA

Jeffrey Steinfeld

Professor of Chemistry Emeritus
Massachusetts Institute of
Technology
Cambridge, MA

Cheryl Stith

Safety Manager
Comcast Cable Corporation
Sacramento, CA

ACKNOWLEDGMENTS

FORUM COORDINATION AND REPORT PRODUCTION

Michael Beck

Recorder/Report Author and Designer
Technical Writer, ATEEC

Melonee Docherty

Co-facilitator/Report Editor
Instructional Designer, ATEEC

Gloria Hanne

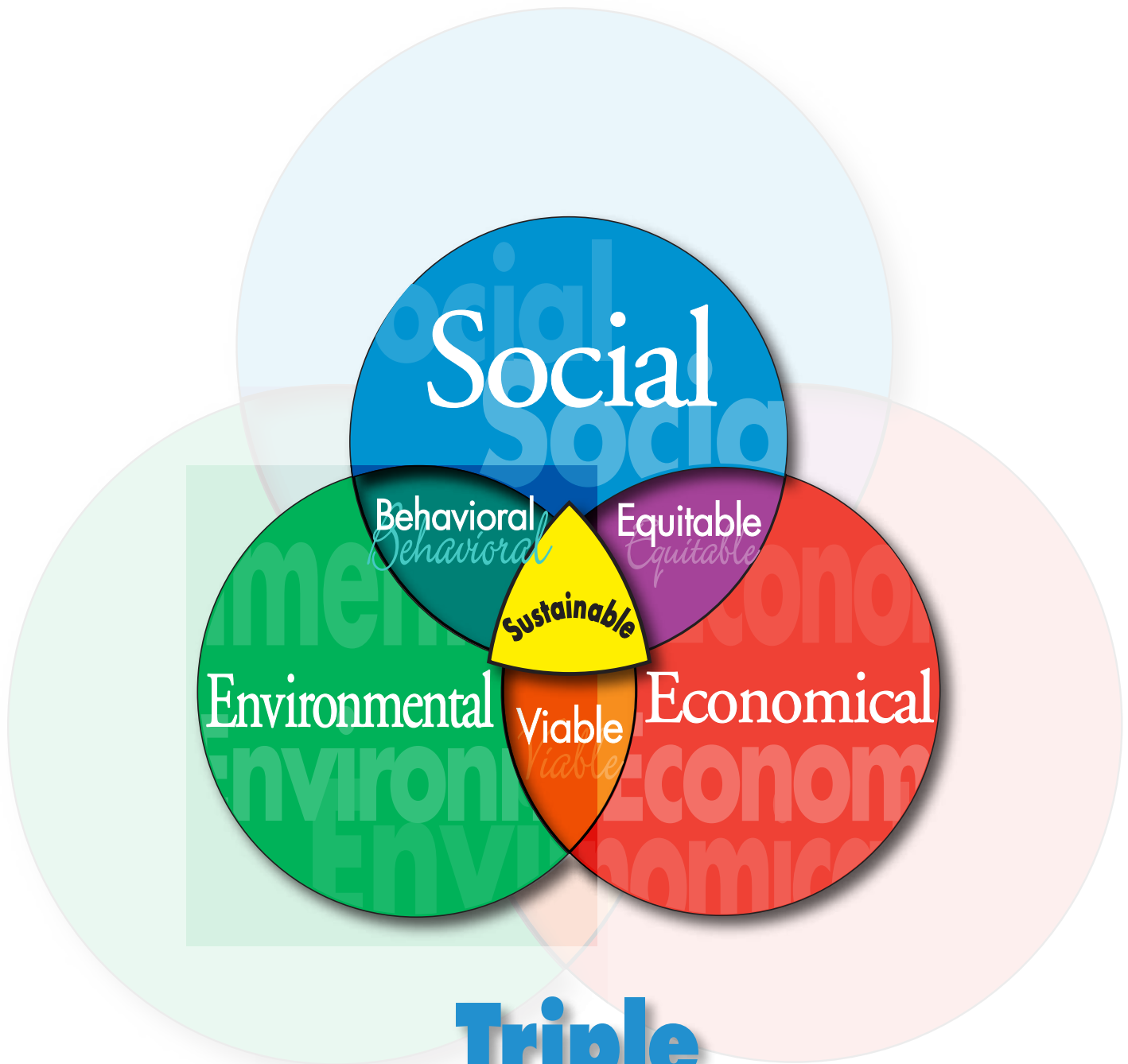
Report Editor
Project Coordinator, ATEEC

Ellen Kabat Lensch

Principal Investigator
Executive Director, ATEEC

Jeremy Pickard

Co-facilitator
Associate Director, ATEEC



Triple Bottom Line of Sustainability



Advanced Technology

**Environmental and
Energy Center**

201 North Harrison Street, Suite 101 • Davenport, IA 52801 • 563.441.4081 • 866.419.6761 • fax: 563.441.4080 • ateec.org



Cover design by
Maxim Marketing & Graphic Services, Bettendorf, IA



EASTERN IOWA COMMUNITY COLLEGES
CLINTON ♦ MUSCATINE ♦ SCOTT