

**Project Title:** Linking energy production technologies to human health protection: A "to and through" approach to the interdisciplinary training of a middle-skilled workforce

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**Awardee:** Tulane University

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**I. ORIGINAL PROJECT SUMMARY (from proposal)**

Objectives:

1. Convene an expert panel to establish a national set of core competencies in environmental health and disaster management targeting the middle-skilled workforce in oil production, marine operations, and nursing in SE Louisiana.
2. Validate the competencies using a "to and through" approach with: 1) high school students in the pipeline as oil production workers, marine operators and nurses, 2) current students in production technologies, marine operations, and nursing and, 3) currently employed oil production workers, marine operators, and nurses.
3. Develop educational products derived from the competencies for target audiences.

Response to RFA:

- The project specifically addresses education and training of middle-skilled workers in the oil and gas industry and health professions by linking oil production, marine operations, and nursing skills with practical environmental health and disaster management competencies.
- The project team is a strategic, collaborative partnership among educational institutions, industry groups, and employers. This will allow for alignment of the competencies and educational products with workforce skills.

- The project will develop educational products that can be adapted by other organizations in their own education efforts.
- The approach is competency-based and will identify gaps in current middle-skilled curricula.

Innovation:

- The project addresses a critical educational gap -- Louisiana's community colleges produce high quality graduates employed in the oil and marine industries and nursing, but graduates lack environmental health and disaster management knowledge. The project will develop competencies connecting oil production technology, marine, and nursing skills with practical environmental health and disaster management knowledge.
- The competency-based approach will provide measurable learning benchmarks.
- The "to and through" approach targeting future applicants, current students, and the existing workforce will accelerate change across the entire pipeline.
- The project will develop tailored educational products, such as case studies in environmental health providing continuing education units.
- While the project is focused on bolstering the knowledge, skills and abilities (KSAs) of the middle--skilled workforce in Louisiana, the approach and outcomes have national applications.
- The partnership between Fletcher Technical Community College and Tulane University School of Public Health and Tropical Medicine brings together industry partners, employers, and local and national organizations with expertise in education, workforce development, and competency development.

Outcomes:

Improvement in safety associated with oil and gas development (Goal 1): The competency-driven approach is designed to foster innovative improvements in KSAs, which in turn will benchmark and benefit performance, ultimately contributing to enhancing safety.

Interconnectedness of oil production and health professions (Goal 2): The project strengthens the interconnectedness of oil production and human health as its central premise. Moreover, the deliverables and the "to and through" approach are designed to have a ripple effect into the broader community -- from high schools to offshore to emergency rooms supporting Gulf communities.

Protection of ecosystem services (Goal 3): This project can accelerate the development of a workforce uniquely skilled at the intersection of environment and health, thus creating a safer work environment regionally and providing an evidence base for national application. A safer work environment could decrease the occurrence of oil spills that damage ecosystem services.

## II. PROJECT RESULTS

### Accomplishments

Problem:

The 2010 Deepwater Horizon Gulf of Mexico oil spill off the coast of Louisiana underscored the relationship among the environment, energy extraction, and human health. Academic programs that prepare students to work in these fields, however, often focus on one area of specialty or discipline (e.g.

production technologies, environmental public health, or nursing). Community colleges educate middle-skilled workers pursuing careers in offshore oil production, marine operations and nursing. In Louisiana, there is no academic program that prepares these future workers in both the technical skills required for their field and practical knowledge and skills in environmental health and disaster management.

#### What we did:

We developed a set of competencies in environmental health and disaster management for the middle-skilled oil production, marine, and nursing workforces. We formed a panel of 17 individuals with expertise in environmental health, disaster management, oil production, marine operations, nursing, occupational medicine, higher education, and competency development. First, the project team wrote a background document to provide foundational material for the expert panel's development of the competencies, describe the project's approach, and propose domains for the competencies. Then, the expert panel established competency domains and wrote a first draft of the competencies during conference calls, e-mail communication, and an in-person, two-day meeting at Fletcher Technical Community College (FTCC). This draft was then revised by the project team for content and consistency. Next, FTCC faculty reviewed each competency against existing FTCC classes to see if content of the competencies was already being taught. They identified which of their existing classes included the content, and if none did, they identified which class(es) could be modified to include it.

In January 2017, a one-day educational summit focusing on the competencies was held at FTCC for current managers/supervisors from the three targeted fields, as well as community college instructors and administrators. Meeting attendees (n=45) provided feedback on the competencies and how they could be used for training and education. In addition, 34 attendees completed a written, IRB-approved survey to validate the competencies. Using a scale of 1 (not at all important) to 5 (extremely important), survey participants rated the competencies on their importance to the everyday work of a middle-skilled employee in the three fields. Responses were uniformly positive with all competencies but one being ranked as extremely important or very important. This one competency ("Identifies characteristics of workplace lifestyle"), however, was still ranked highly as "important" with an overall score of 3.94. Lastly, the project team reviewed the competencies one final time against the survey results and verbal feedback received at the summit. Small revisions were made to wording, and one final competency was added. The project team developed a two-page roadmap explaining how the competencies could be used in education and training.

#### Results:

The competencies consist of measurable knowledge, skills, and attitudes in environmental health and disaster management that an entry-level oil production, marine operations, or nursing employee should master to effectively perform his/her job. The competencies include an overarching set of universal competencies in four domains (Job Safety Analysis, Personal Protective Equipment, Employability, and Commitment to Safety) that apply to all three fields. Each field also has two sets of competencies in the domains of Disaster/Emergency Management and Environmental and Occupational Health.

Another concrete result is that the FTCC nursing program will now include new content in two of its nursing courses on how to take an environmental and occupational health history from patients. These courses are HNUR 1340 Concepts in Practical Nursing (for practical nursing students) and NURS 2800

Issues in Nursing and Health Care (for Associate's in Nursing students). This content is based upon a continuing medical education module developed by Tulane and one of its partners, the Association of Occupational and Environmental Clinics. (See: <http://www.gulfcoastenvironmentalhealth.com/cme-credits-health-history>)

### **Initial Outcomes**

Current and future work of the project team: This project provided the opportunity for FTCC and Tulane to collaborate for the first time on a project of mutual interest. Through support from NAS GRP, we now have a strong foundation to support future training efforts. For FTCC specifically, the competencies can assist with placement of graduating students and increase demand for their academic programs. They can also be used to create a certificate program within FTCC's existing degree programs, or to create a new certificate program for industry partners.

We have already seen the FTCC-Tulane collaboration bear fruit in other areas. One of the expert panel members, Dr. Katherine Kirkland, Executive Director of the Association of Occupational and Environmental Clinics (AOEC), and Dr. Sonia Clarke, Dean of Nursing and Allied Health at FTCC, met with representatives from the Louisiana Community and Technical College System. As an outcome of this meeting, AOEC is now developing two continuing education modules for health professionals and community members on Health Concerns Related to Floods. These modules, developed with a different funding source at Tulane and AOEC, directly address a training need and respond to community concerns in the region.

Implications for research or practices of others: The competencies serve as measurable learning benchmarks for students in similar academic programs across the state and the country. For industry, they can be used as performance benchmarks for current employees and enrich on-the-job training efforts. Industry would also benefit by having more knowledgeable new hires if they graduated from degree programs utilizing the competencies.

Importance to science or society: This project contributes to enhancing safety culture in the three fields and addresses a need for training in environmental health and disaster management among three workforces that are key to Louisiana's economy.

### **Unexpected Results**

When we started the project, we expected to write two sets of knowledge, skills, and attitude competencies in environmental health (EH) and disaster management (DM) for each of the three fields. As our development of the competencies progressed, we determined that there were overarching, universal competencies that applied to all three fields. So, in addition to the originally envisioned competency sets in EH and DM, we developed universal competencies in four domains (Job Safety Analysis, Personal Protective Equipment, Employability, and Commitment to Safety) that apply to all three fields.

### **Project Relevance**

Researchers, educators, community leaders, state government officials, federal government officials, and the private sector would be interested in the results of this project.

Researchers could use our project as a model for partnering with community colleges and for developing competencies in other subject areas. Educators can use the competencies to guide the development and implementation of curriculum. Community leaders will be interested in how the competencies seek to improve safety and disaster management. State level community college officials could apply the competencies to academic programs across the state. Federal standard-setting officials could use the competencies for education and training efforts. Oil production, marine operations, and healthcare industries could incorporate the competencies into training efforts.

### **Education and Training**

Number of students, postdoctoral scholars, or educational components involved in the project:

- Undergraduate students: 0
- Graduate students: 2
- Postdoctoral scholars: 0
- Other educational components: 20

An expert panel, convened to establish the core competencies in environmental health and disaster management, consisted of 17 individuals with expertise in environmental health, disaster management, oil production, marine operations, nursing, occupational medicine, competency development, and higher education.

The project focused on the occupational fields of Nursing, Petroleum Production, and Marine Operations. Three faculty from Fletcher Technical Community College were engaged in this project.

### **III. DATA AND INFORMATION PRODUCTS**

This project produced data and information products of the following types:

- Scholarly publications, reports or monographs, workshop summary or conference proceedings
- Websites or data portals
- Other: Competencies

### **INFORMATION PRODUCTS**

**Citations for project publications, reports and monographs, and workshop and conference proceedings:**

Covert, H.H. (2016). Background document - "Linking energy production technologies to human health protection: A "to and through" approach to the interdisciplinary training of a middle-skilled workforce. New Orleans, LA: Tulane University.

This report a) provides foundational material for the expert panel's development of the competencies, b) describes the project's approach, and c) proposes domains for the competencies. This report will later be used to inform a peer-reviewed publication.

### **Websites and data portals:**

A project home page was created on the website of Tulane University's Center for Gulf Coast

Environmental Health Research, Leadership, and Strategic Initiatives:  
<http://www.gulfcoastenvironmentalhealth.com/comp>.

We expect to maintain the website for 18 months after the project ends. After regular maintenance concludes, content of the website will be archived as Word documents and saved on the server of Tulane's School of Public Health and Tropical Medicine.

**Other activities to ensure access to information products:**

Faculty at Fletcher Technical Community College already have access to the final version of the competencies and can currently use them to inform their curriculum. We will write a peer-reviewed journal article on the project and budget permitting, we will publish in an open access journal to allow for broad dissemination and access.