PROJECT INFORMATION

Project Director's Name*	Daniel Kwasi Adjekum
Organization*	University of North Dakota
Project Title*	Safety Reporting Action Program for Offshore Oil & Gas Industry in the Gulf of Mexico
Reporting Period*	2023

Note to Grantees: In sections 1 to 5, we ask you to highlight your accomplishments (including outputs and outcomes) through this grant award. These sections of the final grant report will be made available to the public.

1. GOALS AND ACCOMPLISHMENTS

1.1 Please restate the goals and objectives of your project.*

The objective of the research was to use a sequential mixed-method approach entailing a literature review, semi-structured interviews, focus groups sessions, and an anonymous quantitative survey to assess the Gulf of Mexico Oil and Gas (O&G) industry stakeholders' perspectives on generative voluntary safety reporting culture (GVSRC) using attributes of a proposed Offshore Safety Action Program (OSAP) modeled after the Aviation Safety Action Program (ASAP).

1.2 Describe the accomplishments of your project. You should include both the anticipated accomplishments that you outlined in your project proposal as well as any *unanticipated* accomplishments that have since occurred. Describe any activities you have conducted, programmatic progress made, or project benchmarks and milestones met.*

The research findings suggested respondents had balanced perceptions about voluntary safety reporting culture and enumerated some challenges with standardizing reporting requirements and policies due to jurisdictional limitations by industry regulators. Most respondents strongly supported a formalized review and adjudication of voluntary safety reports by an Event Review Committee (ERC) with representation from all stakeholders as proposed in OSAP.

These findings imply that OSAP can be a safety reporting initiative that provides a value proposition outlining intrinsic and extrinsic cost benefits to gain acceptability and resource input from industry stakeholders. OSAP provides a veritable framework for organizational learning and enhancements of generative voluntary safety reporting culture through collaborative adjudication of safety reports. OSAP provides data-driven corrective actions for reported safety hazards in the offshore industry.

As part of the study, a GVSRC model was also developed from employee perceptions of ASAP attributes using structural equation modeling. Hypothesized underlying factors of GVSRC: safety reporting policy fundamentals (SRPF), organizational support, personnel engagements in voluntary safety reporting processes (OSPE), and safety reporting benefits (SRB) were validated.

Results suggest that top management support for voluntary safety reporting programs through resource provision can motivate personnel to engage in safety reporting processes. In terms of voluntary reporting propensity, younger respondents significantly underreported safety issues than older personnel, highlighting the need for better hazard identification, safety risk management training, and effective mentoring for younger personnel.

An implication for policy is that despite different operating environments and processes, an ASAP-styled initiative has positive value for safety management and engendering a proactive safety reporting culture in the O&G sector.

Two research publications in high-impact journals, three conference proceedings, and a final research monogram were produced as part of this study. An unanticipated accomplishment was the ability to interview and get data from respondents despite the challenges of the COVID-19 pandemic which restricted access to research participants.

2. Outputs

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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denotes required fields

2. OUTPUTS

Outputs are tangible or measurable deliverables, products, data, or publications produced during the project period.

2.1. Please indicate the number of students (K-12, undergraduate, or graduate), postdoctoral scholars, citizen scientists, or other trainees involved in the project. *

Please enter 0 if none were involved.

K-12 students	0
Undergraduate students	0
Graduate students	3
Postdoctoral scholars	0
Citizen Scientists	0
Other Trainees	0

2.2. Has your project generated any data and/or information products? *

Generation of data includes transformations of existing data sets and generation of data from existing resources (e.g., maps and images). Information products include publications, models, software, code, curricula, and digital resources.

(Check all that apply.)

Responses Selected:

Data
Information Products

2.3. Briefly describe how you fulfilled the approved Data Management Plan and, if applicable, any changes from the approved plan. *

The generated data was initially supposed to be deposited with an external data repository called IPUC data repository but the University of North Dakota Digital Commons have established a data repository that is public facing. It meets the requirements for open-access and makes data available to all researchers. The data was submitted to the UND digitital commons at : Daniel Kwasi Adjekum, Samuel Asante Afari, Nana Yaw Owusu-Amponsah, et al.. "Data Supplement to 'Development of a generative voluntary safety reporting culture (GVSRC) model for the Gulf of Mexico (GOM) oil and gas (O & G) sector using attributes of the Aviation Safety Action Program (ASAP)'" (2023). Datasets. 27. https://commons.und.edu/data/27.

If your project has generated data, please download the Excel worksheet entitled GRP Data Management Reporting. Use the "Data Report" tab in the worksheet to create an inventory of data sets that you produced and to verify deposit in a curation facility. Upon completion, please upload the worksheet to your task list. If you need guidance on how to complete the Data Report, please e-mail gulfgrants@nas.edu. A member of GRP's data management staff will reach out to you.

If your project has produced publications, websites or data portals, GIS applications, models or simulations, software packages or digital tools, code, curricula, or other interactive media, please download the Excel worksheet entitled [GRP Information Management Reporting](). Use the "Information Products Report" tab in the worksheet to create an inventory of these products and to verify deposit in a curation facility. Upon completion, please upload the worksheet to your task list. If you need guidance on how to complete the Information Products Report, please e-mail [gulfgrants@nas.edu](). A member of GRP's data management staff will reach out to you.

2.4. Aside from data and information products, what other tangible or measurable deliverables or products (e.g., workshops, trainings, and outreach events) were produced during the project period? *

Upon completion of this form, you may upload supplemental material that represent the tangible or measurable deliverables or products to complement this narrative report.

A final report is added to the work sheet as a pdf document.

3. Data Management

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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* denotes required fields

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3. DATA MANAGEMENT

In this section, please provide a response to each question to complement the **Data Report** in the GRP Data Reporting Excel worksheet.

3.1 If you listed multiple data sets in the data reporting table, please briefly describe how these data sets relate to one another. *

Only a single set of quantitative data was generated. Qualitative recordings have been deleted due to IRB requirements.

3.2. Please provide a list of additional documentation to describe the data listed in the reporting table (e.g., code books, lab manuals, workflow procedures). Enter none if you did not produce any additional documentation to describe the data. *

A final project report/monogram was produced and has been submitted.

3.3. Beyond depositing data and metadata in a repository, what other activities have you undertaken or will undertake to ensure that others (e.g., researchers, decision makers, and the public) can easily discover project data? What other activities have you undertaken to ensure that others can access and re-use these data in the future? *

We published two articles in high-impact journals and presented at three conferences to desseminate the findings. Details are in the Information work sheet. The data set can be found in the UND digital commons repositiry for public access.

3.4. Are any data products you produced sensitive, confidential, and/or proprietary? *

Yes

3.4a (yes). Were these sensitive, confidential, and/or proprietary data products described in the data management plan of the approved project plan? *

Yes

3.4b (yes). If your plans for managing restricted access to and re-use of confidential data have changed since the approval of the project plan, briefly describe the new plans and procedures.*

No. We deleted all the audio files the interviews in line with UND and USCG IRB requirements.

4. Information Products

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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4. INFORMATION PRODUCTS

In this section, please provide a response to each question to complement the **Information Products Report** in the **GRP Information Products Management** Excel worksheet.

4.1. Please select the type(s) of information products that your project produced. *

Responses Selected:

1. Scholarly publications, reports or monographs, workshop summaries, or conference proceedings

Scholarly publications, reports or monographs, workshop summaries, or conference proceedings *

Please provide a list of citations for project publication, reports and monographs, workshop summaries, and conference proceedings.

Adjekum, D.K., Afari, S.A., Owusu-Amponsah, N.Y., Waller, W., Rasouli ,V., Ullrich, G., Snyder, P., Neal Corbin, N. (2023). Development of a generative voluntary safety reporting culture (GVSRC) model for the Gulf of Mexico (GOM) oil and gas (O & G) sector using attributes of the aviation safety action program (ASAP), Safety Science, Volume 161, 106073, https://doi.org/10.1016/j.ssci.2023.106073.

Adjekum, D. K., Owusu-Amponsah, N. Y., Afari, S. A., Waller, Z., Rasouli, V., Ullrich, G., Snyder, P., et al. (2023). Stakeholders' Perspectives on Generative Voluntary Safety Reporting Culture (GVSRC) in the Gulf of Mexico (GOM) Oil and Gas (O&G) Sector Using the Offshore Safety Action Program (OSAP). Safety, 9(2), 26. MDPI AG. Retrieved from
http://dx.doi.org/10.3390/safety9020026.

Adjekum, D. K. (Presenter), Board of Certified Safety Professionals (BCSP) Research and Innovation Summit. " Qualitative Overview of Voluntary Safety Reporting in the Gulf of Mexico Oil and Gas Industry" J.W. Marriott Hotel. Indianapolis. IN. (August 7-10, 2023). https://whova.com/embedded/session/NR8xb2s6pR4EWFjYHoFe2-uCyZ81WkpOFIemIbSNoll%3D/2925925/?widget=primary

Adjekum, D. K. & Afari, A.S. (Presenters), Offshore Technology Conference (OTC). " Generative Voluntary Safety Reporting Culture (GVSRC) Model Assessment for the Gulf of Mexico (GOM) oil and gas (O & G) sector using attributes of the Aviation Safety Action Program (ASAP)." NRG Center. Houston. TX. (May 1-4, 2023). https://2024.otcnet.org/about/highlights

Adjekum, D. K. & Owusu-Amponsah, N. (Poster Presenters), Williston Basin Petroleum Conference (WBPC). " Offshore Safety Action Program in the Gulf of Mexico (GOM) oil and gas (O & G) sector ." Bismark Events Center. Bismark. ND. (May 11-13, 2021).

4.2. Beyond depositing information products in a repository, what other activities have you undertaken or will undertake to ensure that others (e.g., researchers, decision makers, and the public) can easily discover and access the listed information products? *

We have used institutional media outlets, personal social media, National Academies links and conferneces to publicize the project and direct them to the research reports and findings.

4.3. Are any of the information products you produced confidential, proprietary, or subject to special license agreements? *

No

5. Project Outcomes

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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5. PROJECT OUTCOMES

Outcomes refer to the **impact(s), consequence(s), result(s), or effect(s)** that occur from carrying out the activities or outputs of the project. Outcomes may be environmental, behavioral, health-related, or programmatic. Example outcomes include, but are not limited to: increased learning, knowledge, skills, and motivation; policy changes; actions taken by a group as a result of information generated by your project.

5.1. Please describe the outcomes achieved during your project and how they were assessed. For this question, we are interested in learning about the immediate short-term outcomes that have already occurred during or as a result of your project. Do not include long-term outcomes you foresee your work contributing to beyond the end of the project. *

We had numerous participants sit through our presentations at conferences and also digital captures of the research journal articles. We also had the opportunity to share the findings with the oil and gas industry at the OTC 2023 conference. There has been interest in adopting the proposed OSAP model.

https://www.mendeley.com/catalogue/97aa337f-aaea-3405-8f8d-d5fde263b038/

https://www.mdpi.com/2313-576X/9/2/26#metrics

5.2. We're interested in hearing not just the results of your project but what are their implications for or contributions to:

- **offshore energy system safety,**
- **environmental protection and stewardship, and/or**
- **health and community resilience**

Please describe what you consider to be the most remarkable accomplishment or finding of your project. What can others learn from your accomplishment and finding? How do you see it fitting in with your greater field of study or community of practice? *

The remarkable accomplishment of the study was the ability to cross-pollinate effective safety initiatives from other industries to the oil and gas industry to improve operational safety. The developed voluntary safety reporting framework {OSAP} can be a safety reporting initiative that provides a value proposition outlining intrinsic and extrinsic cost benefits to gain acceptability and resource input from industry stakeholders. OSAP also provides a veritable framework for organizational learning and enhancements of generative voluntary safety reporting culture through collaborative adjudication of safety reports. OSAP provides data-driven corrective actions for reported safety hazards in the offshore industry. Another implication for policy is that despite different operating environments and processes, an OSAP initiative has positive value for safety management and engendering a proactive safety reporting culture in the O&G sector.

6. Communication

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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Note to Grantees: In Section 6, we seek input from you to help us evaluate the Gulf Research Program's funding strategy. <u>This section will not be made available to the public.</u>

6. Information to Inform GRP Evaluations

6.1. Sharing the difficulties you encountered helps us learn from your experience. Describe any challenges you encountered in your project and how you addressed or overcame them. Challenges are inherent to conducting any complex project. These may include (but are not limited to): unexpected staffing changes, changes in the community you are working in, appearance of a new technology or dataset in the field you are working in, challenges accessing a field site, policy or regulatory changes that affect the issue you are addressing, low recruitment rates, delays in setting up services, or other problems in implementing and conducting your project. *

The challenges we faced in our research related to accessing participants during the COVID-19 pandemic. We used vedio conferencing for some of the interviews and delayed the site visits to a later period when it was safe. We also asked for no-cost extensions due to some the challenges related to getting data. There were also challenges with publishing our research findings as the review process was quite long and we had to do numerous reviews to get accepatnce and publications.

6.2. We like to hear about what you learned from your work and how you feel it affects future work or the work of others. Think back on your project strategies, methods, and activities, what worked and what did not? Is there anything you would do differently in the future? If so, tell us what and why. *

It was a great learning experience since this was a multi-disciplinary research approach and it afforded the research team a cross-disciplinary approach to understand voluntary safety reporting culture within the oil and gas industries. The model that was developed also received positive feedback from both regulators and the O & G industry and has value for application to improve safety.

6.3. What are the next steps for this work, either for you and your project team or other researchers? Has this project led to other opportunities to work in this area? *

Our nect step involves adoption by the O&G industry. We will like to assess the safety performance outcomes in the form of generative safety reporting among personnel in the O&G industry using the OSAP model and other using traditional reporting systems. That will enable us to determine the effectiveness of incentivizing voluntary safety reporting through models such as OSAP.

6.4. Have you developed new collaborations or partnerships (formal or informal) as a result of this work? If yes, please describe the new collaborations or partnerships. *

The research team intends to continue collaborating in other areas.

6.5. What, if any, positive changes in policy or practice do you foresee as a result of your work? *

An incentive-driven approach to voluntary safety reporting of near-misses and potential violations in the O&G industry which is good for proactive safety management.

6.6. If you could make one recommendation to the Gulf Research Program for how best to build on the work you conducted in this project, what would it be? *

We will strongly recommend funding for further studies to set up a pilot model of OSAP with an O&G operator or contractor to operationalize the initiative and also collect data on generative voluntary safety reporting due to the model implementation.

7. Communication and Dissemination

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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Note to Grantees: In Section 7, we ask you to help us communicate the importance, progress, and accomplishments of your work. Information provided in this section will be used by the Gulf Research Program to highlight its funded projects in print and electronic informational and promotional materials. The intended audience for the information provided in this section is different and should be thought of as a general audience. When you return to the dashboard, you may upload images that represent and illustrate the work of your project.

7.1. Please describe the most exciting or surprising thing you have learned while working on this project in a way that is understandable by a general audience. *

As a researcher with an aviation background (pilot), it was interesting to learn that an appreciation of risk posed by hazards within the O&G industry was similar to that faced in aviation. I also had the opportunity to learn about some technical aspects of O&G production, which, enhanced my perspective on safety management in other high-reliability industries, such as the oil and gas industry.

7.2. Do you have any stories that capture the impact of this project? (optional)

If so, please share one or two. Examples of what we are interested in include stories of people/communities that the project has helped; lives that have changed; work that led to policy change, such as legislation or regulation; and research breakthroughs.

Most respondents were surprised that a non-industry professional (pilot) was researching safety in the oil and gas industry. That enhanced our interactions with them as they also wanted to know about safety management in aviation.

7.3. Have any communications, outreach, or dissemination activities occurred in relation to your project?*

Please describe:

- Any press releases issued (other than that issued by the National Academies of Sciences, Engineering, and Medicine) about the project.
- Any media coverage or news stories about the project.
- Any social media accounts, websites, listservs, or other communication vehicles used to communicate information about this project. Please include relevant web addresses if available.

https://blogs.und.edu/jdosas/2020/01/und-researchers-tapped-to-help-improve-oil-and-gas-safety-in-gulf-of-mexico/

https://www.plantengineering.com/articles/aviation-offshore-drilling-research-teams-collaborate-to-improve-safety/

https://scholar.google.com/citations?user=I0IMxAkAAAAJ

https://www.linkedin.com/feed/update/urn:li:activity:7059911168991129600/