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# Develop a Risk-Based Approach and Criteria for Hazard Detection Layout

Agreement #693JK31910008POTA

Quarterly Status Report – Q3

Public

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## 1 Items Completed During this Quarterly Period

The performance period for the research project “Develop a Risk-Based Approach and Criteria for Hazard Detection Layout” (Project) is September 30, 2019 through March 31, 2021 as outlined in PHSMA Agreement #693JK31910008POTA (Agreement). The current quarter closes on March 29, 2020. The PHMSA Agreement Officer's Representative (AOR) for this project is Ms. Chau Tran.

Table 1-1 shows the items and deliverables that were completed during this Quarter.

Table 1-1. Items Completed During This Quarterly Period

Item	Task	Deliverable	Quarter	Federal Payment	Cost Share
4	3	Establish Detector Performance Targets	3	\$30,976	\$7,744
5	4	Identify Hazard Scenarios	3	\$51,072	\$12,768
4	8	Quarterly Status Report and Project Management	2	\$6,478	\$494

## 2 Items Not Completed During this Quarterly Period

There were no items or deliverables scheduled to be completed during this Quarter that were not completed.

## 3 Project Financial Tracking During this Quarterly Period

The current project financial tracking is shown in Figure 3-1. Work for the project is currently on schedule and projected to remain on schedule.

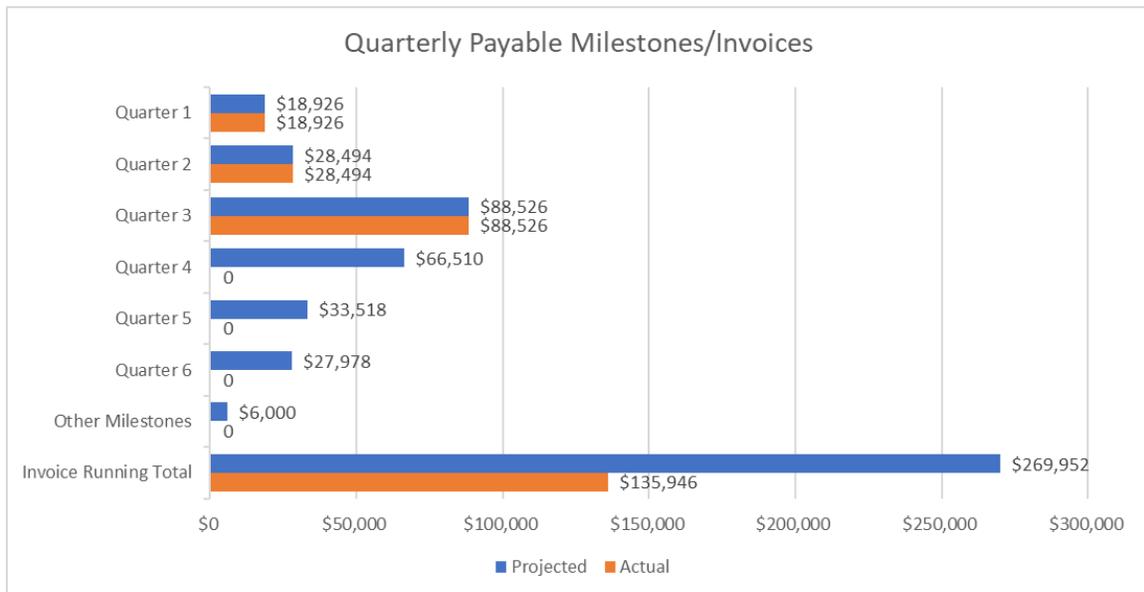


Figure 3-1: Project Financial Tracking

## 4 Project Technical Status

### 4.1 Task 3 – Establish Detector Performance Targets

The literature review performed under Task 2 confirmed a lack of quantifiable performance targets available in the public domain for evaluating fire and gas detection systems at LNG facilities. BLUE developed a performance-based approach that utilizes Location Specific Individual Risk contours to identify which locations within the facility present the highest level of risk, and how hazard detection resources can be allocated accordingly. The results of this analysis are summarized in report 03902-RP-002 dated June 26, 2020. It is important to note that, in order to demonstrate the application of this methodology, a set of hazard thresholds and risk criteria had to be specified, however, the methodology is independent of the chosen criteria – that is, users may choose to apply different criteria but remain able to adopt this methodology as described.

A conference call with PHMSA and the TAP was held on June 3, 2020 via WebEx. The TAP also had the opportunity to review and comment on a draft version of the report prior to submission to PHMSA.

### 4.2 Task 4 – Identify Hazard Scenarios

Fire and explosion risk assessments typically include a range of potential releases, varying from pinhole leaks to full-bore ruptures. It is not feasible to design a fire and gas detection system capable of detecting every conceivable leak. Therefore, the list of potential

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hazard scenarios used to evaluate fire and gas detection systems should exclude scenarios with minor risk contribution and focus on scenarios that require mitigation. BLUE demonstrated that a quantitative risk assessment could be used to determine the unmitigated risk of the facility (without hazard detection), followed by a hole size sensitivity to determine which hole sizes are driving the risk profile. The detector performance targets established under the Task 3 methodology could then be evaluated using this reduced set of hazard scenarios.

A complete demonstration of the approach developed in Task 4 is provided in report 03902-RP-003 dated June 26, 2020; the TAP had the opportunity to review and comment on a draft version of the report prior to submission to PHMSA. The results of Task 4 were also included in the progress meeting held on June 3, 2020.

### 4.3 Task 5 – Consequence Modeling

Task 5 compares 2D and 3D hazard modeling techniques to evaluate hazard detector performance against the detector criteria established in Task 3 and the hazard scenarios identified in Task 4. This work is ongoing and will continue into Quarter 4 of the project.

### 4.4 Task 8 – Project Management

All project reports due this quarter are complete and submitted to PHMSA.

## 5 Project Schedule

The project team's efforts to advance the project schedule are summarized below:

- The project is on schedule;
- The overall schedule shown in Figure 5-1 remains on track and no changes in the project schedule have been required;
- The project team remains highly engaged and stable (with no changes in personnel).

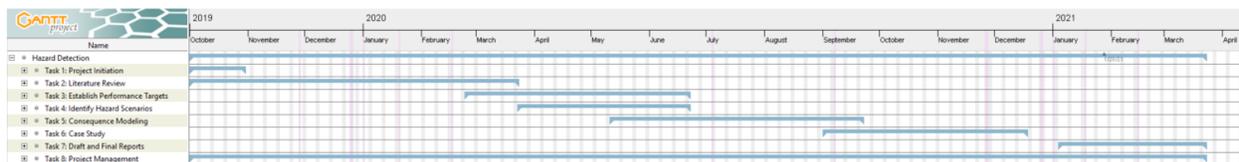


Figure 5-1: Project Schedule

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## 6 Status Report Summary

Three payable milestones were completed in the current quarter:

- 1) Establish Detector Performance Targets
- 2) Identify Hazard Scenarios
- 3) Quarterly status report

Work for the project is currently on schedule and projected to remain on schedule.