

	<b>Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling</b>	03903-QRP-005
	Q5 Status Report	Rev A
	Public	Page 1 of 6



# Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling

Agreement #693JK31910009POTA

Quarterly Status Report – Q5

Public

December 29, 2020

6011 University Blvd, Suite 220  
Ellicott City, MD 21043  
DUNS: 081360388  
EIN: 83-1234215

Project Manager: Dr. Filippo Gavelli, P.E.  
Phone: 410-680-3568  
Email: fgavelli@blueeandc.com  
<https://blueengineeringandconsulting.com>

In Collaboration with: Gas Technology Institute



	<b>Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling</b>	03903-QRP-005
	Q5 Status Report	Rev A
	Public	Page 2 of 6

## 1 Items Completed During this Quarterly Period

The performance period for the research project is 27 months, from September 30, 2019 through December 31, 2021. The current quarter closes on December 29, 2020. The PHMSA Agreement Officer’s Representative (AOR) for this project is Robert Smith and the Technical Task Inspector (TTI) is Mr. Thach Nguyen.

Table 1-1 shows the items and deliverables completed to date; the items in gray were completed during earlier quarters, while the items in green were completed during this Quarter. The items in orange were not completed during this Quarter. The items in blue (light and dark) are not yet due.

	Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling	03903-QRP-005
	Q5 Status Report	Rev A
	Public	Page 3 of 6

Table 1-1. Items Completed

Item No.	Task No.	Activity	Deliverable	Due Quarter No.	Completion %
1	1	Conduct kick-off Team meeting to review scope, tasks, deliverables and schedule, and to gather initial insights.	Kick-Off meeting minutes	1	100%
2	8	1st Quarterly Status Report	Submit 1st quarterly report	1	100%
3	2	Review literature on model evaluation and validation requirements; develop Model Evaluation methodology	Model Evaluation methodology report	2	100%
4	8	2nd Quarterly Status Report	Submit 2nd quarterly report	2	100%
3a	2a	Review literature on model evaluation and validation requirements; develop Model Evaluation methodology Revised to include Source Term models	Revised Model Evaluation methodology report	3	100%
7	8	3rd Quarterly Status Report	Submit 3rd quarterly report	3	100%
5	3	Define the Uncertainty Quantification Set; Identify and Characterize Sources of Uncertainties; Define the Uncertainty Propagation Method; Publish the UQ Protocol	Report on Uncertainty Quantification Protocol	4	100%
6	4.1	Review literature on experimental series and assemble model validation database for dispersion of non-LNG flammable releases	Model validation database for dispersion of non-LNG flammable releases	4	100%
9	5.1	Publish Model Evaluation Protocol for dispersion of non-LNG flammable releases	Model Evaluation Protocol for dispersion of non-LNG flammable releases	4	100%
10	8	4th Quarterly Status Report	Submit 4th quarterly report	4	100%
26	4.0	Review literature on experimental series and assemble model validation database for source term	Model validation database for source term	5	20%
8	4.2	Review literature on experimental series and assemble model validation database for dispersion of toxic releases	Model validation database for dispersion of toxic releases	5	100%
12	5.2	Publish Model Evaluation Protocol for dispersion of toxic releases	Model Evaluation Protocol for dispersion of toxic releases	5	100%
13	8	5th Quarterly Status Report	Submit 5th quarterly report	5	100%
11	4.3	Review literature on experimental series and assemble model validation database for vapor cloud explosions	Model validation database for vapor cloud explosions	6	0%
27	5.0	Publish Model Evaluation Protocol for source term	Model Evaluation Protocol for source term	6	0%
16	8	6th Quarterly Status Report	Submit 6th quarterly report	6	0%
14	4.4	Review literature on experimental series and assemble model validation database for BLEVEs	Model validation database for BLEVEs	7	0%
15	5.3	Publish Model Evaluation Protocol for vapor cloud explosions	Model Evaluation Protocol for vapor cloud explosions	7	0%
19	8	7th Quarterly Status Report	Submit 7th quarterly report	7	0%
17	5.4	Publish Model Evaluation Protocol for BLEVEs	Model Evaluation Protocol for BLEVEs	8	0%
20	8	8th Quarterly Status Report	Submit 8th quarterly report	8	0%
18	6	Develop Recommendations for Model Evaluation	Report on Recommendations for Model Evaluation	9	0%
19	7	Prepare and Submit Draft Final Report	Submit draft final report	9	0%
21	8	Prepare & Present Paper at public event or publish paper in journal/magazine	Prepare & Present Paper at public event or publish paper in journal/magazine		100%
22	8	Final Virtually Held Info Dissemination Meeting	Final Virtually Held Info Dissemination Meeting		0%
23	8	Peer Review #1 - Virtually Administered	Prepare presentation and present. Submit presentation file.		100%
24	8	Peer Review #2 - Virtually Administered	Prepare presentation and present. Submit presentation file.		0%
25	7	Address Comments and Submit Final Report	Submit final report		0%

	<b>Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling</b>	03903-QRP-005
	Q5 Status Report	Rev A
	Public	Page 4 of 6

## 2 Items Not Completed During this Quarterly Period

Items 26, “Review literature on experimental series and assemble model validation database for source term” with “Model validation database for source term” as deliverable was scheduled to be completed during this Quarter but was not completed during this Quarter due to other tasks taking longer than anticipated. The implications of this delay on the overall project schedule will be discussed with the TTI during the next Quarter.

## 3 Project Financial Tracking During this Quarterly Period

The contract for this research project is fixed-price. The current project financial tracking is shown in Figure 3-1. Work for the project is slightly behind on schedule as discussed in section 2; however, the project remains on budget relative to the work completed to date.

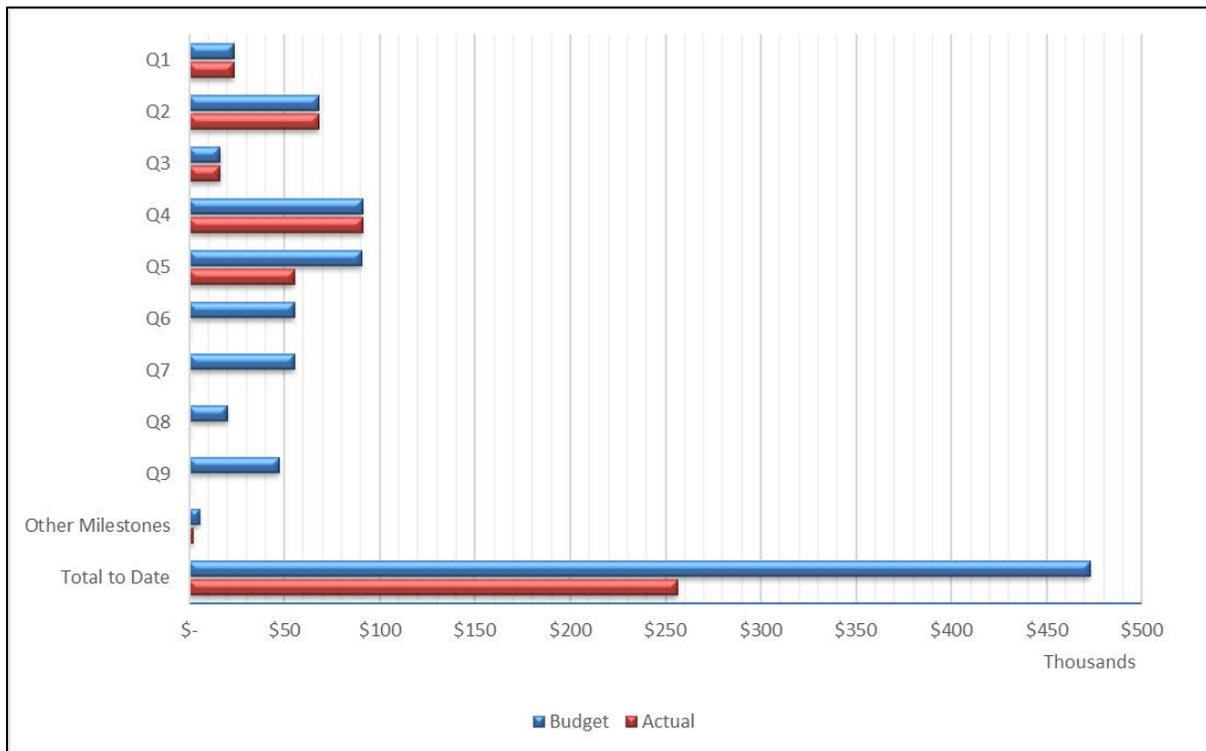


Figure 3-1: Project Financial Tracking

	<b>Develop an Evaluation Protocol for Non-LNG Release Hazards – Modeling</b>	03903-QRP-005
	Q5 Status Report	Rev A
	Public	Page 5 of 6

## 4 Project Technical Status

### 4.1 Task 4.0 – MVD for Source Terms

Work on Task 4.0 is in progress and expected to be completed during Q6.

### 4.2 Task 4.2 – MVD for the Dispersion of Toxic Releases

Work on Task 4.2 is now complete; the final report for this task was submitted in Q5.

### 4.3 Task 4.3 – MVD for Vapor Cloud Explosions

Work on Task 4.3 has been delayed. An updated schedule will be discussed with the TTI during Q6.

### 4.4 Task 5.2 – MEP for the Dispersion of Toxic Releases

Work on Task 5.2 is now complete; the final report for this task was submitted in Q5.

### 4.5 Task 6 – Develop Recommendations for Model Evaluation

The start of work on Task 6 has been delayed. An updated schedule will be discussed with the TTI during Q6.

### 4.6 Task 8 – Project Management

A full manuscript was submitted to the 2020 Mary Kay O’Connor Process Safety Symposium, held at Texas A&M University in October 2020; the paper accompanied a public presentation (held remotely). The topic of the paper was “Towards a comprehensive model evaluation protocol for LNG hazard analyses”. The paper and presentation complete the requirement to “Prepare & Present Paper at public event or publish paper in journal/magazine” (item 21 in Table 3-1).

A peer review meeting was held on October 14, 2020. The meeting completed the requirement for “Peer Review #1” (item 26 in Table 3-1).

The Q5 report was submitted on December 29, 2020.

## 5 Project Schedule

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

- The project is now slightly behind schedule;
- The overall schedule in Figure 5-1 shows the tasks completed (in green), those currently affected by delay (in orange) and those to be completed in later quarters (in yellow), per the schedule revisions in Mod. 002;
- The project team remains highly engaged and stable (with no changes in personnel).

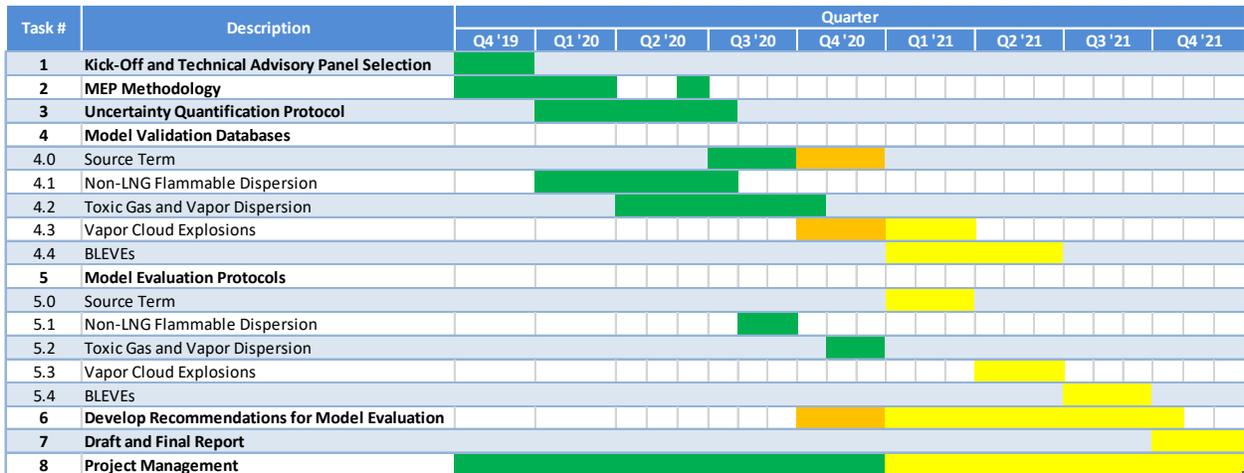


Figure 5-1: Project Schedule

### 5.1 Future Activities

Project team resources in Quarter 6 will be focused on completing Task 4.0 “Model Validation Database for Source Term” and working on Task 4.3 “Model Validation Database for Vapor Cloud Explosions” and Task 5.0 “Model Evaluation Protocol for Source Term”.