

## Quarterly Report – Public Page

**Date of Report:** 1st Quarterly Report - December 31, 2024

**Contract Number:** 693JK32410009POTA

**Prepared for:** U.S. DOT Pipeline and Hazardous Materials Safety Administration

**Project Title:** LNG Knowledge Development – Consequences of Catastrophic Failure of LNG Storage Tanks

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**For quarterly period ending:** December 31, 2024

### 1: Items Completed During this Quarterly Period:

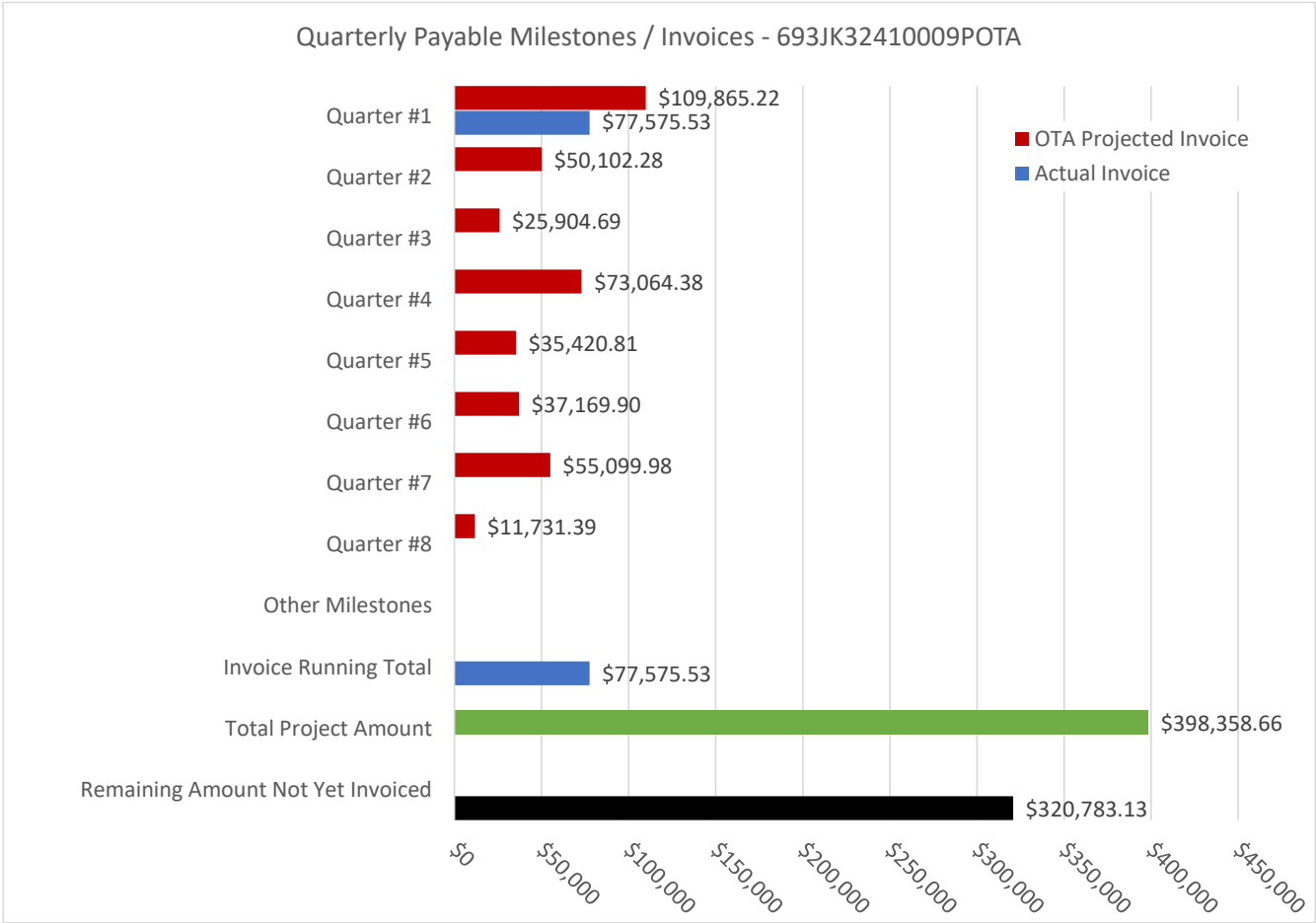
<i>Item #</i>	<i>Task #</i>	<i>Activity/Deliverable</i>	<i>Title</i>
1	1	Literature Review	Summary of Literature Review in the BoA
2	1	Review and Identification of Representative LNG Tank Designs	Properties of the LNG tanks to be analyzed and discussion in the BoA
3	1	Development of Hazard Scenarios	Determination of LNG tank failure hazard scenarios and summary in the BoA
5	1	Development of Analysis Parameters	Summary of analysis and modeling parameters in the BoA
6	5	Basis of Assessment (BoA)	Submit BoA
7	5	1st Quarterly Status Report	Submit 1st quarterly report

### 2: Items Not Completed During this Quarterly Period:

The project is on time.

<i>Item #</i>	<i>Task #</i>	<i>Activity/Deliverable</i>	<i>Title</i>
4	1	PHA Support and Coordination	PHA report

3: Project Financial Tracking During this Quarterly Period:



4: Project Technical Status –

We started work in the first quarter and reached out to our industry and academy contacts to form a technical advisory panel (TAP). We had a project kickoff meeting with TAP members and PHMSA on 9 November 2023. The work is progressing on track, and we are continuing discussions with our TAP members. We completed data and literature review to determine the typical structures, piping, and equipment to be evaluated in our study, PFP and CSP types to be considered, and analysis scenarios. We developed the research project basis of assessment (BoA) document in this quarter, and it will be officially issued in the first half of January. The technical status of each task completed in this quarter is summarized below.

[Item 1] [Task 1] [Literature Review] [Summary of Literature Review in the BoA]

We performed a detailed literature survey on the hazards due to catastrophic failure of LNG tanks and code requirements. Our literature survey also included review of LNG tank designs from previous projects, guideline documents, and research reports. In our BoA, we summarized the requirements and technical approach for assessment of catastrophic LNG tank failure effects. We developed flowcharts showing the work process, critical steps of each task, and the Hazard Identification and Characterization (HAZ-ID-C) methodology.

[Item 2] [Task 1] [Review and Identification of Representative Designs] [Properties of the LNG tanks to be analyzed and discussion in the BoA]

We reviewed LNG tank designs and hazard scenarios from previous projects. We identified three main groups and representative types of LNG tank categories including small volume and high-pressure LNG tanks (gross

capacity up to 1,000 m<sup>3</sup>), medium size (50,000 to 100,000 m<sup>3</sup> gross capacity) single containment steel tank, and large (150,000 to 200,000 m<sup>3</sup> gross capacity) full containment steel-concrete tank. The selection of LNG tanks and key parameters will be discussed with TAP members and confirmed in the next quarter.

*[Item 3] [Task 1] [Development of Hazard Scenarios] [Determination of LNG tank failure hazard scenarios and summary in the BoA]*

We reviewed the literature and previous project work on hazard scenarios and catastrophic failure mechanisms for LNG tanks. The hazard scenarios and screening approach are presented in the BoA and will be discussed with TAP members in the next quarter.

*[Item 5] [Task 1] [Development of Analysis Parameters] [Summary of analysis and modeling parameters in the BoA]*

We determined and documented the analysis parameters in our BoA. These include the material properties, dimensions, and configuration of typical pressure vessels, and analysis cases to be simulated in our finite element models. Structural and process safety analysis parameters, range of facilities, and hazard scenarios are discussed in the BoA. Actual hazard scenarios and analysis cases will be confirmed after discussions with the TAP members.

*[Item 6] [Task 5] [Basis of Assessment (BoA)] [Submit BoA]*

Our team developed the draft BoA during this quarter. This comprehensive document presents findings from our literature review, previous project experience, technical approach and the workflow.

*[Item 7] [Task 5] [1st Quarterly Status Report] [Submit 1st quarterly report]*

This task includes project management, administration, and progress reporting. We discussed the project objectives, methodology, testing program, and analysis approach with project team members and reached out to our industry and academia contacts to form a TAP. Monthly progress reports were shared on PRIMIS, and the first quarterly report was developed.

## **5: Project Schedule –**

The project is on schedule. HAZ-ID-C will be performed in the next quarter.

*[Item 4] [Task 1] [PHA Support and Coordination] [PHA report]*

We developed the technical approach, guidewords and terms of reference for the HAZ-ID-C. This workshop will be attended by industry experts from our TAP and will be conducted in Q1 of 2025. HAZ-ID-C is a critical part of our research to get feedback from industry representatives. Due to coordination requirements and availability of key attendees the workshop got postponed. The other tasks will progress in parallel, and this delay does not affect the overall project schedule.