**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

**Lead Agency: Utah Department of Transportation**

**INSTRUCTIONS:**

*Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.*

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| **Transportation Pooled Fund Program Project #**  **TPF-5(350)** | | **Transportation Pooled Fund Program - Report Period:**  \_ Quarter 1 (January 1 – March 31, 2016)  \_ Quarter 2 (April 1 – June 30, 2016)  \_ Quarter 3 (July 1 – September 30, 2016)  **x Quarter 4 (October 1 – December 31, 2016)** | |
| **Project Title:**  Development of Next Generation Liquefaction (NGL) Database for Liquefaction-Induced Lateral Spread | | | |
| **Name of Project Manager(s):**  David Stevens | **Phone Number:**  801-589-8340 | | **E-Mail**  davidstevens@utah.gov |
| **Lead Agency Project ID:**  FINET 42080, ePM PIN 15017  UDOT PIC No. PL05.350 | **Other Project ID (i.e., contract #):**  UDOT Contract No. 17-8236 | | **Project Start Date:**  September 8, 2016 |
| **Original Project End Date:**  March 31, 2019 | **Current Project End Date:**  March 31, 2019 | | **Number of Extensions:** |

Project schedule status:

**X** On schedule \_ On revised schedule \_ Ahead of schedule \_ Behind schedule

Overall Project Statistics:

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| **Total Project Budget** | **Total Cost to Date for Project** | **Percentage of Work**  **Completed to Date** |
| $110,354.93 (current contract)  $120,000.00 (total TPF commitments) | $0 (paid by UDOT)  $10,020 (at the U. of Utah) | 5% |

***Quarterly*** Project Statistics:

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| **Total Project Expenses**  **and Percentage This Quarter** | **Total Amount of Funds**  **Expended This Quarter** | **Total Percentage of**  **Time Used to Date** |
| This Quarter = 6%  Total Project = 10% | $5,920 | 10% |

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| **Project Description**:  This research will be conducted in conjunction with the Pacific Earthquake Engineering Research (PEER) Center and various state DOTs via a pool-fund study managed by the Utah Department of Transportation (UDOT). The Mountain Plains Consortium (MPC) is also providing funding for certain aspects of this study, under separate contract with the University of Utah. The research topic addresses the need to improve empirical, semi-empirical, analytical and numerical methods to estimate the amount of permanent ground displacement associated with liquefaction-induced lateral spread resulting from several major earthquakes. This scope of work addresses the development of a lateral spread community database as part of the PEER Next Generation Liquefaction Project (http://peer.berkeley.edu/lifelines/projects/ngl/). It does not address predictive model development for lateral spread evaluations, which is future effort planned by PEER, but not included in this work plan.  The primary outcome of this research is a vetted and community database of seismic, topographical, geotechnical and horizontal displacement measurements pertaining to case histories of liquefaction-induced lateral spread for further research and model development by other researchers and investigators under the auspices of the PEER Center (http://peer.berkeley.edu/). Secondary outcomes will be web host and publishing required to house and disseminate this database and its supporting information.  Phase I Tasks include (funded):  (1) Kickoff meeting and procurement of software  (2) Development of data quality indicators/metrics, quality assurance and database population protocols  (3) Defining methods for quantifying uncertainty of key inputs  (4) Development and structuring of database  (5) Selection of case histories  (6) Obtaining and screening of case history information  (7) Population of case history database  (8) Phase I Reporting  (9) Database dissemination  Phase II Tasks include (not yet funded):  (10) Review and Development of Screening Criteria for Lateral Spread Potential  (11) Phase II Reporting  The principal investigators for this study will be Drs. Steven Bartlett (U. of Utah), Steven Kramer (U. of Washington and PEER Research Executive Committee Member), Kevin Franke (Brigham Young University) and Daniel Gillins (NOAA and consultant). The technical advisory committee (TAC) for the study currently includes representatives from Utah, California, Oregon, and Washington State DOTs. The MPC is providing additional funding for the study. |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**  **Task 1** – Scope of work has been negotiated with BYU. OSU (Dan Gillins) has left the university, so OSU will not be participating in the study. Dan Gillins, now with NOAA will continue as a consultant and PI of the study. OSU student support will be shifted to BYU and U of U.  **Task 2** – In progress, but not finalized.  **Task 3** – In progress.  **Task 4** – U. of Utah has structured the database.  **Task 5** – No work yet.  **Task 6** – Work on the Niigata, Japan case histories in progress.  **Task 7** – Started.  **Task 8** – No work yet.  **Task 9** – No work yet.  TAC meetings – None were held this quarter.  Contract – No changes were made. |
| **Anticipated work next quarter**:  **Task 1** – Finalize SOW and contract with U. of Washington. The Kickoff Meeting Summary will be submitted to UDOT for sharing with the TAC.  **Task 2** – Database quality indicator system will be established during this quarter.  **Task 3** – Continue to inventory methods of quantifying uncertainty and data quality.  **Task 4** – Seek review from BYU and U.W. regarding developed structure.  **Task 5** – Prioritization of case histories for database entry.  **Task 6** – Involve other universities in case history screening.  **Task 7** – Continue population of data set.  **Task 8** – None.  **Task 9** – None.  TAC meetings – None are planned this quarter.  Contract – UDOT will work with the TAC members to transfer their remaining funding commitments to Utah. UDOT will also coordinate with representatives of Questar Gas Company regarding their potential funding contribution to the study. |

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| **Significant Results:**  Database structure is completed. Population of database with Niigata, Japan case history is underway. We will use this as an example to check for completeness of the database and make modification, as we progress. |
| **Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that**  **might affect the completion of the project within the time, scope and fiscal constraints set forth in the**  **agreement, along with recommended solutions to those problems).**  None. |

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| **Potential Implementation:**  None yet. |