EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 4-54

☐ Other ☐ Amendment Number:

Contract Number: EP-D-14-032

Contract Period: 09/16/2014 To 09/15/2019

Base Option Period Number 4

Title of Work Assignment/SF Site Name: Megacities Partner - L.America

Contractor: INDUSTRIAL ECONOMICS, INCORPORATED

Specify Section and paragraph of Contract SOW: 2,3,7,8,12,14

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/16/2018 To 09/15/2019

Comments:
The work plan and cost estimate dated 04/26/2019 have been received, reviewed, and approved for 760 hours and $89,895.42. No previously performed work shall be duplicated.

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

SFO (Max 2) ☐

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

		Cost/Fee	LOE
Contract Period:	09/16/2014 To 09/15/2019	$0.00	0
This Action:		$89,895.42	760
Total:		$89,895.42	760

Work Plan / Cost Estimate Approvals

		Cost/Fee	LOE
Contractor WP Dated:	04/26/2019	$89,895.42	760
Cumulative Approved:		$89,895.42	760

Work Assignment Manager Name: Paul Almodovar
(Signature) (Date)
Branch/Mail Code:
Phone Number: 919-541-0283
FAX Number:

Project Officer Name: Carolyn Blake
(Signature) (Date)
Branch/Mail Code:
Phone Number: 919-541-5256
FAX Number:

Other Agency Official Name:
(Signature) (Date)
Branch/Mail Code:
Phone Number:
FAX Number:

Contracting Official Name: Natalia Fisher-Jackson
Natalia Fisher Jackson (Signature) 5/7/2019 (Date)
Branch/Mail Code:
Phone Number: 919-541-3564
FAX Number:

Work Assignment Form. (WebForms v1.0)

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 4-55

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-D-14-032	09/16/2014 To 09/15/2019 Base Option Period Number 4	Uncertainty @ Lower PM2.5

Contractor: INDUSTRIAL ECONOMICS, INCORPORATED

Specify Section and paragraph of Contract SOW: 1,2,3,4,10,14

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 09/16/2018 To 09/15/2019

Comments:
See revised SOW (changes highlighted in yellow). Contractor shall prepare a revised work plan/cost estimate in response to the amended SOW. No previously performed work shall be duplicated.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

SFO (Max 2) ☐

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 09/16/2014 To 09/15/2019 Cost/Fee: LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: Cost/Fee LOE:

Cumulative Approved: Cost/Fee LOE:

Work Assignment Manager Name Neal Fann (Signature) (Date)	Branch/Mail Code: Phone Number: 919-541-0209 FAX Number:	
Project Officer Name Carolyn Blake (Signature) (Date)	Branch/Mail Code: Phone Number: 919-541-5256 FAX Number:	
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:	
Contracting Official Name Natalia Fisher-Jackson Natalia Fisher Jackson (Signature) 5/1/19 (Date)	Branch/Mail Code: Phone Number: 919-541-3564 FAX Number:	

I. TITLE: Characterizing Uncertainty at Lower $PM_{2.5}$ Concentrations

II. WORK ASSIGNMENT MANAGER (WAM):

Neal Fann
EPA, OAQPS, OAR
C539-07
RTP, NC 27711
919-541-0209

Alternate:

Elizabeth Chan
EPA, OAQPS, OAR
C539-07
RTP, NC 27711
919-541-3771

III. PERIOD OF PERFORMANCE:

Duration: Upon CO approval through September 15, 2019

IV. BACKGROUND:

The Agency has employed a number of techniques for characterizing the magnitude, distribution and uncertainty associated with $PM_{2.5}$-related health effects. For example, when describing the uncertainty associated with PM-related mortality, the Agency has drawn upon the results of the 2006 PM Expert Elicitation, wherein 12 experts described the shape and magnitude of the concentration-response relationship and the probability of a threshold (or safe level) below which PM-related effects were not expected to occur. All but one Expert reported that the PM-mortality relationship was log-linear without a threshold; one Expert believed a threshold may exist at relatively low $PM_{2.5}$ levels.

Beginning in 2010, the Agency began reporting the number of PM-related premature deaths estimated to occur above and below the Lowest Measured Levels (LMLs) of the two long-term cohort studies used to quantify PM mortality risk. In this analysis, the Agency noted that it was less confident in PM-related effects estimated to occur below these LMLs. Regulatory Impact Analyses reporting benefits this way find that most avoided deaths occur above the LMLs of each study. More recently, the Agency has begun reporting the number of avoided (or incurred) PM-related deaths at annual mean PM concentrations that correspond to the levels observed in the American Cancer Society long-term cohort study. Following this approach, the Agency indicates it is most confident in results occurring at model-predicted $PM_{2.5}$ levels that correspond to the mass of the PM air quality distribution observed in the epidemiological study used to quantify risk.

Researchers continue to develop new quantitative techniques for characterizing the uncertainty associated with effects estimated at lower PM levels. This work assignment directs the Contractor to support the Agency as it evaluates a new approach to characterizing this uncertainty.

V. STATEMENT OF WORK (SOW):

Task #1: Develop Work Plan

The Contractor shall develop a work plan for this work assignment, including a cost estimate. The Contractor shall submit the proposed work plan no later than twenty (20) days following approval and receipt of this work assignment. In addition, the Contractor shall provide monthly progress reports to be submitted with the invoice in the manner described in this contract.

Task #2: Validate two approaches to characterizing uncertainty

The Contractor shall replicate and validate two approaches described in the U.S. EPA-authored white paper titled "Quantitative Characterization of Uncertainty in the Concentration-Response (C-R) Relationship for Long-Term $PM_{2.5}$ Exposure and Mortality at Low $PM_{2.5}$ Concentrations." These two approaches include those titled: (1) Estimation of Hazard Ratios and Corresponding Confidence Intervals through Stepwise Assessment of PM2.5 Concentrations; and (2) Calculation of Uncertainty at Alternative Mean Annual PM2.5 Concentrations."

The white paper provides the R code used to derive each technique. The Contractor shall run this R code and validate the results reported in the memo.

Deliverables:
2.1 Validated R code

Task #3: Parametrize BenMAP-CE health impact functions

The Contractor shall construct BenMAP-CE-ready health impact functions that implement approach #1 above. This task shall include specifying a custom uncertainty distribution as needed. The Contractor shall, at minimum, parametrize all-cause mortality functions for the long-term cohort studies specified in the white paper and functions for as many as five other all-cause or cause-specific functions derived from WA-COR specified long-term cohort studies. **The Contractor shall further parametrize the Global Exposure Mortality Model function, specifying a function that incorporates a concentration-specific standard error.**

The Contractor shall validate these functions by calculating the functions outside of the BenMAP-CE tool in R and confirming that both BenMAP-CE and the R code yield

the same mean estimate and percentile values. The Contractor shall document its approach for deriving the health impact functions in the form of a memorandum to the WA-COR. At the direction of the WA-COR, the Contractor shall also update the user manual.

Deliverables:
3.1 Validated health impact functions
3.2 Memorandum and revised user manual

Task #4: Modify the BenMAP-CE software to address bugs

At the direction of the WA-COR, modify the BenMAP-CE software to address bugs encountered in task #3. The Contractor shall further modify the code to address any other bugs specified by the WA-COR.

Deliverables:
4.1 Revised version of the BenMAP-CE program

VI. Quality Assurance Requirements:

It is the policy of OAQPS that within the constraints of available resources, QA activities shall be conducted to assure environmental data generated, processed or used for its program requirements will be of known quality and will achieve prescribed data quality objectives. Furthermore, the data will be adequate and sufficient for their intended use. This Work Assignment involves one or more environmental data operations (EDO), defined as "work performed to obtain, use or report information pertaining to environmental processes and conditions." As such, the Contractor shall be in compliance with the requirements of CIO 2105.0, Policy and Program Requirements for the Mandatory Agency Wide Quality System and the American National Standard-Specifications and Guidelines for Environmental Data Collection and Environmental Technology Programs (ANSI/ASQC-E4-2014). The quality assurance policy of EPA requires every EDO to have a written and approved quality assurance project plan (QAPP) prior to the start of the EDO. The QAPP should address the requirements in EPA QA/G-5 available at http://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5. Since this work assignment is a continuation of previous work assignments (4-44 & 4-45) and the scope and data quality objectives associated with the project have not changed, the previously approved QAPP (5/14/2013) is still in effect for this work assignment.

VII. REPORTING REQUIREMENTS:

All reports shall be in accordance with contract specifications. The Contractor shall submit work products in electronic as well as hard copy form. In addition, the Contractor shall deliver to the WAM each draft and final report in electronic format that is readable by OAQPS's windows-based word-processing (Microsoft Word 2016), graphics (Microsoft PowerPoint 2016), spreadsheet (Excel 2016), and database (Access 2016) programs.

VIII. DELIVERABLES:

The Contractor shall adhere to the following schedule:

Task	Deliverable	Delivery Schedule
1	Cost estimate	20 days after effective date of WA
2	Validate method	2 weeks after effective date of WA
3	Parametrized functions	1 month after effective date of WA
4	Bug fixes	4 months after effective date of WA