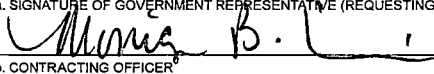


<b>INTERAGENCY AGREEMENT</b>		1. IAA NO. NRC-HQ-60-14-T-0008/M0006			PAGE OF 1 13	
2. ORDER NO.		3. REQUISITION NO. RES-16-0445		4. SOLICITATION NO.		
5. EFFECTIVE DATE 09/07/2016		6. AWARD DATE 09/07/2016		7. PERIOD OF PERFORMANCE 08/01/2014 TO 01/31/2017		
8. SERVICING AGENCY PACIFIC NORTHWEST NAT LAB ALC: DUNS: +4: US DEPARTMENT OF ENERGY PACIFIC NORTHWEST SITE OFFICE PO BOX 350 MS K9-42 RICHLAND WA 99352  POC Genice Madera TELEPHONE NO. 509-372-4010				9. DELIVER TO TANYA OXENBERG US NUCLEAR REGULATORY COMMISSION OFFICE OF RESEARCH 11555 ROCKVILLE PIKE MAIL STOP TWFN 10 B58 ROCKVILLE MD 20852		
10. REQUESTING AGENCY ACQUISITION MANAGEMENT DIVISION ALC: 31000001 DUNS: 040535809 +4: US NUCLEAR REGULATORY COMMISSION TWO WHITE FLINT NORTH 11545 ROCKVILLE PIKE MAIL STOP T-5E3 ROCKVILLE MD 20852-2738 POC Jeffrey Mitchell TELEPHONE NO. 301-415-5074				11. INVOICE OFFICE US NUCLEAR REGULATORY COMMISSION ONE WHITE FLINT NORTH 11555 ROCKVILLE PIKE MAILSTOP O3-E17A NRCIPACRESOURCENRCGOV ROCKVILLE MD 20852-2738		
12. ISSUING OFFICE US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-5E03 WASHINGTON DC 20555-0001				13. LEGISLATIVE AUTHORITY Energy Reorganization Act of 1974		
				14. PROJECT ID NRCHQ2514D0001		
				15. PROJECT TITLE SEE FIELD 18 BELOW		
16. ACCOUNTING DATA See Schedule						
17. ITEM NO.	18. SUPPLIES/SERVICES			19. QUANTITY	20. UNIT	21. UNIT PRICE
	Project Title: Technical Assistance in Support of Agency Environmental Reactor Programs Master IAA: NRCHQ2514D0001 The purpose of this modification is to 1) increase the SOW's level of effort by incorporating NRC comments on Tasks 1-4 that have been completed to date, and to incorporate Sub-Tasks 5.1, 5.2, and 5.3 into Task 5, 2) increase the total ceiling by \$215,257 from \$215,671 to \$430,928, and 3) to provide \$230,928 of incremental funding increasing the total obligation amount from \$200,000 to \$430,928. Continued ...					
23. PAYMENT PROVISIONS				24. TOTAL AMOUNT \$230,928.00		
25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (SERVICING)				25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (REQUESTING) 		
25b. NAME AND TITLE		25c. DATE	25b. CONTRACTING OFFICER MONIQUE B. WILLIAMS		26c. DATE	

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

SEP 16 2016

ADM002

Accordingly the Agreement is modified as follows:  
Refer to the Statement of Work and delete in its entirety and replace with the following Statement of Work Rev 1.

The Authorized Cost Ceiling is \$430,928.00.

All other terms and conditions of this agreement remain unchanged.

Attachments: Statement of Work Rev 1

This agreement is entered into pursuant to the authority of the Energy Reorganization Act of 1974, as amended (42 U.S.C 5801 et seq.). This work will be performed in accordance with the NRC/DOE Memorandum of Understanding dated November 24, 1998. To the best of our knowledge, the work requested will not place the DOE and its contractor in direct competition with the domestic private sector.

## STATEMENT OF WORK

### REVISION NO 1

<b>NRC Agreement Number</b>  NRC-HQ-25-14-D-0001	<b>NRC Agreement Modification Number</b>  	<b>NRC Task Order Number (If Applicable)</b>  NRC-HQ-60-14-T-0008	<b>NRC Task Order Modification Number (If Applicable)</b>  6
<b>Project Title</b> Support Visual Sample Plan (VSP)			
<b>Cost Center</b>  1044	<b>B&amp;R Number</b>  	<b>DOE Laboratory</b>  The Pacific Northwest National Laboratory (PNNL)	
<b>NRC Requisitioning Office</b> RES			
<b>NRC Form 187, Contract Security and Classification Requirements</b> <input type="checkbox"/> Applicable <input type="checkbox"/> Note Applicable		<input type="checkbox"/> Involves Proprietary Information <input type="checkbox"/> Involves Sensitive Unclassified	
<input checked="" type="checkbox"/> Non Fee-Recoverable		<input type="checkbox"/> Fee-Recoverable (If checked, complete all applicable sections below)	
<b>Docket Number (If Fee-Recoverable/Applicable)</b>  		<b>Inspection Report Number (If Fee Recoverable/Applicable)</b>  	
<b>Technical Assignment Control Number (If Fee-Recoverable/Applicable)</b>  		<b>Technical Assignment Control Number Description (If Fee-Recoverable/Applicable)</b>  	

### 1.0 BACKGROUND

Visual Sample Plan (VSP) is a computer code developed at the Pacific Northwest National Laboratory (PNNL). The code's purpose is to determine the number and location of samples and perform statistical and data quality assessment in support of the decision making process for decommissioning and other health physics applications.

VSP is used by U.S. Nuclear Regulatory Commission (NRC) staff, Agreement States, licensees, and contractors to ensure confident statistically defensible decisions at a variety of facilities. The code has been successfully developed and maintained by PNNL for use by the NRC and its contractors for many years and PNNL had previously performed work on the code under the guidance of the NRC.

This modernization effort will ensure that VSP is continually upgraded and maintained to meet new information technology requirements.

## 2.0 OBJECTIVE

The objective of this contract is to support the development and maintenance of the VSP code. These contract efforts expect to (1) improve VSP-MARSSIM methods and interface, (2) development of a user expert guide, (3) incorporate COMPASS elements within VSP, and (4) analysis of the Rank-Set Sampling (RSS) module for MARSSIM applications. Yet, another contract objective, after efforts 1-4 have been completed, is to (5) address other emergent technical issues. Completion of this contract will increase efficiency and effectiveness in the determination of the number and location of samples and in statistical and data quality assessments used by the Office of Nuclear Material Safety and Safeguards (NMSS) to support the decision making process for decommissioning and other health physics applications.

## 3.0 SCOPE OF WORK

PNNL will provide all resources necessary to accomplish the tasks and deliverables described in this statement of work (SOW).

## 4.0 SPECIFIC TASKS

PNNL will perform the following tasks:

### **Task 1 – VSP-MARSSIM Methods and Interface Improvements**

PNNL will improve VSP- MARSSIM methods and interface. The requirements of this task are:

- Specify the maximum size of sampling unit and have VSP grid up the sample area in to that size decision units; apply design to each decision unit
- Add UFP-QAPP compatible formats for creating/exporting automatically generated VSP reports; automatically populate appropriate UFP-QAPP forms.
- Permit sampling of partial walls (e.g. Up to 6 ft under one design, above 6 ft using a different sampling design)
- Automatically create user defined parameter for MARSSIM 3 class definition
- Facilitate breaking a large room (e.g. Large hanger) into smaller zones or decision units with no "walls" between zones/decision units. Define zones according to MARSSIM guidelines (e.g. 100 sq m)
- Modify automatically generated reports to support multiple decision objectives or sampling goals

Estimated Effort: 30 percent of total time

Completion Date: 6 months after award of contract

*Deliverable:* 1. Monthly task status reports and Task 1 section of Task 1-4 final letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc. 2. A road map that clearly breaks down this task with deliverable dates before work is to be started.

## **Task 2 – VSP-MARSSIM Expert Guide (NUREG)**

Using the VSP expert guide framework developed for UXO, CBRN, and Rad applications, PNNL will develop an expert guide for MARSSIM applications in a NUREG format that walks the user through the workflow associated with using VSP for MARSSIM sites. Helps the user set up maps, sample areas, etc. in VSP then points them to the right module(s) for their particular objective/use.

Estimated Effort: 25 percent of total time  
Completion Date: 9 months after award of contract  
*Deliverable:* 1. Monthly task status reports and Tasks 1-4 final letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc. 2. A road map that clearly breaks down this task with deliverable dates before work is to be started.

## **Task 3 – Incorporation of COMPASS Elements Within VSP**

PNNL will review and incorporate any appropriate COMPASS code elements within VSP. The requirements of this task are:

- Review COMPASS code and list VSP duplicative and unique functions
- Incorporate unique COMPASS functions into VSP
- Add VSP new online help and modify VSP report generators with COMPASS related content

Estimated Effort: 20 percent of total time  
Completion Date: 7 months after award of contract  
*Deliverable:* 1. Monthly task status reports and Task 3 section of Task 1-4 final letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc. 2. A road map that clearly breaks down this task with deliverable dates before work is to be started.

## **Task 4 – Rank-Set Sampling Module for MARSSIM Applications**

PNNL will evaluate the use of Rank-Set Sampling (RSS) in MARSSIM Context. The requirements of this task are:

- Explore appropriate use of Rank-Set Sampling (RSS) in MARSSIM Context
- Revise VSP-RSS module (hasn't been updated for 10 years) to ensure appropriate use and make user friendly
- Revise online help and report generators in VSP for RSS

Estimated Effort: 25 percent of total time  
Completion Date: 8 months after award of contract  
*Deliverable:* 1. Monthly task status reports and Task 4 section of Task 1-4 final letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc. 2. A road map that clearly breaks down this task with deliverable dates before work is to be started.

## **Task 5 – Other VSP Enhancements (after completing Tasks 1-4)**

This task is to support emergent technical issues, as defined by the PM, with regards to VSP development and maintenance. Before initiating any effort under this task, PNNL will request approval by NRC Project Manager.

Estimated Effort: TBD

Completion Date: TBD

*Deliverable:* 1. Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc. 2. A road map that clearly breaks down this task with deliverable dates before work is to be started.

### **5.1 VSP MARSSIM VISUAL DATA DISPLAY, DATA ANALYSIS AND ASSOCIATED HELP**

PNNL will support development of new diagnostic graphs, data analysis capabilities, and complete help documentation for the new designs from incorporated COMPASS code elements within VSP. The requirements of this task are:

- Add VSP new online help and modify VSP report generators with COMPASS related content
- Update graphs for all designs, including
  - Retrospective power curves and
  - Combined retrospective and prospective power curves.
  - Validation of graphs for consistency with MARSSIM equations
- Data analysis support to make a decision based on design and sub-design type
- Update VSP help files for all designs
- Adjusting (lowering) the DCGLW for surrogate radionuclides.

Letter report describing the improvements, implementation, and limitations.

### **5.2 VSP MARSSIM Workflow Tool**

PNNL previously developed a draft expert guide for MARSSIM applications that guide the user through the MARSSIM features in VSP. This task will support building upon that tool to develop a more full-featured tool that follows the cheat sheet and incorporates information from the MARSSIM cheat sheet developed by Oak Ridge Associated Universities (ORAU), along with adding additional tools and features to VSP to better support MARSSIM Planning and Assessment Phase processes. The requirements of this task are:

- Develop phase-specific guidance within VSP for decision criteria, parameter selection, and site setup consistent with MARSSIM and NUREG guidance
- Implement a workflow tool to navigate between phases and work through the MARSSIM cheat sheet process. This workflow tool is a software

module/graphical user interface that will present logical steps and sub-steps for the user to work through the necessary survey design phases. The roadmap for this module is based on the ORAU MARSSIM cheat sheet. The design phases that the user may select are parameters such as survey unit class, design type (e.g. Wilcoxon Rank Sum (WRS) Test, Sign Test, unity rule, etc.), and Type I and Type II errors.

- Implement additional software features in VSP to support cheat sheet steps. These additional features are listed in the table below.

Feature Description	Cheat Sheet Step
Adjusting (lowering) the DCGLW for surrogate radionuclides	Planning Phase (PP) 3
Data assessment tool to use initial characterization data to develop surrogate ratios	PP 3
Site classification according to contamination potential by comparing initial characterization results to DCGL values	PP 5
Survey unit tool to divide areas into max size based on class	PP 6
Scenario B support, including tests to determine whether scenario A or B should be used and sample size calculations for scenario B	PP 7
Preliminary data review as described in MARSSIM 8.2.2	Assessment Phase (AP) 3
Data analysis support to make a decision for all variants of Sign Test and Wilcoxon Rand Sum Test designs	AP 5 and 6
Flagging of values for Elevated Measurement Comparison	AP 7
Determine that the total dose from all sources is below the release criterion	AP. 8
Post-survey data assessment tools to evaluate surrogate ratios that were used for Final Status Surveys (FSS) and verify that the MARSSIM-recommended proportion of samples from the survey unit included measurements for all radionuclides of concern including hard-to-detect (HTD) radionuclides	
Retrospective power analysis on FSS results	

Letter report describing the improvements, implementation, and limitations. Updated release of VSP including new MARSSIM Workflow Tool.

### 5.3 CONFIRMATORY SURVEY SUPPORT

This task will support development of a dedicated module in VSP to support development of confirmatory or independent verification survey sampling plan. The requirements of this task are:

- Develop detailed specifications for a confirmatory sampling module in VSP.

- Add tools to determine the location and extent of confirmatory surveys based on final status survey results.
- (Provide) data assessment tools to perform statistical evaluations and compare final status survey results side-by-side with confirmatory survey results.

Letter report describing the improvements, implementation, and limitations. Updated release of VSP including new confirmatory survey module.

#### 5.0 DELIVERABLES AND/OR MILESTONES SCHEDULE

Task Number	Deliverable/Milestone Description			Additional Comments
N/A	<i>Kickoff Meeting (within 30 days of award)</i>			
1 VSP-MARSSIM Methods and Interface Improvements	Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.			*MLSRs are due by the 20 <sup>th</sup> of each month documenting progress.
2 VSP-MARSSIM Expert Guide	Draft 5 months after award	NRC Review and Comment 7 months after award	Draft Final 9 months after award	*MLSRs are due by the 20 <sup>th</sup> of each month documenting progress.
	Review of Documentation - Ongoing			
3 Incorporation of COMPASS Elements Within VSP	Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.			*MLSRs are due by the 20 <sup>th</sup> of each month documenting progress.
4 Rank-Set Sampling Module for MARSSIM Applications	Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.			*MLSRs are due by the 20 <sup>th</sup> of each month documenting progress.
5 Other VSP Enhancements (after completing Tasks 1-4)	Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.			*MLSRs are due by the 20 <sup>th</sup> of each month documenting progress.
<b>5.1 VSP MARSSIM Visual Data display, Data Analysis and Associated Help</b>	<ol style="list-style-type: none"> <li>1. Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.</li> <li>2. Updated version of VSP with added graphs, data analysis, and help documentation.</li> </ol>			<b>October 15, 2016</b>
<b>5.2 VSP MARSSIM Workflow Tool</b>	<ol style="list-style-type: none"> <li>1. Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.</li> <li>2. Updated version of VSP with MARSSIM workflow tool and additional features.</li> </ol>			<b>December 31, 2016</b>



<b>5.3 Confirmatory Survey Support</b>	<ol style="list-style-type: none"> <li>1. Letter report describing the improvements and implementation of this task, limitations if any, areas of application, etc.</li> <li>2. Updated version of VSP with planning and assessment tools for confirmatory surveys.</li> </ol>	<b>December 31, 2016</b>
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\*Please refer to Section 9.0 REPORTING REQUIREMENTS

## 6.0 TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

This work requires staff with expertise in the development of the VSP code and in particular, code development with regard to statistical and data quality assessment for decommissioning and other health physics applications that are inherent with the code system.

## 7.0 ESTIMATED LABOR CATEGORIES AND LEVELS OF EFFORT

INTENTIONALLY LEFT BLANK

## 8.0 MEETINGS AND TRAVEL

All travel, except for the two anticipated meetings at NRC head-quarters mentioned below, requires written Government approval from the CO, unless otherwise delegated to the COR.

For the proper development and completion of this project, it is expected that two 2-person trips to the NRC head-quarters may be necessary. PNNL will develop a trip report and submit it with the Monthly Letter Status Report for that month.

Foreign travel for PNNL personnel requires a 60-day lead time for NRC approval. For prior approval of foreign travel, PNNL will submit an NRC Form 445, "Request for Approval of Official Foreign Travel." NRC Form 445 is available in the MD 11.7 Documents library and on the NRC Web site at: <http://www.nrc.gov/reading-rm/doc-collections/forms/>. Foreign travel is approved by the NRC Executive Director for Operations (EDO).

## 9.0 REPORTING REQUIREMENTS

PNNL is responsible for structuring the deliverable to follow agency standards. The current agency standard is Microsoft Office Suite 2010. The current agency Portable Document Format (PDF) standard is Adobe Acrobat 9 Professional. Deliverables will be submitted free of spelling and grammatical errors and conform to requirements stated in this section. All submissions are to be provided in WORD and PDF format.

## **Monthly Letter Status Reports**

In accordance with Management Directive 11.7, NRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy, PNNL will electronically submit a Monthly Letter Status Report (MLSR) by the 20<sup>th</sup> day of each month to the Contracting Officer Representative (COR) with copies to the Contracting Officer (CO) and the Office Administration/Division of Contracts to [ContractsPOT.Resource@nrc.gov](mailto:ContractsPOT.Resource@nrc.gov). If a project is a task ordering agreement, a separate MLSR will be submitted for each task order with a summary project MLSR, even if no work has been performed during a reporting period. Once NRC has determined that all work on a task order is completed and that final costs are acceptable, a task order may be omitted from the MLSR.

The MLSR will include the following: agreement number; task order number, if applicable; job code number; title of the project; project period of performance; task order period of performance, if applicable; COR's name, telephone number, and e-mail address; full name and address of the performing organization; principal investigator's name, telephone number, and e-mail address; and reporting period. At a minimum, the MLSR will include the information discussed in Attachment 1. The preferred format for a MLSR can also be found in Attachment 1.

### **10.0 PERIOD OF PERFORMANCE**

The estimated period of performance for this work is 6 months from date of the contract modification.

### **11.0 CONTRACTING OFFICER'S REPRESENTATIVE**

The COR monitors all technical aspects of the agreement/task order and assists in its administration. The COR is authorized to perform the following functions: assure that PNNL performs the technical requirements of the agreement/task order; perform inspections necessary in connection with agreement/task order performance; maintain written and oral communications with PNNL concerning technical aspects of the agreement/task order; issue written interpretations of technical requirements, including Government drawings, designs, specifications; monitor PNNL's performance and notify PNNL of any deficiencies; coordinate availability of NRC-furnished material and/or GFP; and provide site entry of PNNL personnel.

#### Contracting Officer's Representative

Name: Tanya Palmateer Oxenberg  
Agency: U.S. Nuclear Regulatory Commission  
Office: Office of Nuclear Regulatory Research  
Mail Stop: 3C07Am  
Washington, DC 20555-0001  
E-Mail: [Tanya.Oxenberg@nrc.gov](mailto:Tanya.Oxenberg@nrc.gov)  
Phone: 301-415-2437

#### Alternate Contracting Officer's Representative

Name: Stephanie Bush-Goddard  
Agency: U.S. Nuclear Regulatory Commission  
Office: Office of Nuclear Regulatory Research  
Mail Stop: 3C07Am

Washington, DC 20555-0001  
E-Mail: Stephanie.Bush-Goddard@nrc.gov

**12.0 MATERIALS REQUIRED (TYPE N/A IF NOT APPLICABLE)**

N/A

**13.0 NRC-FURNISHED PROPERTY/MATERIALS (TYPE N/A IF NOT APPLICABLE)**

N/A

**14.0 RESEARCH QUALITY (TYPE N/A IF NOT APPLICABLE)**

The quality of NRC research programs are assessed each year by the Advisory Committee on Reactor Safeguards. Within the context of their reviews of RES programs, the definition of quality research is based upon several major characteristics:

Results meet the objectives (75% of overall score)

Justification of major assumptions (12%)

Soundness of technical approach and results (52%)

Uncertainties and sensitivities addressed (11%)

Documentation of research results and methods is adequate (25% of overall score)

Clarity of presentation (16%)

Identification of major assumptions (9%)

It is the responsibility of PNNL to ensure that these quality criteria are adequately addressed throughout the course of the research that is performed. The NRC COR will review all research products with these criteria in mind.

**15.0 STANDARDS FOR CONTRACTORS WHO PREPARE NUREG-SERIES MANUSCRIPTS**

The U.S. Nuclear Regulatory Commission (NRC) began to capture most of its official records electronically on January 1, 2000. The NRC will capture each final NUREG-series publication in its native application. Therefore, please submit your final manuscript that has been approved by your NRC Project Manager in both electronic and camera-ready copy.

The final manuscript will be of archival quality and comply with the requirements of NRC Management Directive 3.7 "NUREG-Series Publications." The document will be technically edited consistent with NUREG-1379, Rev. 2 (May 2009) "NRC Editorial Style Guide." The goals of the "NRC Editorial Style Guide" are readability and consistency for all agency documents.

All format guidance, as specified in NUREG-0650, "Preparing NUREG-Series Publications," Rev. 2 (January 1999), will remain the same with one exception. You will no longer be required to include the NUREG-series designator on the bottom of each page of the manuscript. The NRC will assign this designator when we send the camera-ready copy to the printer and will place the designator on the cover, title page, and spine. The designator for each report will no longer be assigned when the decision to prepare a publication is made. The NRC's Publishing Services Branch will inform the NRC Project Manager for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, PNNL will prepare the text in Microsoft Word, and use any of the following file types for charts, spreadsheets, and the like.

File Types to be Used for NUREG-Series Publications	
File Type	File Extension
Microsoft®Word®	.doc
Microsoft® PowerPoint®	.ppt
Microsoft®Excel	.xls
Microsoft®Access	.mdb
Portable Document Format	.pdf

This list is subject to change if new software packages come into common use at NRC or by our licensees or other stakeholders that participate in the electronic submission process. If a portion of your manuscript is from another source and you cannot obtain an acceptable electronic file type for this portion (e.g., an appendix from an old publication), the NRC can, if necessary, create a tagged image file format (file extension.tif) for that portion of your report. Note that you should continue to submit original photographs, which will be scanned, since digitized photographs do not print well.

If you choose to publish a compact disk (CD) of your publication, place on the CD copies of the manuscript in both (1) a portable document format (PDF); (2) a Microsoft Word file format, and (3) an Adobe Acrobat Reader, or, alternatively, print instructions for obtaining a free copy of Adobe Acrobat Reader on the back cover insert of the jewel box.

## 16.0 OTHER CONSIDERATIONS (TYPE N/A IF NOT APPLICABLE)

### References

N/A

### Access to Non-NRC Facilities/Equipment

N/A

### Applicable Publications

N/A

Controls over document handling and non-disclosure of materials  
N/A