

INTERAGENCY AGREEMENT		1. AAW NO NRC-HQ-60 14-T-0010/M0006	PAGE 1	OF 2
2. ORDER NO		3. REQUISITION NO RES-16-0398	4. SOLICITATION NO.	
5. EFFECTIVE DATE 08/25/2016	6. AWARD DATE 08/25/2016	7. PERIOD OF PERFORMANCE 09/02/2014 TO 03/30/2018 <i>Sandra start date is date of SFO CD acceptance</i>		
8. SERVICING AGENCY ALBUQUERQUE SANDIA NATL LAB ALC: DUNS: 155505027 +4: DOENNSASFO CONTRACTING OFFICER PO BOX 5400 ALBUQUERQUE NM 87185-5400 POC MARY BOGGS <i>Christine Whitley</i> TELEPHONE NO 505-845-6055 <i>(505)844-3811</i>		9. DELIVER TO SALMAN HAQ US NUCLEAR REGULATORY COMMISSION 11555 ROCKVILLE PIKE MAIL STOP TWPN 10 B58 ROCKVILLE MD 20852		
10. REQUESTING AGENCY ACQUISITION MANAGEMENT DIVISION ALC: 11000001 DUNS: 040535809 +4: US NUCLEAR REGULATORY COMMISSION ONE WHITE FLINT NORTH 11555 ROCKVILLE PIKE ROCKVILLE MD 20852-2738 POC Shashi Malhotra TELEPHONE NO 301-415-7803		11. INVOICE OFFICE Multiple U.S. Nuclear Regulatory Commission One White Flint North 11555 Rockville Pike Mailstop O3-E17A Rockville, MD 20852-2738		
12. ISSUING OFFICE NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWPN-5E03 WASHINGTON DC 20555-0001		13. LEGISLATIVE AUTHORITY Energy Reorganization Act of 1974		
16. ACCOUNTING DATA 2016-X0200-REIM-60-600003-11-R-727-1307-253D		14. PROJECT ID		
17. ITEM NO		15. PROJECT TITLE SEE BLOCK 18		
18. SUPPLIES/SERVICES		19. QUANTITY	20. UNIT	21. UNIT PRICE
Master IAA: NRCHQ6013D0001 Project Title: Additional Post-SOARCA MELCOR Analysis The purpose of this modification is to (1) expand additional within scope Task 6, as a result the authorized cost ceiling is increased by \$499,061.00 from \$1,256,111.00 to \$1,755,172.00; (2) provide incremental funding in the amount of \$180,000.00 and 3) extend the period of performance through March 30, 2018. Continued ...		450140374 (7000100)	3Z	
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		Annette M. Leyba, Certifying Officer PPB&E, SPP, NA-MB-53		
23. PAYMENT PROVISIONS		24. TOTAL AMOUNT \$180,000.00		
25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (SERVICING) <i>[Signature]</i>		25b. SIGNATURE OF GOVERNMENT REPRESENTATIVE (REQUESTING) <i>[Signature]</i>		
25c. NAME AND TITLE Son E. Holmberg, Contracting officer		25d. DATE 9/2/16		25e. CONTRACTING OFFICER JEFFREY R. MINNELL
		25f. DATE <i>[Signature]</i>		

Accordingly the agreement is modified as follows:

Reference to the "Statement of Work," is hereby deleted in its entirety and replaced with the following Statement of Work attached to this Modification No. 6 entitled "Statement of Work, Rev. 2."

The new authorized cost ceiling is \$1,755,172.00.

This modification provides incremental funding in the amount of \$180,000.00, thereby increasing the total obligations for this Agreement from \$1,256,111.00 to \$1,436,111.00 .

→ The Period of Performance is hereby revised as follows:

~~02/02/2014~~ through 03/30/2018.

Sandra start date is date of SFO CO acceptance

All other terms and conditions remain unchanged.

DUNS:040535809

→ TAS:31X0200.320

ALC:31000001

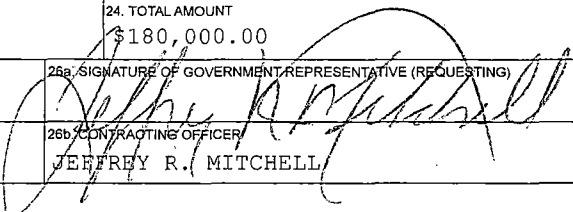
→ This agreement is entered into pursuant to the authority of the Energy Reorganization Act of 1974, as amended (42 U.S.C 5801 et seq.). This work will be performed in accordance with the NRC/DOE Memorandum of Understanding dated November 24, 1998. To the best of our knowledge, the work requested will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

[] Fee Recoverable Work

[x] Non-fee Recoverable Work

Notwithstanding the agreement effective dates and period of performance start dates stated elsewhere in the agreement, the effective date of the agreement and start date of the period of performance are the last date of signature by the parties.

Attachment: Statement of Work, Revision 2

INTERAGENCY AGREEMENT		1. IAA NO. NRC-HQ-60-14-T-0010/M0006		PAGE OF 1 2	
2. ORDER NO.		3. REQUISITION NO. RES-16-0398		4. SOLICITATION NO.	
5. EFFECTIVE DATE 08/25/2016		6. AWARD DATE 08/25/2016		7. PERIOD OF PERFORMANCE 09/02/2014 TO 03/30/2018	
8. SERVICING AGENCY ALBUQUERQUESANDIA NATL LAB ALC: DUNS: 155505027 +4: DOENNSASFO CONTRACTING OFFICER PO BOX 5400 ALBUQUERQUE NM 87185-5400 POC Mary Cocco TELEPHONE NO. 505-845-6055			9. DELIVER TO SALMAN HAQ US NUCLEAR REGULATORY COMMISSION 11555 ROCKVILLE PIKE MAIL STOP TWFN 10 B58 ROCKVILLE MD 20852		
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			15. PROJECT TITLE SEE BLOCK 18		
16. ACCOUNTING DATA 2016-X0200-REIM-60-60D003-11-R-727-1302-253D					
17. ITEM NO.	18. SUPPLIES/SERVICES	19. QUANTITY	20. UNIT	21. UNIT PRICE	22. AMOUNT
	Master IAA: NRCHQ6013D0001 Project Title: Additional Post-SOARCA MELCOR Analysis The purpose of this modification is to (1) expand additional within scope Task 6, as a result the authorized cost ceiling is increased by \$499,061.00 from \$1,256,111.00 to \$1,755,172.00; (2) provide incremental funding in the amount of \$180,000.00 and 3) extend the period of performance through March 30, 2018. Continued ...				
23. PAYMENT PROVISIONS			24. TOTAL AMOUNT \$180,000.00		
25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (SERVICING)			25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (REQUESTING) 		
25b. NAME AND TITLE JEFFREY R. MITCHELL		25c. DATE	25b. CONTRACTING OFFICER		25c. DATE 8/25/16

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The Period of Performance is hereby revised as follows:

09/02/2014 through 03/30/2018.

All other terms and conditions remain unchanged.

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[] Fee Recoverable Work
[x] Non-fee Recoverable Work

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Attachment: Statement of Work, Revision 2

STATEMENT OF WORK (SOW)

REVISION 2

NRC Agreement Number NRC-HQ-60-13-D-0001	NRC Agreement Modification Number 	NRC Task Order Number (If Applicable) NRC-HQ-60-14-T-0010	NRC Task Order Modification Number (If Applicable) M0006
Project Title Additional Post-SOARCA MELCOR Analysis			
Job Code Number 1302	B&R Number 		Servicing Agency Sandia National Laboratory
NRC Requisitioning Office RES		Period of Performance September 2014 through March 2018	
NRC Form 187, Contract Security and Classification Requirements <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not 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)	
Docket Number (If Fee-Recoverable/Applicable) 		Inspection Report Number (If Fee Recoverable/Applicable) 	
Technical Assignment Control Number (If Fee-Recoverable/Applicable) 		Technical Assignment Control Number Description (If Fee-Recoverable/Applicable) 	

1. BACKGROUND

This contract expands upon the work performed in JCN N6306, "State-of-the-Art Reactor Consequence Analyses (SOARCA)," and JCN V6429, "Post-SOARCA MELCOR Analysis." NRC initiated the SOARCA project to develop best estimates of the offsite radiological health consequences for potential severe reactor accidents for two pilot plants: the Peach Bottom Atomic Power Station, a boiling water reactor (BWR) with a Mark I containment located in Pennsylvania and the Surry Power Station, a pressurized water reactor (PWR) with a large dry (subatmospheric) containment, located in Virginia. Other objectives of the SOARCA project included: (1) evaluating the potential benefits of post-9/11 mitigation improvements, (2) updating the quantification of offsite consequences found in earlier NRC publications such as NUREG/CR-2239, "Technical Guidance for Siting Criteria Development," (referred to as the 1982 Siting Study), and (3) enabling the NRC to better communicate severe-accident-related aspects of nuclear safety to stakeholders, including Federal, State, and local authorities; licensees; and the general public.

To provide a basis for comparison to past analyses of severe accident scenarios before the post-9/11 mitigation measures existed, the SOARCA project analyzed the selected scenarios twice: first assuming that the event proceeds without the 10 CFR 50.54(hh) mitigation measures, called "unmitigated" and then assuming that the 10 CFR 50.54(hh) mitigation is successful, called "mitigated". Thermal-hydraulics, accident progression, and source terms were calculated with the MELCOR computer code. For scenarios leading to an offsite release of radioactive material, SOARCA then analyzed the material's atmospheric dispersion, the surrounding area's emergency response, and potential health consequences using the MELCOR Accident Consequence Code System, Version 2 (MACCS2) computer code.

SOARCA analyses for Peach Bottom and Surry have been completed and are documented in the following NUREG reports:

- NUREG-1935, "State-of-the-Art Reactor Consequence Analyses Report,"
- NUREG/CR-7110 Volume 1, "Peach Bottom Integrated Analysis,"
- NUREG/CR-7110 Volume 2, "Surry Integrated Analysis,"
- NUREG/BR-0359, "Modeling Potential Reactor Accident Consequences"

While these analyses have generally met the SOARCA project's objectives, certain additional severe accident consequence analyses are warranted to expand upon the body of knowledge developed in SOARCA and to support and inform other agency activities including the Site Level 3 PRA project and Fukushima lessons learned. These additional analyses are discussed in SECY-12-0092, "State-of-the-Art Reactor Consequence Analyses – Recommendation for Limited Additional Analysis", dated July 5, 2012.

The overall objective of JCN V6429, "Post-SOARCA MELCOR Analysis," is to leverage lessons learned from the SOARCA pilot plant analyses and methodology to expand upon the body of knowledge developed in SOARCA regarding severe accident progression and offsite consequences for potential severe reactor accidents. The objectives of the two individual tasks are: (1) to conduct an uncertainty analysis for a severe accident scenario at the Surry power station; and (2) to conduct a severe accident consequence analysis for station blackout scenarios at the Sequoyah Nuclear Plant, a PWR with an ice condenser containment.

The ice condenser containment is unique relative to other containment types including those studied in the SOARCA project (BWR Mark I at Peach Bottom and large dry at Surry). It has aspects worth exploring regarding buildup of hydrogen during an SBO since it has the lowest design pressure among containments in the United States and relies on hydrogen igniters. SOARCA project, Fukushima, and other studies have shown SBOs to be the most important scenarios. The uncertainty analysis for a Surry scenario is expected to reveal similar insights for PWR severe accident progression as the Peach Bottom uncertainty analysis did for BWRs.

The work in this contract will complement and build on work performed under V6429. Continuing interest in the SOARCA follow-on activities has created a demand to complete additional work beyond V6429, as described below.

Background for Modification No. M0006

During the February 2016 ACRS subcommittee review of the SOARCA Surry Uncertainty Analysis, ACRS members raised interesting questions with regard to safety valve failure modeling and how they affect the results, which have implications for both the SOARCA Surry and Sequoyah uncertainty analyses. Additional efforts required researching the valve failure data, reanalyzing the research conducted by other organization such as EPRI, modifying the MELCOR input decks to implement more complex modeling of safety valve failures, making sensitivity runs, or assess uncertainty using MELCOR computer code, and analyzing the new results produced by the MELCOR runs. Based on initial and few sensitivity

MELCOR runs, decisions will be made if further analysis, or additional runs are needed to evaluate the influence of parameters other than safety valves for both Surry and Sequoyah. In addition, based on new results and analysis, decisions will be made on how to effectively document the results for public and level of effort require to revise the draft NUREG reports. Responding to ACRS comments are within the scope of Tasks 3-6, but will require a higher effort than originally projected. Task 6.6 and 6.7 are added to clarify the specific expectations related to this modification.

A bulk of this work is expected to be completed to support follow up meetings with ACRS, planned in spring 2017. Remaining work will require technical support in answering ACRS questions and improving documentations and report to resolve ACRS and reviewers comments.

As a note, the focus of SNL's work under this modification will concentrate first and foremost on SQN-related analysis. At this time Surry analysis will be considered optional to the completion of this modification.

2. OBJECTIVES

The overall objective of this work is to continue to leverage lessons learned and insights from the SOARCA and SOARCA uncertainty analyses and methodology to expand upon the body of knowledge regarding severe accident progression, offsite consequences, and important uncertainties for potential severe reactor accidents. The objectives of the individual tasks are the following:

- Task 1: To conduct an analysis of the fleetwide applicability of SOARCA and SOARCA Uncertainty Analyses' results.
- Task 2: To conduct quality assurance on SOARCA MELCOR model elements enhancements.
- Task 3: To support external reviews of SOARCA follow-on work by the NRC's Advisory Committee on Reactor Safeguards.
- Task 4: To provide consulting support as needed to help respond to periodic information requests from within and outside the NRC on SOARCA projects.
- Task 5: To conduct supplemental analyses to gain additional SOARCA UA MELCOR insights.
- Task 6: To conduct a severe accident progression using MELCOR to support consequence analysis for station blackout scenarios at Sequoyah Nuclear Plant and post ACRS Surry analysis.

3. TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

This work requires expertise with respect to BWR and PWR severe accident phenomenology, use of the MELCOR code for severe accident simulations, and uncertainty analysis.

4. SCOPE OF WORK

Task 1: Fleetwide applicability of SOARCA and SOARCA UA results

The objective of Tasks 1.1 and 1.2 is to analyze the results from the SOARCA and SOARCA UA studies and explain how the results are specific to the pilot plant, applicable to the class of reactor (PWR Westinghouse NSSS with large dry containment or BWR 4 GE NSSS with Mark I containment), or applicable across the fleet of reactor type (PWR or BWR). This explanation would provide a basis for potentially applying the SOARCA and SOARCA UA results to other reactors and across the reactor fleet.

Task 1.1: BWR Fleetwide applicability of Peach Bottom SOARCA and SOARCA UA results

The DOE Laboratory shall review the existing Peach Bottom SOARCA and SOARCA UA results documented in NUREG-1935, NUREG/CR-7110, and forthcoming NUREG/CR-7155, and explain the areas of the MELCOR model and results that are specific to the Peach Bottom Atomic Power Station, applicable to other BWR 4/Mark Is, or applicable across the entire fleet of BWRs or both BWRs and PWRs. The DOE Laboratory shall describe the technical basis for the different ranges of applicability.

Deliverable: Letter report describing the review of the Peach Bottom SOARCA and SOARCA UA results and the explanation of the applicability of these results to BWRs and to the entire reactor fleet.

Task 1.2: PWR Fleetwide applicability of Surry SOARCA and SOARCA UA results

Following the completion and NRC approval of the draft Surry SOARCA UA the DOE Laboratory shall review the Surry SOARCA and SOARCA UA results and explain the areas of the MELCOR models that are specific to the Surry Power Station, applicable to Westinghouse PWRs with large, dry containments, or applicable across the entire fleet of PWRs or both PWRs and BWRs. The DOE Laboratory shall describe the technical basis for the different ranges of applicability.

Deliverable: Letter report describing the review of the Surry SOARCA and SOARCA UA results and the explanation of the applicability of these results to PWRs and to the entire reactor fleet.

Task 2: Quality Assurance of SOARCA MELCOR model elements

The SOARCA Surry Uncertainty Analysis (UA) has required some MELCOR model enhancements, including modifications to certain model elements. Proper quality assurance is needed to ensure that model modifications specific to Surry do not introduce inconsistencies or other conceptual errors, and that the intended model enhancements are properly implemented. The purpose of this task is to perform quality assurance of MELCOR model elements as needed.

Deliverable: Letter reports describing necessary QA of model elements, as the need arises.

Task 3: Support for Advisory Committee for Reactor Safeguards (ACRS) review

The ACRS has requested that NRC staff present to the ACRS during key points in the SOARCA follow-on projects, such as the Surry UA. The previous SOARCA Peach Bottom UA project benefitted from ACRS review. RES plans to use the ACRS as an external technical review group for the Surry UA project as well. It is important to have key project staff attend the ACRS review meetings. The purpose of this task is to provide contract support for the ACRS reviews.

Task 4: Consulting support as needed

RES staff periodically receive information requests on the SOARCA UAs from within and outside the NRC. For example, sources of these requests include international organizations performing severe accident studies, or NRC working groups conducting regulatory activities in response to the Fukushima accident. Consulting support is needed to help respond to these periodic requests, and the scope and number of requests are difficult to predict ahead of time. The consulting support may be requested in a variety of forms, for example, telephone calls, e-mail responses, or short reports. In addition, some

consulting support is needed to review changes to the SOARCA Peach Bottom UA draft NUREG/CR report. The specific deliverable and schedule will be mutually agreed upon by the PMs as the need arises.

Task 5: Supplemental analyses to gain additional SOARCA UA MELCOR insights

The DOE Laboratory shall conduct single realization analyses and additional sensitivity analysis to support expected questions related to the UA studies. Examples of questions that should be addressed include: (1) what are the phenomenological explanations for salient variations in MELCOR results? (2) what are some important model uncertainties and their effects on MELCOR results?

Task 6: Accident progression using MELCOR to support consequence analysis for station blackout scenarios at Sequoyah Nuclear Plant

The scope of this task includes SOARCA analysis for seismic induced Station Blackout (SBO) at Sequoyah (SQN), considering automatic mitigation such as AFW and DC battery depletion timings, operator assisted mitigation including 10 CFR 50.54 (hh), B5B and new flex equipment to evaluate their impact on accident progression, as well as un-mitigated accident progression as discussed in NRC Accident Sequence Selection document for SQN. In accordance with SECY-12-0092, this study is based on insights from Peach Bottom and Surry SOARCA analysis, and should be conducted to complement and supports the post-Fukushima activities including tier 3 items. Furthermore the Uncertainty Analysis (UA) for task 6 should be conducted in parallel rather than as an add-on to best estimate study. The EDO due date for the consequence analysis study is December 30, 2016.

This scope is expected to include following steps

- 6.1 Identify parameters and cases for MELCOR model development including UA
 - a) Update model based on TVA documentation (from December 2014 trip)
 - b) Update model to be consistent with current MELCOR best practices
 - c) Identify parameters to support sequences and scenarios runs and UA based on insights from SOARCA analysis perform in task 1-5 of this task order.
- 6.2 Complete development of MELCOR Model / input deck
 - a) Update model to run transients Sequences Scenarios approved by NRC
 - b) Add operator actions, FLEX equipment for mitigation as appropriate
 - c) Run test cases to check input deck and model, debug the model input, and rerun as necessary
 - d) Comprehensive review of results for validation and confirmation of model
 - e) Based on NRC sequence selection document develop a plan for production Runs
 - f) Freeze the input deck to be used for production runs in step 6.4.
- 6.3 Document the Model Description
 - a) Develop documentations for the SOARCA-SQN model and input deck similar to Chapter-4 of NUREG/CR-7110 Vol. 2 (Surry SOARCA).
- 6.4 Run MELCOR for final Results
 - a) Use the input file developed in subtask 6.2 MELCOR production run, analyze results, and identify parameters and model controls for sensitivity and UA runs
 - b) Confirm sensitivity run parameters developed in 6.2 and using insights from Surry SOARCA analysis, run MELCOR Sensitivity cases and analyze results

- c) Confirm UA run parameters developed in 6.2 and using insights from Surry UA results, run MELCOR UA cases and analyze results
- d) Documented MELCOR outputs, charts, figures, and key conclusions for comprehensive review of documentation for acceptance of the results.
- e) Development documentation similar to Chapter 5 of NUREG/CR-7110 Vol. 2 (Surry SOARCA).

6.5 Assist NRC to Present Case to ACRS

- a) Assist NRC in presentation to ACRS
- b) Assist NRC in resolving clarifying questions from NRC

6.6 Post ACRS model enhancements, analysis and documentation for SQN

- a) Improve PRT model using containment water level information.
- b) Improve model or documentation for SV updated failure rates information recently collected from valve industry, experts, and other organization e.g. EPRI report.
- c) Improve TD-AFW model.
- d) Provide technical support on other issues such as containment isolation and leakage as needed.
- e) Perform MELCOR model/input decks reviews to confirm accuracy of important information which has significant impact on the results and confirm that the documentation is consistent with the model.
- f) After updating the model and completing reviews, rerun MELCOR UA, perform UA analysis using technique already used in Surry and SQN analysis and document the results by updating chapters 3 and 4 of existing draft technical report.

6.7 Post ACRS model enhancements, analysis and documentation for Surry

- a) Perform Surry model enhancements on PRT using lesson learn from SQN for releases from PRT post PRT rupture disk failure.
- b) Improve model or documentation for SV updated failure rates information and make it consistent with SQN model
- c) Reevaluate the SGTR modeling and update as needed, in consultation with NRC.
- d) Provide technical support on other minor issues as needed.
- e) Perform MELCOR model reviews to confirm accuracy of important information which has significant impact on results and confirm the documentation is consistent with the model.
- f) After updating the model and completing reviews, rerun MELCOR UA, perform UA analysis using technique already used in Surry and SQN analysis and document the results by updating appropriate chapters in the existing draft technical report.

DELIVERABLES/SCHEDULES AND/OR MILESTONES

Task	Item	Date (or frequency) Estimate
1.1	BWR Fleetwide applicability of Peach Bottom SOARCA and SOARCA UA results	Draft Letter Report: December 31, 2014 Final Letter Report: January 31, 2015
1.2	PWR Fleetwide applicability of Surry SOARCA and SOARCA UA results	Draft Letter Report: April 30, 2015 Final Letter Report: January 31, 2016
2	Quality Assurance of SOARCA MELCOR model elements	Letter reports describing necessary QA of model elements, as the need arises: May 31, 2015

3	Support for Advisory Committee for Reactor Safeguards (ACRS) review	<p>Draft first presentation: January 1, 2015 Final first presentation: February 1, 2015 First draft update to report: February 28, 2015 Draft 2nd presentation: May 31, 2015 Final 2nd presentation: June 30, 2015 Second draft update to report: July 31, 2015 Draft 3rd presentation: September 30, 2015 Final 3rd presentation: October 31, 2015 3rd draft update to report: December 20, 2015 Final update to reports: January 31, 2016</p>
4	Consulting support as needed	Letter reports as needed, final: January 31, 2016
5	Supplemental analyses to gain additional SOARCA UA MELCOR insights	<p>Draft 1 Letter Report: January 31, 2015 Draft 2 Letter Report: July 31, 2015 Final Letter Report: January 31, 2016</p>
6	Accident Progression for Sequoyah Nuclear Plant	<p>6.1 Model parameter Sept 2015 6.1.1 Updated list of parameters, roadmap of runs, and updated model 6.1.2 Results of bench marking with ice condenser test results 6.2 Complete MELCOR model/Input Deck 6.2.1 MELGEN and MELCOR input deck with fully functional model complete with control functions incorporating flex equipment for accident progression and through mitigations or containment failure and release source term. 6.3 Documentation of Model 6.3.1 Documentation for the SOARCA-SQN model and input deck similar to Chapter-4 of NUREG/CR-7110 Vol. 2 (Surry SOARCA). 6.4 MELCOR Runs and Results Jan 2016 6.4.1 MELCOR final input and output, key results, tables, charts, graphs with summaries to be reviewed with NRC team. Confirm parameters for sensitivity and UA runs. 6.4.2 Results of Sensitivity and UA cases for review 6.4.3 Documentation of results similar to Chapter 5 of NUREG/CR-7110 Vol. 2 (Surry SOARCA). 6.5 ACRS Support May 2016 6.5.1 Review presentation material for ACRS meetings and assistance in resolving technical issues if identified by ACRS.</p>

		<p>6.6 Post ACRS SQN Model Enhancement</p> <p>6.6.1 Complete all analysis and provide source term to MACCS team by Oct 3, 2016</p> <p>6.6.2 Complete all documentation Nov 3, 2016</p> <p>6.7 Post ACRS Surry Model Enhancement</p> <p>6.7.1 Complete all analysis and provide source term to MACCS team by Jan 30, 2017</p> <p>6.7.2 Complete all documentation April 30, 2017</p> <p>Provide support for ACRS meetings in Mar-April 2017 Final letters to EDO due August 30, 2017 Contract end date March 2018.</p>
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5. REPORTING REQUIREMENTS

Required deliverables are outlined in section 5 above. All letter reports shall be reviewed by a first-level supervisor prior to submittal. All deliverables shall be submitted electronically via email to the NRC COR.

6. MONTHLY LETTER STATUS REPORTS

In accordance with Section 4 of the attached Standard Terms and Conditions for DOE Work, a copy of the Monthly Letter Status Report (MLSR) is to be submitted to the following mailboxes.

Salman.Haq@nrc.gov
RESDSAMLSR.Resource@nrc.gov
ContractsPOT.Resource@nrc.gov

7. MEETINGS AND TRAVEL

When requested by the NRC COR, SNL staff may attend meetings and travel to NRC Headquarters in Rockville, MD to present results as needed.

Travel is estimated below by fiscal year (subject to change according to project needs):

FY15: Domestic travel – 2 trip for 3 travelers
FY16: Domestic travel – 1 trip for 3 travelers
FY16-17: Domestic Travel – 1 trip for 2 travelers

8. NRC-FURNISHED MATERIAL

No NRC-furnished material is required.

9. RESEARCH QUALITY

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

10. NEW STANDARDS FOR DOE LABORATORIES 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 shall be of archival quality and comply with the requirements of NRC Management Directive 3.7 "NUREG-Series Publications." The document shall 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 COR for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, the DOE Laboratory shall 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.

11. SUBCONTRACTING/CONSULTANT INFORMATION

Describe any technical support effort that is proposed to be performed by a subcontractor or consultant. Identify the level of effort, by task, of any proposed subcontractor or consultant and provide an explanation of the need for subcontracting that portion of the effort. Note that "pass through" contracting is not allowed under the requirements of the DOE/NRC Memorandum of Understanding. For the purposes of this effort, a "pass through" contract is generally defined as subcontracting 50 percent or more of the technical effort. For any subcontract or consultant effort, describe the following:

- the necessity of subcontracting,
- the tasks and subtasks the subcontractor or consultant will perform,
- the level of effort proposed for the subcontract effort,
- the status and expected time frame for selection, and
- the method of selection of the subcontractor or consultant.

13 INFORMATION TECHNOLOGY (IT) RESOURCES:

When IT resources are proposed by a DOE Laboratory that are not specifically identified in the Statement of Work, the need for and cost of those resources must be justified. Exhibit 8 of MD 11.7 can be used to help determine justification. Proposed IT resources should be those required to accomplish the work, but which are not available from within the laboratory's inventory of IT resources. Common office automation equipment and software, i.e., personal computers, word processing and spreadsheet software, and printers, should not routinely be proposed as they should normally be provided as part of the laboratory's information processing infrastructure. Whenever IT resources are proposed, justification is necessary for the NRC to be able to evaluate the requirements and to approve their acquisition.

In addition to the total cost of IT resources to be reported on the NRC Form 189, the following justification is to be included in the proposal:

1. IT Resource Requirements. List as line items each IT resource (hardware, e.g., laptop computer, engineering workstation; software - by product name; and services, e.g., computer time, database services) proposed for acquisition and estimate the cost of each item by fiscal year. Funding should be indicated for the year in which the IT resources are needed. Provide totals for all items for each fiscal year which match the costs listed on the line labeled IT RESOURCES on the NRC Form 189. Any IT acquisition shall conform to the acquisition and reporting requirements identified in NRC Management Directive 11.7, Part 9.
2. Justification. For each required IT resource with an acquisition cost of \$500 or more, or group of resources, e.g., a system, provide specifications or the specific make/model, and other acquisition and reporting requirements identified in NRC Management Directive 11.7, Part 9. Briefly discuss how the IT resources will be used, including information about workload to be processed, required capacities, throughput, transfer rates, compatibility and expandability requirements, or any other information that supports the need to acquire the specific resources being proposed.

14. CONTRACTING OFFICER'S REPRESENTATIVE (COR)

Technical direction as defined in Section 1 of the Standard Terms and Conditions will be provided by the COR, Salman Haq, who can be reached at:

U. S. Nuclear Regulatory Commission
Mail Stop CSB C3A07M
Washington, D. C. 20555-0001
Phone: (301) 415-1799
Email: Salman.Haq@nrc.gov

Express mail should be sent to:
U. S. Nuclear Regulatory Commission
Mail Stop: CSB C3A07M
11545 Rockville Pike
Rockville, MD 20852-2738