ASME Standards Technology, LLC
(ASME ST-LLC)
Request for Proposals (RFP)
RFP-ASMEST-08-01
Task Investigator – Gen IV / NGNP Materials Project

Date Posted: January 31, 2008
Proposal Due Date: February 29, 2008 by 1:00 PM EST.

1. Summary

ASME Standards Technology, LLC is soliciting proposals for services as Task Investigators for tasks 6, 7, 8, 9 & 10 for the Generation IV / NGNP Materials project. Solicitations are welcome for individual tasks as well as multiple tasks.

This is a continuation of the existing Cooperative Agreement between ASME Standards Technology, LLC and The U.S. Department of Energy supporting the Generation IV / NGNP programs. The scope includes development of technical basis documents necessary to update and expand codes and standards for application in next generation reactor systems that operate at elevated temperatures. This is a multi-year agreement. A project structure is already in place that includes a Steering Committee, and subcontracted Task Investigators and Technical Advisors.

2. Scope of Work

a. Statement of Work

Please see Appendix A for the "Statement or Work".

b. Task Investigator Scope Description

Task Investigators (TI's) perform the work on each of the individual tasks described in the Statement of Objectives. A close collaboration between the Task Investigator and the Technical Advisor (TA) is expected given that the TA's responsibilities include ensuring that all technical aspects are properly addressed for example: Has the Task Investigator has identified the critical issues (has he/she dug out the relevant background information). Multiple Investigators may be assigned to each task. Task Investigators will report to the Project Manager.

c. Deliverable

All deliverables are clearly identified for each task. The deliverable shall be a technical report provided as an electronic file in MS Word format. Recommendations regarding R&D and specific testing that should be conducted (if any) to further strengthen the technical validity of the report must be included. Report outline to follow ASME ST-LLC's Style Guide & Template (a copy will be provided contract recipients). One review cycle is anticipated and modifications required to the report, as a result of the review cycle, are the responsibility of the contractor awarded the contract.

d. Schedule

The final deliverable for each task is shown on the Project Schedule. See Appendix B for the schedule. Investigators shall submit a schedule with their proposal describing the major milestones and reporting schedule.

e. Reporting:

Quarterly, Yearly and Final reports are due as within 30 days after the reporting period.

f. Travel Requirements

Current travel is anticipated to be twice per year with the possibility for an overnight stay. Travel expenses will be reimbursed, per the project Travel Policy: See link: Travel Policy.

g. Budget

The budget for each task will vary, the total budget for the targeted tasks will not exceed $500,000.00.

Note: Funding is still pending; therefore ASME ST-LLC will make no awards until funding is finalized.

3. Applicant Eligibility Requirements

ASME ST-LLC is seeking proposals from qualified engineering firms, individuals, or consultants. In addition to relevant technical qualifications and experience, applicants must have an understanding of Very High Temperature Reactor (VHTR) design concepts. Applicants may not serve as both the Task Investigator and Technical Advisor for the same task.

Federally Funded Research and Development Centers (FFRDC's) are not eligible for funding under this award.

4. Basis for Selection and Award

Selection of a proposal by ASME ST-LLC will be achieved through a process of evaluating and comparing the relative merits of the applicant's complete applications. This process reflects ASME ST-LLC's desire to accept an application based on its potential in best achieving program objectives, rather than solely on evaluated technical merit or cost. Evaluation criteria includes, but is not limited to, the following:

- Technical capabilities
- Access to the date require to perform the task
- Experience
- Price
- Agreement with Terms and Conditions

It is anticipated that there may be multiple awards resulting from this solicitation. However, ASME ST-LLC reserves the right to award, in whole or in part, any, all, or none of the applications submitted in response to this solicitation.

5. Contract Terms and Conditions

A labor hour and expenses type contract shall be used. The project sponsor, U.S. Department of Energy (DOE), must also approve the selected applicant. Draft terms and conditions are included: See links for ASME ST-LLC T&C; 1600.5 form; 10cfr Subpart C 1-1-05 Edition; Disclosure of Lobbying Activities (Standard Form LLL).

The final contractual terms and conditions will be negotiated between ASME ST-LLC and the selected applicant(s) following award.

ASME ST-LLC shall provide required access to codes and standards and other technical references necessary for performance of the work.

6. Submission Requirements

a. Proposal Due Date: Proposals and amendments of proposals must be received by February 29, 2008 by 1:00 PM EST.. Applicants are encouraged to transmit their proposal well before the deadline.

b. Anticipated Selection and Award Date: It is anticipated that selection and award will be made within 2 weeks of the proposal due date.

c. Application Preparation Costs: This solicitation does not obligate ASME ST-LLC to pay any costs incurred in the preparation and submission of proposals or in making necessary studies or designs for the preparation thereof or to acquire, or contract for any services.

d. Application Clarification: ASME ST-LLC reserves the right to require proposals to be clarified or supplemented to the extent considered necessary. The award may be made after few or no exchanges, discussions or negotiations. Therefore, all applicants are advised to submit their most favorable application to ASME ST-LLC. ASME ST-LLC reserves the right, without qualification, to reject any or all proposals received in response to this solicitation and to select any proposal, in whole or in part, as a basis for negotiation and or award.

   ASME ST-LLC reserves the right to modify or cancel this solicitation. All questions relating to the solicitation must be submitted to the contact below. Any amendments to the solicitation will be posted on the ASME ST-LLC web site (http://www.stllc.asme.org/).

e. Treatment of Proprietary Information: A proposal may include technical data and other data, including trade secrets and/or privileged or confidential commercial or financial information, which the applicant does not want disclosed to the public or used by ASME ST-LLC for any purpose other than proposal evaluation. To protect such data, the applicant should specifically identify the data to be protected.

f. Proposal Preparation and Submittal Instructions:

   Response should include two separate documents:a Technical Proposal and a Financial Proposal.

   1. Technical Proposal

      a. Provide organization name and contact information.

      b. Provide evidence of technical capabilities: the credentials, qualifications, capabilities, and experience of individuals and the organization.

c. Identify the specific task(s) to be investigated.

d. Confirm agreement with the Scope of Work for the specified task(s)

2. Financial Proposal

a. Provide an hourly billing rate quotation and estimated project maximum.

b. Confirm agreement with the draft Terms and Conditions, or state any specific exceptions.

3. Submit Technical and Financial responses via e-mail to the ASME ST-LLC contact below.

4. Responses must be received on or before the deadline.

7. ASME Standards Technology, LLC Contact Information:

Name: Jim Ramirez

Vice President, Business Development

ASME Standards Technology, LLC

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Statement of Work

TASK 6: Operating Condition Allowable Stress Values

Background:

A spot check of minimum stress to rupture values provided in NH revealed that there was disagreement between the minimum stress to rupture values, S_r, at 100,000 hours and the values of Design Condition stress intensity, S_o. Based on the allowable stress criteria, the values of S_o should be no greater than 80% of S_r at 100,000 hours. However, for all the listed NH materials, at higher temperature there were values of S_o which exceeded 80% of S_r. In most, if not all cases, the values of S_o were significantly higher at some temperatures. Since the NH values of S_o are in agreement with the allowable stress values listed in Section II, Part D, the expectation is that the values of S_r are lower than would be expected if they were derived from the same data as the values for S_o. Further, the values of S_t, the allowable stresses for Operating Conditions, appear consistent with the values of S_r, thus throwing in doubt all the allowable Operating Condition stress values for both load controlled stress limits and displacement controlled limits in NH.

Part I: Review Current Operating Condition Allowable Stresses and Assemble Original Data Base Used.

Review current values of S_r and S_o and identify discrepancies. Do the same with S_t and S_r. Identify and assemble the database(s) used to establish S_r, S_t and S_o.

Part II: Assessment of Data Base.

Review the assembled databases for completeness and consistency. Identify areas of inconsistency and recommend a course of action to resolve them. This should include additional testing if required. Also identify those time and temperature regimes where the listed values of S_t and S_r are correct and no further action is required.

Part III: Correct Operating Condition Allowable Stress Values.

For those time/temperature regimes that require corrections, based on currently available data prepare recommended corrections to the currently listed values of S_t and S_r for those regimes where the data is sufficient. Prepare a rough order of magnitude cost estimate for the testing required to complete the required corrections to S_t and S_r.

Task 6 Deliverables

Part I: Review Current Operating Condition Allowable Stresses and Assemble Original Data Base Used.

Report on the findings and the original database used to establish these allowable stresses

Part II: Assessment of Database.

Report on assessment of database

Part III: Operating Condition Allowable Stress Values.

Report on the recommended corrections for the current operating condition allowables based on currently available data.

Report on the recommended testing, including an order of magnitude cost estimate, required to complete the corrections to S_t and S_r.

Task 7: ASME Code Considerations for the Intermediate Heat Exchanger (IHX)

Background:

The intent of this task is to recommend how and where within ASME codes and standards the IHX, safety valve, etc. would be addressed and to provide guidance to equipment suppliers on potential critical code issues to be addressed. Part of this determination is the role of the IHX primary to secondary heat exchanger surface in plant licensing considerations. Although the main focus of this activity is on compact, micro channel heat exchangers due to their unique design features, consideration should also be given to plate-fin and shell-and-tube concepts in considering equivalent reliability and assessing critical “construction” issues at very high temperatures representative of VHTR operation. Note that in this context “construction” refers to the full scope of ASME Code rules, namely: materials, design, fabrication and installation, examination and overpressure protection. Inservice examination issues should also be considered.

Part I: Review of Current Experience.

The objective is to identify, to the extent feasible, the current status of compact/micro channel heat exchanger “construction” (including aging and coolant corrosion effects where available) of representative heat exchanger pressure boundary and internal designs. Heat exchangers with working fluid temperatures at the upper end of the creep regime for their materials of construction will be emphasized. Candidate designs should include shell-and-tube, plate-fin, and compact design. Additional concepts will be identified if possible. This is to be accomplished by soliciting input from component vendors, reactor heat transport system designers and process heat end users. Particular attention will be paid to (a) service experience and problem resolution, (b) design criteria including methods, if any, for evaluation of cyclic life, (c) construction codes of record and designated pressure boundaries, and (d) qualification of materials and fabrication techniques for the intended service.

Part II: Recommended Code Approach.

Recommend key features of a construction code needed to address the unique issues associated with the VHTR IHX and associated equipment. As examples of what might be considered: (a) because the sharp corners associated with many if not all micro channel designs is a key feature, what test(s) should be required to establish cyclic life or to calibrate design methods, and (b) what sort of inspection or process control is required to achieve adequate joint reliability in components with on the order of a million joints and limited accessibility? Candidate Codes to be considered include Subsection NB and NH, Subsection NC and ND and their respective elevated temperature Code Cases and Section VIII, Div 1 and 2. A rough order of magnitude estimate will be prepared for the cost and schedule of implementing the proposed Code approach.

Further, it would be desirable to review the adequacy of existing ASTM specifications for materials, testing, examination, etc. to determine if any new standards will need to be developed to support IHX design, fabrication, operation or inspection. We need to understand in the near term if the ASTM specification infrastructure will also have to be augmented in order to support the new test and inspection requirements for IHX.

Task 7 Deliverables

Part I: Review of Current Experience.

A report documenting current practice, lessons learned and projected service environments as available

Part II: Recommended Code Approach.

A report on recommended ASME Code and ASTM considerations for the IHX and associated components. To be included is a rough cost estimate and schedule for implementing the proposed approach.

Task 8: Creep and Creep-Fatigue Crack Growth at Structural Discontinuities and Welds

Background:

The lack of a quantitative methodology for evaluating the potential for creep and creep-fatigue crack growth at structural discontinuities and weldments has been identified in NRC reviews as an NH shortcoming. NH does provide a number of design factors and procedures to ensure elevated temperature weldments and stress risers will perform satisfactorily but does not provide for a quantitative assessment of creep crack growth. Although desirable for design, such a methodology is even more needed for evaluation of potential cracks and crack growth detected during in-service inspection. During the early years of the evolution of the current NH, such methodologies for evaluation of creep crack growth were in their infancy. However, there have been numerous advances in the technology in recent years, for both nuclear and non-nuclear applications. A key issue for nuclear applications is whether these methodologies are sufficiently well established that they can be implemented to give the required assurances without undue conservatism which would preclude designs and/or operating parameters which are actually not susceptible to premature failure.

Part I: Review and Assess Current Methodologies and Recommend NH Implementation.

Review currently used methods for creep and creep-fatigue crack growth at discontinuities and in weldments to assess their applicability for design and in-service inspection assessment of NH components. Methods used in other nuclear standards such as R5, RCC-MR and KTA shall be considered as well as those employed in assessments of non-nuclear equipment. Currently approved materials for NH construction shall be considered as well as potential additions such as Alloy 617 and 230, and a low carbon/high nitrogen version of 316 stainless steel. Identify promising technologies and the testing required to implement the specific methodology in NH.

Part II: Draft Code Rules.

Prepare draft rules based on the above assessment for implementation in NH. These rules should be based on existing data where feasible.

Task 8 Deliverables

Part I: Review and Assess Current Methodologies and Recommend NH Implementation.

Report on the review and assessment of current methodologies and recommend NH implementation

Part II: Draft Code Rules.

Report on the draft code rules

Tasks 9 & 10: Update and Improve Subsection NH

Background

Current design analysis rules in Subsection NH were developed during the decades ending in the late 1980's. Since then there have been notable advances in computing technology that permit evaluation methodologies not previously considered. There have also been advances in the understanding of elevated temperature material behavior and failure mechanisms. Also, as shown by the results from Tasks 3 and 5 of the first round DOE/ASME GEN IV Materials Project, the current methodologies for evaluating creep-fatigue interaction have a number of deficiencies.

Task 9: Update and Improve Subsection NH - Simplified Elastic and Inelastic Design Analysis Methods.

Review and compare current design methods and assessment techniques in ASME NH, RCC-MR, BC5500, DIN, and JNC, R5, API 579 and other relevant sources. Propose a range of design analysis methods consisting of: (i) elastic analysis, (ii) reference stress method, and (iii) limit load, shakedown, and ratcheting analysis. Recommend requisite requirements for codification, including data generation, data extrapolation strategies, round-robin structural analyses, and feature testing to validate methods.

Task 9 Deliverables

A final report with recommendation on design methods and requirements for supporting data

Task 10: Update and Improve Subsection NH - Alternative Simplified Creep-Fatigue Design Methods.

Review creep-fatigue methodologies, including damage-based, strain-based, and methods not involving separate accounting of creep and fatigue damage in various design codes, assessment procedures and relevant literatures. Assess the potential of deploying these methods in NH either to remove excessive conservatism or to resolve NH issues identified in the final report of Task 2. Where applicable, provide rationale and propose implementation strategies for these methods. Propose methods to address the effects of aging, surface conditions, and geometric discontinuity. Recommend requisite requirements for codification, including data generation, data extrapolation strategies, and feature testing to validate methods.

Task 10 Deliverables

Report on alternative simplified creep-fatigue design methods

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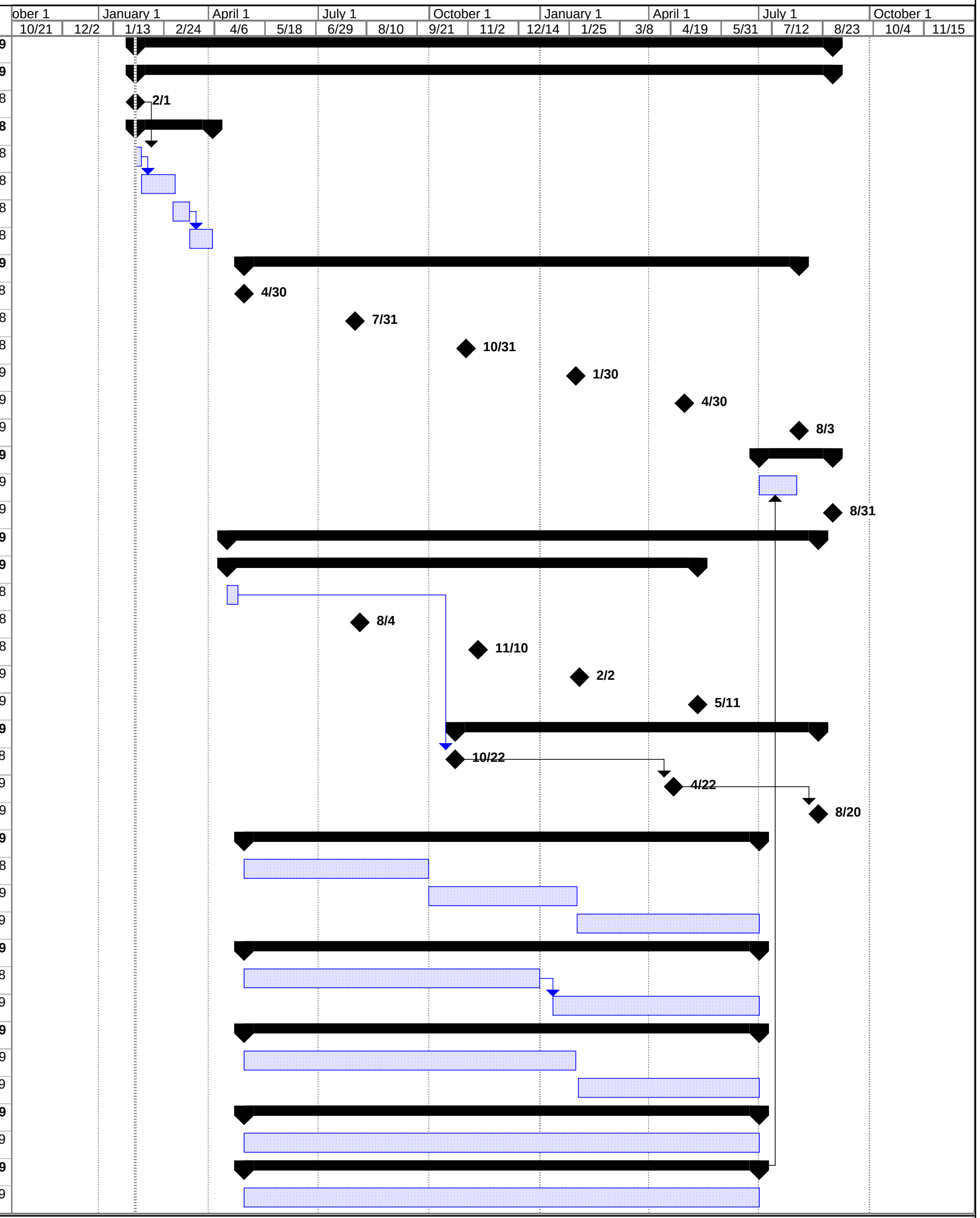
Appendix B

ID	WBS	Task Name	Duration	Start	Finish
1	**1**	**ASME ST-LLC Gen IV-NGNP Milestones**	**1734 days**	**Fri 2/1/08**	**Mon 8/31/09**
2	**1.1**	**A. Project Management**	**1734 days**	**Fri 2/1/08**	**Mon 8/31/09**
3	1.1.1	Funding Authorized	0 days	Fri 2/1/08	Fri 2/1/08
4	**1.1.2**	**Select project Task Investigators**	**192 days**	**Fri 2/1/08**	**Fri 4/4/08**
5	1.1.2.1	Prepare solicitations	3 wks	Fri 2/1/08	Tue 2/5/08
6	1.1.2.2	Solicit proposals	16.8 wks	Tue 2/5/08	Tue 3/4/08
7	1.1.2.3	Select Task Investigators	8.4 wks	Mon 3/3/08	Mon 3/17/08
8	1.1.2.4	Execute subcontracts	11.4 wks	Mon 3/17/08	Fri 4/4/08
9	**1.1.3**	**Reporting**	**1380 days**	**Wed 4/30/08**	**Mon 8/3/09**
10	1.1.3.1	Quarterly reports 1	0 days	Wed 4/30/08	Wed 4/30/08
11	1.1.3.2	Quarterly reports 2	0 days	Thu 7/31/08	Thu 7/31/08
12	1.1.3.3	Quarterly reports 3/Annual report 1	0 days	Fri 10/31/08	Fri 10/31/08
13	1.1.3.4	Quarterly reports 4	0 days	Fri 1/30/09	Fri 1/30/09
14	1.1.3.5	Quarterly reports 5	0 days	Thu 4/30/09	Thu 4/30/09
15	1.1.3.6	Final	0 days	Mon 8/3/09	Mon 8/3/09
16	**1.1.4**	**Project Closure**	**183 days**	**Wed 7/1/09**	**Mon 8/31/09**
17	1.1.4.1	Report Preaparation	93 days	Wed 7/1/09	Sat 8/1/09
18	1.1.4.2	Final Invoce	0 days	Mon 8/31/09	Mon 8/31/09
19	**1.2**	**B. Review Meetings**	**1470 days**	**Thu 4/17/08**	**Thu 8/20/09**
20	**1.2.1**	**Task Investigators/Advisors**	**1170 days**	**Thu 4/17/08**	**Mon 5/11/09**
21	1.2.1.1	Project Kickoff meeting (window)	27 days	Thu 4/17/08	Fri 4/25/08
22	1.2.1.2	Code Meeting 2	0 days	Mon 8/4/08	Mon 8/4/08
23	1.2.1.3	Code Meeting 3	0 days	Mon 11/10/08	Mon 11/10/08
24	1.2.1.4	Code Meeting 4	0 days	Mon 2/2/09	Mon 2/2/09
25	1.2.1.5	Code Meeting 5	0 days	Mon 5/11/09	Mon 5/11/09
26	**1.2.2**	**Progress Review Meetings**	**903 days**	**Wed 10/22/08**	**Thu 8/20/09**
27	1.2.2.1	Progress review meeting 1	0 days	Wed 10/22/08	Wed 10/22/08
28	1.2.2.2	Progress review meeting 2	0 days	Wed 4/22/09	Wed 4/22/09
29	1.2.2.3	Progress review meeting 3	0 days	Thu 8/20/09	Thu 8/20/09
30	**1.3**	**Task 6 - Operating Conditions Allowables**	**1281 days**	**Thu 5/1/08**	**Wed 7/1/09**
31	1.3.1	Part I - Review Current Operating Conditions	91.8 wks	Thu 5/1/08	Tue 9/30/08
32	1.3.2	Part II - Assessment of Database	73.8 wks	Wed 10/1/08	Sat 1/31/09
33	1.3.3	Part III - Operating Conditions Allowable Stress Values	90.6 wks	Sun 2/1/09	Wed 7/1/09
34	**1.4**	**Task 7 - IHX**	**1281 days**	**Thu 5/1/08**	**Wed 7/1/09**
35	1.4.1	Part I: Review Current Experience	147 wks	Thu 5/1/08	Wed 12/31/08
36	1.4.2	Part II: Recommended Code Approach	102.6 wks	Mon 1/12/09	Wed 7/1/09
37	**1.5**	**Task 8 - Crepp and CF Crack Growth**	**1281 days**	**Thu 5/1/08**	**Wed 7/1/09**
38	1.5.1	Part I - Review and Assess Current Methodologies	165 wks	Thu 5/1/08	Fri 1/30/09
39	1.5.2	Part II - Draft Code Rules	90 wks	Mon 2/2/09	Wed 7/1/09
40	**1.6**	**Task 9 - Simplified Elastic and Inelastic**	**1281 days**	**Thu 5/1/08**	**Wed 7/1/09**
41	1.6.1	Report with Recommendations on Design Methods	256.2 wks	Thu 5/1/08	Wed 7/1/09
42	**1.7**	**Task 10 - Simplified CF Design Methods**	**1281 days**	**Thu 5/1/08**	**Wed 7/1/09**
43	1.7.1	Report on Alternative Simplified CF	256.2 wks	Thu 5/1/08	Wed 7/1/09



Project: Gen IV Year 2 timeline
Date: Thu 1/31/08

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			

Thu 1/31/08