



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SEP 21 1982

US Army Cold Regions Research  
and Engineering Laboratory  
Corps of Engineers  
ATTN: CRREL-EI  
Hanover, NH 03755

Gentlemen:

Subject: Interagency Agreement No. NRC-03-82-129

Pursuant to the authority contained in Section 7 of the Economy Act of 1932, the US Nuclear Regulatory Commission (NRC) and the US Army Cold Regions Research and Engineering Laboratory (CRREL) wish to enter into an interagency agreement whereby the CRREL shall provide staff consultant, advisory, and analytical services to assess adequacy of the design basis for ice expansion forces of safety related structures in the Callaway Ultimate Heat Sink retention pond. The CRREL shall provide assistance to staff for development of general guidance for use in determining design basis ice expansion forces.

The NRC shall provide funding in the total amount of \$10,000.00 to complete the effort described in the attached statement of work entitled "Review of Callaway UHS Ice Forces."

Accordingly, the parties hereto mutually agree to the following terms of this agreement:

ARTICLE I - STATEMENT OF WORK

A description of the effort is contained in the attached Statement of Work which is hereby incorporated as a part of this interagency agreement.

ARTICLE II - PERIOD OF PERFORMANCE

This agreement will commence upon the date of execution and all effort hereunder shall be completed within three months which is estimated to be December 3, 1982.

ARTICLE III - ESTIMATE OF COST

The estimated cost of the effort described in the attached Statement of Work is \$10,000.00.

ARTICLE IV - OBLIGATIONS

The amount presently obligated by the NRC with respect to this Interagency Agreement is \$10,000.00. The funds are chargeable to the following appropriation data:

Appropriation: 31X0200.202      B&R: 20-19-40-41-2      FIN: B8618

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ARTICLE V - PAYMENT

The NRC agrees to reimburse the CRREL during the period of performance for an amount not to exceed \$10,000.00 for services described in the Statement of Work. The CRREL shall invoice the NRC for actual costs incurred. Invoices should be submitted to:

US Nuclear Regulatory Commission  
ORM/Division of Accounting & Finance  
Washington, DC 20555

ARTICLE VI - REPORTING REQUIREMENTS

The reporting requirements are contained in the attached Statement of Work.

ARTICLE VII - GOVERNMENT-FURNISHED MATERIALS

The NRC will provide one copy of pertinent sections of the Callaway Final Safety Analysis Report and other documents prepared by the applicant or the NRC concerning ice forces in the USH retention pond.

ARTICLE VII - PROJECT OFFICER

Rex Wescott is hereby designated as the Contracting Officer's authorized representative (hereinafter called Project Officer) for technical aspects of this agreement. The Project Officer is not authorized to approve or request any action which results in or could result in an increase in the agreement cost; nor terminate or settle any claim or dispute arising under the agreement; nor issue any unilateral directive whatsoever.

The Project Officer is responsible for (1) monitoring the Contractor's technical progress, including surveillance and assessment of performance, and recommending to the Contracting Officer changes in requirements; (2) interpreting the scope of work; (3) performing technical evaluations as required; (4) performing technical inspections and acceptances required by this agreement; and (5) assisting the Contractor in the resolution of technical problems encountered during performance. Within the purview of this authority, the Project Officer is authorized to review all costs requested for reimbursement by the Contractor and submit recommendations for approval, disapproval, or suspension for supplies or services required under the agreement. The Contracting Officer is responsible for directing or negotiating any changes in terms, conditions, or amounts cited in the agreement.

For guidance from the Project Officer to the Contractor to be valid, it must: (1) be consistent with the description of work set forth in the agreement; (2) not constitute new assignment of work or change to the expressed terms, conditions, or specifications incorporated into this agreement; (3) not constitute a basis for an extension to the period of performance; and, as stated above, (4) not constitute a basis for any increase in the agreement cost.

ARTICLE VIII - INSPECTION AND ACCEPTANCE

Acceptance of the services and reports to be delivered herein will be made by the Project Officer.

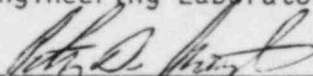
If this agreement is acceptable to the CRREL, please so indicate by signing below and returning three copies to the undersigned. The fourth copy is for your retention. A fully executed copy will be forwarded to you.

Sincerely,

John E. Rebello  
Contracting Officer

ACCEPTED:

US Army Cold Regions Research  
and Engineering Laboratory

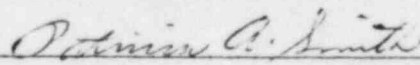
BY:   
PETER D. SWART

TITLE: Chief, Resource Mgmt. Office

DATE: 23 September 1982

ACCEPTED:

US Nuclear Regulatory Commission

BY: 

TITLE: Contracting Officer

DATE: September 30, 1982

## Statement of Work

Title: Review of Callaway UHS Ice Forces

FIN: B8618

B&R Number: 20-19-40-41-2

Project Manager: R. Wescott (FTS 492-8476)

### Purpose of Agreement

The Callaway Nuclear Power Plant has an Ultimate Heat Sink (UHS) retention pond which may be susceptible to ice formation. Forces exerted by this ice could compromise the ability of the UHS to supply emergency cooling water in the event of an accident. The NRC staff must evaluate the design basis for ice forces used by the applicant in the design of safety related structures, systems, and components in the UHS (as required by Standard Review Plan (SRP) Section 2.4.7, Ice Effects) in order to assure that the UHS will function as intended under severe meteorological conditions (as required by SRP Section 2.4.11, Cooling Water Supply and Regulatory Guide 1.27 Ultimate Heat Sink for Nuclear Power Plants).

The advice of the Cold Regions Research and Engineering Laboratory is needed because the specialized expertise in certain aspects of ice engineering is not available within the NRC staff.

### Objective

The objective of this Interagency Agreement is to obtain the consultant, advisory and analytical services of expert technical personnel from the Cold Regions Research and Engineering Laboratory to assist the NRC Hydrologic Engineering Section staff in the performance of their staff responsibilities.

### Proposal Requirements

As part of the proposal, the Cold Regions Research and Engineering Laboratory should provide a plan and methodology for accomplishing each subtask including estimated completion dates and manpower.

Task: Review of Callaway UHS Ice Forces

Background

General Design Criterion (GDC) 2 (10 CFR 50, App. A) requires that structures, systems and components (at nuclear power stations) important to safety be designed to withstand the effects of natural phenomena. GDC 2 also requires that the design basis for these structures, systems, and components shall reflect appropriate consideration of the most severe historically reported events for the site and surrounding area with sufficient margin for the limited accuracy, quantity and period of time in which the historical data have been accumulated. The staff considers the force exerted by expanding ice to be a natural phenomenon that could in the case of Callaway and possibly other nuclear power stations, compromise the ability of the Ultimate Heat Sink (UHS) to supply emergency cooling water (SRP) 2.4.7, SRP 2.4.11 and R.G. 1.27). The objective of this task is to assess the adequacy of the design basis which the applicant has chosen in regard to ice forces in the Callaway UHS retention pond and to assist the staff in developing general guidance for determining design basis ice expansion forces for safety related structures, systems, and components at nuclear power stations as well as procedures which may be used to limit ice buildup.

Work Requirements

The following subtasks shall be completed for this contract:

- Subtask 1: Review the material available in Sections 2.4 and 9.2.5 of the Callaway FSAR and other pertinent documents submitted by the applicant and NRC concerning ice forces in the UHS retention pond.
- Subtask 2: Assess the adequacy of the applicant's proposed design basis when compared to NRC's regulatory requirements as stated in GDC 2 of 10 CFR 50, Appendix A and current licensing practice regarding other natural phenomena such as earthquakes, floods, and tornadoes. Questions should be prepared if necessary to solicit additional information from the applicant, and sent to the NRC project manager.
- Subtask 3: Prepare a report documenting the adequacy or inadequacy of the design basis after receipt of additional information from the applicant. If the applicant's design basis is found to be inadequate, provide guidance to the staff as to appropriate remedial measures.
- Subtask 4: Based on the analyses and assessments performed in subtasks 1-3<sup>1/2</sup> assist the staff in formulating general guidance for determining an acceptable design basis for ice expansion forces and acceptable measures for limiting ice buildup around safety related structures, systems and components at nuclear power stations.<sup>1/</sup>

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<sup>1/</sup>NOTE: Criteria should be generally applicable to other water bodies such as lakes and rivers.

Level of Effort and Period of Performance

The level of effort is estimated at approximately one man-month over a period of 3 months following the acceptance of this work order.

Reporting Requirements

1. The results of subtask 3 are to be provided in a single report which should be issued to NRC project manager initially in draft form for review and then in final form after comments are received.
2. The results of subtask 4 may consist of either review and comments on NRC supplied draft guidance or may be a report generated by CRREL. The reporting requirements of this subtask will be specified by NRC upon completion of subtasks 2 and 3 and discussions with the NRC project manager.

Meetings and Travel

No contractor travel is anticipated for this task.

NRC Furnished Materials

The NRC will provide, if it has not already done so, one copy of pertinent sections of the Callaway Final Safety Analysis Report and other documents prepared by the applicant or NRC concerning ice forces in the UHS retention pond.

NRC Contacts

The NRC technical representative for the work hereunder is Rex Wescott, Hydrologic and Geotechnical Engineering Branch, NRR; telephone number (301) 492-8476.