

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

BPA NO. FFS# RES-CO6-305

1. DATE OF ORDER 02/23/06		2. CONTRACT NO. (if any)		6. SHIP TO:	
3. ORDER NO. DR-04-05-046		MODIFICATION NO.		4. REQUISITION/REFERENCE NO. RES-06-046	
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div of Contracts Two White Flint North - MS T-7-I-2 Contract Management Center No. 1 Washington, DC 20555			6. STREET ADDRESS Attn: E.P. Jain, RES		
7. TC:			c. CITY Washington		d. STATE DC
a. NAME OF CONTRACTOR SOUTHWEST RESEARCH INSTITUTE			f. SHIP VIA		
b. COMPANY NAME			8. TYPE OF ORDER		
c. STREET ADDRESS 6220 CULEBRA RD			<input checked="" type="checkbox"/> a. PURCHASE		<input type="checkbox"/> b. DELIVERY
d. CITY SAN ANTONIO			e. STATE TX		f. ZIP CODE 782385100
9. ACCOUNTING AND APPROPRIATION DATA B&R 6601511121 JC: N6278 BOC: 252A 31X0200.660 Obligate: \$99,937			10. REQUISITIONING OFFICE RES \$99,937.00 E.P.Jain 301-415-6303		
11. BUSINESS CLASSIFICATION (Check appropriate box(es))				12. F.O.B. POINT Destination	
<input type="checkbox"/> a. SMALL		<input checked="" type="checkbox"/> b. OTHER THAN SMALL		<input type="checkbox"/> c. DISADVANTAGED	
<input type="checkbox"/> d. WOMEN-OWNED		<input type="checkbox"/> e. HUDZone		<input type="checkbox"/> f. EMERGING SMALL BUSINESS	
<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED					
13. PLACE OF		14. GOVERNMENT BAL. NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)	
a. INSPECTION		b. ACCEPTANCE		See SOW	
				16. DISCOUNT TERMS N/A	

17. SCHEDULE (See reverse for footnotes)

ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
	Contractor shall provide services in accordance with the attached statement of work entitled, "GS1-191 Power Sump Blockage Chemical Effects Thermodynamic Simulations - Technical Assistance to NRC Staff." Period of Performance: 02/23/06 through 12/30/06					
1	Firm Fixed Price for training of NRC Staff				\$21,206.00	
2	Firm Fixed Price for Computer Program Manual				\$32,855.00	
3	Firm Fixed Price for Technical Letter Report				\$35,854.00	
4	Estimated Cost for Travel to NRC Headquarters (Three 3-day trips to Rockville, MD)				\$4,494.00	
5	Estimated Cost for Travel to NRC Headquarters (One 3-day trip to Chicago, IL)				\$1,444.00	
Total Obligated Amount: \$99,937 Project Officer is E.P. Jain 301-415-6303						

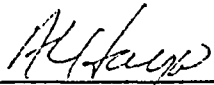
SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(b) TOTAL (Cont. pages) 17(c) GRAND TOTAL
	21. MAIL INVOICE TO:						
	a. NAME U.S. Nuclear Regulatory Commission Contract Management Branch No. 3						
	b. STREET ADDRESS (or P.O. Box) Attn: (DR-04-06-046) M/S T7I2						
c. CITY Washington		d. STATE DC		e. ZIP CODE 20555		\$99,937.00	
22. UNITED STATES OF AMERICA BY (Signature)					23. NAME (Typed) Valerie M. Whipple TITLE: CONTRACTING/ORDERING OFFICER		

Valerie M. Whipple

SUNSI REVIEW COMPLETE

Please indicate your acceptance of this order by having an official who is authorized to bind your organization, execute this document in the space provided below.

ACCEPTED:



Name **R. B. Kalmbach**

Director, Contracts

Title

March 16, 2006

Date

ADDITIONAL SIMPLIFIED ACQUISITION TERMS AND CONDITIONS

A.1 NOTICE LISTING CLAUSES INCORPORATED BY REFERENCE

The following clauses are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR "52.252-2 CLAUSES INCORPORATED BY REFERENCE" contained in this document. FAR 52.252-2 contains the internet address for electronic access to the full text of a clause.

NUMBER	TITLE	DATE
52.222-42	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1) STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES	MAY 1989
52.222-47	SERVICE CONTRACTS ACT (SCA) MINIMUM WAGES AND FRINGE BENEFITS	MAY 1989
52.223-6	DRUG-FREE WORKPLACE	MAY 2001
52.237-1	SITE VISIT	APR 1984
52.237-2	PROTECTION OF GOVERNMENT BUILDINGS, EQUIPMENT, AND VEGETATION	APR 1984
52.243-1	CHANGES—FIXED PRICE ALTERNATE I (APR 1984)	AUG 1987
52.213-3	NOTICE TO SUPPLIER	APR 1984
A.2 52.213-4	TERMS AND CONDITIONS - SIMPLIFIED ACQUISITIONS (OTHER THAN COMMERCIAL ITEMS) (FEB 2006)	

(a) The Contractor shall comply with the following Federal Acquisition Regulation (FAR) clauses that are incorporated by reference:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-3, Convict Labor (June 2003) (E.O. 11755).

(ii) 52.222-21, Prohibition of Segregated Facilities (Feb 1999) (E.O. 11246).

(iii) 52.222-26, Equal Opportunity (Apr 2002) (E.O. 11246).

(iv) 52.225-13, Restrictions on Certain Foreign Purchases (FEB 2006) (E.o.s, proclamations, and statutes administered by the Office of Foreign Assets Control of the Department of the Treasury).

(v) 52.233-3, Protest After Award (Aug 1996) (31 U.S.C. 3553).

(vi) 52.233-4, Applicable Law for Breach of Contract Claim (OCT 2004) (Pub. L. 108-77, 108-78).

(2) Listed below are additional clauses that apply:

(i) 52.232-1, Payments (Apr 1984).

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(ii) 52.232-8, Discounts for Prompt Payment (Feb 2002).

(iii) 52.232-11, Extras (Apr 1984).

(iv) 52.232-25, Prompt Payment (Oct 2003).

(v) 52.233-1, Disputes (Jul 2002).

(vi) 52.244-6, Subcontracts for Commercial Items (FEB 2006).

(vii) 52.253-1, Computer Generated Forms (Jan 1991).

(b) The Contractor shall comply with the following FAR clauses, incorporated by reference, unless the circumstances do not apply:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-19, Child Labor—Cooperation with Authorities and Remedies (JAN 2006) (E.O. 13126). (Applies to contracts for supplies exceeding the micro-purchase threshold.)

(ii) 52.222-20, Walsh-Healey Public Contracts Act (Dec 1996) (41 U.S.C. 35-45) (Applies to supply contracts over \$10,000 in the United States, Puerto Rico, or the U.S. Virgin Islands).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (DEC 2001) (38 U.S.C. 4212) (Applies to contracts of \$25,000 or more).

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (June 1998) (29 U.S.C. 793). (Applies to contracts over \$10,000, unless the work is to be performed outside the United States by employees recruited outside the United States.) (For purposes of this clause, United States includes the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.)

(v) 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (DEC 2001) (38 U.S.C. 4212) (Applies to contracts of \$25,000 or more).

(vi) 52.222-41, Service Contract Act of 1965, As Amended (JUL 2005) (41 U.S.C. 351, et seq.) (Applies to service contracts over \$2,500 that are subject to the Service Contract Act and will be performed in the United States, District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, Johnston Island, Wake Island, or the outer continental shelf lands).

(vii) 52.223-5, Pollution Prevention and Right-to-Know Information (AUG 2003) (E.O. 13148) (Applies to services performed on Federal facilities).

(viii) 52.225-1, Buy American Act—Supplies (June 2003) (41 U.S.C. 10a-10d) (Applies to contracts for supplies, and to contracts for services involving the furnishing of supplies, for use in the United States or its outlying areas, if the value of the supply contract or supply portion of a service contract exceeds the micro-purchase threshold and the acquisition—

(A) Is set aside for small business concerns; or

(B) Cannot be set aside for small business concerns (see 19.502-2), and does not exceed \$25,000.)

(ix) 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration (OCT 2003). (Applies when the payment will be made by electronic funds transfer (EFT) and the payment office uses the Central Contractor Registration (CCR) database as its source of EFT information.)

(x) 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration (May 1999). (Applies when the payment will be made by EFT and the payment office does not use the CCR database as its source of EFT information.)

(xi) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (FEB 2005) (46 U.S.C. Appx 1241). (Applies to supplies transported by ocean vessels (except for the types of subcontracts listed at 47.504(d).)

(2) Listed below are additional clauses that may apply:

(i) 52.209-6, Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (JAN 2005) (Applies to contracts over \$25,000).

(ii) 52.211-17, Delivery of Excess Quantities (SEPT 1989) (Applies to fixed-price supplies).

(iii) 52.247-29, F.o.b. Origin (FEB 2006) (Applies to supplies if delivery is f.o.b. origin).

(iv) 52.247-34, F.o.b. Destination (NOV 1991) (Applies to supplies if delivery is f.o.b. destination).

(c) FAR 52.252-2, Clauses Incorporated by Reference (FEB 1998). This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

(d) Inspection/Acceptance. The Contractor shall tender for acceptance only those items that conform to the requirements of this contract. The Government reserves the right to inspect or test any supplies or services that have been tendered for acceptance. The Government may require repair or replacement of nonconforming supplies or reperformance of nonconforming services at no increase in contract price. The Government must exercise its postacceptance rights--

(1) Within a reasonable period of time after the defect was discovered or should have been discovered; and

(2) Before any substantial change occurs in the condition of the item, unless the change is due to the defect in the item.

(e) Excusable delays. The Contractor shall be liable for default unless nonperformance is caused by an occurrence beyond the reasonable control of the Contractor and without its fault or negligence, such as acts of God or the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather, and delays of common carriers. The Contractor shall notify the Contracting Officer in writing as soon as it is reasonably possible after the commencement of any excusable delay, setting forth the full particulars in connection therewith, shall remedy such occurrence with all reasonable dispatch, and shall promptly give written notice to the Contracting Officer of the cessation of such occurrence.

(f) Termination for the Government's convenience. The Government reserves the right to terminate this contract, or any part hereof, for its sole convenience. In the event of such termination, the Contractor shall immediately stop all work hereunder and shall immediately cause any and all of its suppliers and subcontractors to cease work. Subject to the terms of this contract, the Contractor shall be paid a percentage

of the contract price reflecting the percentage of the work performed prior to the notice of termination, plus reasonable charges that the Contractor can demonstrate to the satisfaction of the Government, using its standard record keeping system, have resulted from the termination. The Contractor shall not be required to comply with the cost accounting standards or contract cost principles for this purpose. This paragraph does not give the Government any right to audit the Contractor's records. The Contractor shall not be paid for any work performed or costs incurred that reasonably could have been avoided.

(g) Termination for cause. The Government may terminate this contract, or any part hereof, for cause in the event of any default by the Contractor, or if the Contractor fails to comply with any contract terms and conditions, or fails to provide the Government, upon request, with adequate assurances of future performance. In the event of termination for cause, the Government shall not be liable to the Contractor for any amount for supplies or services not accepted, and the Contractor shall be liable to the Government for any and all rights and remedies provided by law. If it is determined that the Government improperly terminated this contract for default, such termination shall be deemed a termination for convenience.

(h) Warranty. The Contractor warrants and implies that the items delivered hereunder are merchantable and fit for use for the particular purpose described in this contract.

2052.209-72

CONTRACTOR ORGANIZATIONAL CONFLICTS OF INTEREST JAN 1993

A.3 SEAT BELTS

Contractors, subcontractors, and grantees, are encouraged to adopt and enforce on-the-job seat belt policies and programs for their employees when operating company-owned, rented, or personally owned vehicles.

A.4 Compliance with U.S. Immigration Laws and Regulations

NRC contractors are responsible to ensure that their alien personnel are not in violation of United States Immigration and Naturalization (INS) laws and regulations, including employment authorization documents and visa requirements. Each alien employee of the Contractor must be lawfully admitted for permanent residence as evidenced by Alien Registration Receipt Card Form 1-151 or must present other evidence from the Immigration and Naturalization Services that employment will not affect his/her immigration status. The INS Office of Business Liaison (OBL) provides information to contractors to help them understand the employment eligibility verification process for non-US citizens. This information can be found on the INS website, <http://www.ins.usdoj.gov/graphics/services/employerinfo/index.htm#obl>.

The NRC reserves the right to deny or withdraw Contractor use or access to NRC facilities or its equipment/services, and/or take any number of contract administrative actions (e.g., disallow costs, terminate for cause) should the Contractor violate the Contractor's responsibility under this clause.

(End of Clause)

OFFICE OF NUCLEAR REGULATORY RESEARCH
DIVISION OF ENGINEERING TECHNOLOGY
STATEMENT OF WORK
RES - 06-046

TITLE: GSI-191 PWR SUMP BLOCKAGE CHEMICAL EFFECTS THERMODYNAMIC SIMULATIONS -TECHNICAL ASSISTANCE TO NRC STAFF

BACKGROUND

As part of the resolution of generic safety issue (GSI) 191, the NRC is studying the performance of pressurized water reactor (PWR) sumps and the availability of water sources for emergency core cooling following a loss-of-coolant accident (LOCA) to ensure that emergency core cooling systems (ECCS) operate properly during potential accident scenarios. NRC's Advisory Committee on Reactor Safeguards (ACRS) during its review of staff activities raised a concern that corrosion products due to chemical interactions between the ECCS/ containment spray water and exposed materials (such as metal surfaces, paint chips, and fiberglass insulation debris) could impede the performance of ECCS recirculation after a loss-of-coolant accident (LOCA) at a PWR plant. In response to this concern, the NRC's Office of Nuclear Regulatory Research (RES) sponsored an integrated chemical effects tests (ICET) program at the University of New Mexico, under the direction of Los Alamos National Laboratory. The ICET program was developed as a limited-scope suite of five different tests. Each test represents a unique containment pool environment and is intended to represent conditions applicable to a portion of the commercial PWR plants. The ICET program was conducted under a joint memorandum of understanding between the NRC Office of Nuclear Regulatory Research (RES) and the Electric Power Research Institute (EPRI) to address concerns about the possible deleterious impact from chemical reaction products on emergency core cooling system (ECCS) performance during recirculation following a hypothetical LOCA. The primary objectives for the ICET series were to (1) determine, characterize, and quantify chemical reaction products that may develop in the containment pool under a representative post-LOCA environment; and (2) determine and quantify any amorphous or gelatinous material that could be produced during the post-LOCA recirculation phase. The ICET results indicated that chemical products can form in representative sump environments and can potentially influence the sump head loss.

The NRC sponsored thermodynamic simulations at the Center for Nuclear Waste Regulatory Analyses (CNWRA) of certain chemicals and metals to gain information on potential chemical reactions and the effects of chemical reactions on the generation of debris and the effectiveness of post-LOCA coolant recirculation systems. In order to gain insights into important parameters and develop predictive capability of ICET results, a study was initiated at the CNWRA to perform thermodynamic simulations of chemical effects in a typical PWR post-LOCA containment environment. The results of CNWRA's thermodynamic simulations using a computer software OLI were summarized in NUREG/CR-6873. The report provided insights into important parameters and an understanding of the evolution of solution chemistry and the formation of solid phases in the ICET tests.

The CNWRA staff has assessed the usefulness of commercially available modeling software in simulating the formation of corrosion products from debris components and in their ability to provide useful insights into potential post-LOCA sump environment reactions during a postulated LOCA event in a PWR. The CNWRA also evaluated the capability of commercially available modeling software to predict the environment generated in the ICET program and to determine

limits of applicability of codes to allow an assessment of precipitate formation in plant specific environments that have not been explicitly tested as part the ICET program.

OBJECTIVES

The objective of this WORK is to provide technical assistance to the NRC staff in conducting safety reviews of licensees' responses to Generic Letter 2004-02. The scope includes to (1) develop a user manual to model plant-specific conditions using the CNWRA recommended thermodynamic simulation computer program best suited for speciation prediction in anticipated PWR sump environments, (2) provide training to NRC staff on the use of the selected thermodynamic simulation software, and (3) provide technical assistance to NRC staff for predicting mass transfer reactions and chemical species formation under plant-specific conditions.

SCOPE OF WORK

Task 1: Develop User Manual/Guidance

In this task, CNWRA will develop, for NRC staff use, a computer program user manual and guidance specific to the modeling of the plant-specific conditions and interpreting results. The Manual will clearly identify any limitation of the modeling software and will also specify the applicable range of input parameters.

Task 2: Training of NRC staff

In this task, CNWRA will provide training for visiting NRC staff on the use of recommended software and in modeling of plant-specific conditions for thermodynamic simulation.

Task 3: Technical Assistance

In this task, CNWRA will provide technical assistance to NRC staff on as needed basis. The assistance includes but is not limited to additional evaluation of thermodynamic simulation software as required to enhance and address staff's comments on the draft NUREG/CR under preparation (Purchase order No. NRC-DR-04-05-067), participation in technical meetings, support in preparation of meetings with ACRS, participating in chemical effects peer review panel, and evaluation of any plant specific PWR environments.

PUBLICATION NOTE

RES encourages the publication of the scientific results from RES sponsored programs in referred scientific and engineering journals as appropriate. If CNWRA proposes to publish in the open literature or present the information at meeting in addition to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the RES Project Manager. The RES Project Manager shall either approve the material as submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the RES Project Manager may disapprove or delay presentation or publication of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved. Additional information regarding the publication of NRC sponsored research is contained in NRC

Management Directives 3.8, "Unclassified Contractor and Grantee Publications in the NUREG Series," and 3.9, "NRC Staff and Contractor Speeches, Papers, and Journal Articles on Regulatory and Technical Subjects."

If the presentation or paper is in addition to the required technical reports and the RES Project Manager determines that it will benefit the RES project, the Project Manager may authorize payment of travel and publishing costs, if any, from the project funds. If the Project Manager determines that the article or presentation would not benefit the RES project, the costs associated with the preparation, presentation, or publication will be borne by CNWRA. For any publication or presentations falling into this category, the NRC reserves the right to require that such presentation or publication will not identify the NRC's sponsorship of the work.

Reminder: An electronic version of camera-ready papers and draft and final versions of the paper shall be submitted to the NRC Project Manager with the paper versions.

MEETINGS AND TRAVEL

All travel shall be approved by and coordinated with the NRC Project Manager. For the purpose of estimate, the project should assume four 3-days trips to NRC Headquarters (Rockville, MD) to provide technical assistance and brief the NRC Project Manager on the results.

NRC FURNISHED MATERIALS

None.

CNWRA ACQUIRED MATERIAL

None.

DELIVERABLE/SCHEDULE AND/OR MILESTONES

Monthly Letter Status Report

A monthly letter status report (MLSR) will be submitted by the 20th of each month, for the previous month, to the NRC Project Manager, with copies to the Director, Division of Engineering Technology; Chief, Engineering Research Applications Branch; Chief, Mechanical and Structural Engineering Section, Engineering Research Applications Branch; and to the Division of Contracts, Office of Administration. Each MLSR will provide information in accordance with NRC Management Directive 11.7 Handbook, with the agreed upon capability of the CNWRA accounting system, including the title of the project, the JCN, the Principal Investigators, the period of performance, and the reporting period.

The MLSR will contain two sections as follows:

a) Project Status Section:

- (1) Objective: A brief statement of CNWRA's understanding of the objective of the program.
- (2) Progress During Reporting Period: A brief discussion and conclusion of efforts completed during the period, milestones reached, or if missed, and explanation provided. This will include all contacts made with industry during this period.
- (3) Travel: Travel taken during the reporting period will be described.
- (4) Anticipated and Encountered Problem Areas: Any problems or delays encountered or anticipated, and recommendations for resolution will be identified. (Note: if the recommended resolution involves a contract modification, i.e., change of work requirements level of effort (costs), or period of performance, a separate letter will be prepared and submitted to the NRC Project Manager).
- (5) Plans for Next Reporting Period: A brief summary of plans for the next reporting period, including work to be performed and anticipated travel. Milestones that will be completed will be described.
- (6) Variance: Any variance in either schedule or spending will be identified and discussed, including the cause and proposed solutions.

b) Financial Status Section:

- (1) Financial Status: CNWRA will provide a narrative description of the financial status of the project, including a discussion of the status of the projected cost and the schedule of the project. In addition, financial information will be provided in accordance with NRC Management Directive 11.7 within the agreed-upon capabilities of the CNWRA accounting system.
- (2) Spending Plan (SP) Update: Any required updates to the spending plan will be reported and discussed.

Major Milestones:

NRC staff training will be scheduled during the last two quarters of FY06.

Computer Program Manual:

- (1) Deliverable: Computer program user manual and guidance specific to the modeling of the plant-specific conditions and interpreting results. The Manual will clearly identify any limitation of the modeling software and will also specify the applicable range of parameters.

An electronic version of the camera-ready Computer Program Manual shall be submitted to the NRC Project Manager with the paper versions.

- (2) Delivery Schedule: A draft Computer Program Manual shall be delivered by June 30, 2006. NRC will provide comments within four weeks of delivery of the draft computer program manual. The final Computer program manual shall be provided to the NRC PM by August 31, 2006.

Technical Letter Report

The deliverable for Task 3 is a final technical letter report (TLR). The TLR shall summarize work performed under this task and an outline for the TLR shall be submitted to the NRC project manager for approval by August 15, 2006. The draft TLR shall be submitted by September 30, 2006, and the final TLR shall be completed by November 30, 2006.

Work performed under Task 3 to enhance and address staff's comments on the draft NUREG/CR will be included in a revised draft NUREG/CR. The revised draft NUREG/CR shall be submitted to the NRC project manager by April 30, 2006 and final NUREG/CR by June 15, 2006.

NRC PROJECT OFFICER

B.P. Jain, RES, 301-415-6303
Engineering Research Applications Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Mail Stop: T-10D20

PERIOD OF PERFORMANCE

The period of performance is from 2/23/06 to 12/30/06.

LEVEL OF EFFORT

The estimated effort level is 0.3 staff-year.