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CPSC-IAG-00-1188

INTERAGENCY AGREEMENT

BETWEEN THE

U.S. CONSUMER PRODUCT SAFETY COMMISSION

AND THE

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

I. INTRODUCTION

The U S. Consumer Product Safety Commission, hereinafter referred to as CPSC, and the National Institute of Standards and Technology, hereinafter referred to as NIST, hereby agree that NIST shall conduct product testing and analysis of certain smoke alarms, fire alarms and related technology and provide the subsequent findings to CPSC, in accordance with the terms and conditions set forth below. This IAG will allow CPSC Engineering Sciences (ES) to carry out its obligations in areas of regulation development, compliance and enforcement.

II. TITLE:

"Testing and Analysis of Smoke Alarms".

III. PURPOSE AND OBJECTIVES:

The purpose of this project is to test and analyze various smoke alarms to determine if they can respond to threatening residential fire settings permitting egress of typical occupant sets. The ability of the alarm devices to avoid nuisance alarms shall also be evaluated.

The objectives of this project are:

A. To evaluate the performance of current smoke alarm technology;

B. To fully characterize the smoke alarms in a consistent manner to facilitate comparisons;

C. To develop standard nuisance alarm sources to be included in the test program;

D. To utilize fire models to extend the applicability of the test arrangements and maximize the test instrumentation;

E. To utilize in the testing, conditions representative of those involved in current fatal residential fires;

F. To include in the testing, fuel items that incorporate materials and construction methods representative of current residential products;

G. To evaluate the effectiveness of current requirements for number and location of smoke alarms;

H. To obtain data on the potential for improvements in performance by new technologies;

I. To examine other fire detection technologies in combination with smoke alarms (example: residential sprinkler and heat detectors);

J. To make all of the data collected as widely accessible as possible;

K. To develop educational materials to raise public fire safety awareness.

IV. BACKGROUND:

While there is no question that smoke alarms have successfully prevented thousands of residential fire deaths, their beneficial effect may be beginning to plateau. It is recognized that reducing the number of non-working alarms may produce some further reduction in fire deaths. Further, introducing more effective alarms in residential dwellings could have a greater impact in reducing deaths. However, there seems to be little incentive to produce and install better residential smoke alarms until performance improvements can be demonstrated through objective, realistic, and accurate testing.

The following organizations have entered into a cooperative effort to investigate smoke alarms through testing and analysis:

National Institute of Standards and Technology (NIST);
United States Fire Administration (USFA);

Centers for Disease Control (CDC);
Department of Housing and Urban Development (HUD);
U.S. Consumer Product Safety Commission (CPSC) and,
Underwriter's Laboratory (UL).

NIST shall conduct the tests and the evaluation of current and emerging smoke alarm technology responses to common residential fire scenarios and nuisance alarm sources. NIST shall perform the research under the guidance of a steering committee of the sponsoring organizations.

V. STATEMENT OF WORK

A. NIST shall conduct full-scale tests of smoke alarms and other related technologies. The full-scale tests shall characterize the test environment and collect at a minimum CO, CO_2, O_2, HCN, smoke obscuration, temperature, humidity, smoke particle size and concentration. NIST shall develop an analysis plan to accurately characterize the implications of various smoke alarms' responses measured in the test program.

B. In order to accomplish the objectives of this investigation, NIST shall complete the tasks listed below:

TASK 1. Acquire test detectors/alarms and conduct detector characterization.

The NIST project staff shall meet with smoke alarm manufacturers and develop a set of test articles that are representative of the range of products currently sold Appropriate modifications may be made to the test articles to facilitate the acquisition of useful data but any modified articles shall be calibrated against unmodified devices to assure representativeness. All test articles shall be initially characterized in NIST's Fire Emulator/Detector Evaluator (FE/DE) apparatus to provide baseline data. Test articles exposed to fire tests shall be re-checked in the FE/DE between field trials to assure that such exposure did not alter the operational characteristics.

Task 2. Identify potential dwellings for test sites.

Test sites must be typical of US housing and represent single- and multi-family units, apartments and condominiums, and manufactured homes. Test sites shall be selected from donated homes scheduled for demolition or rehab, purchased units, or

simulated arrangements of rooms. Potential sites shall be identified and evaluated by NIST staff and selections made in the interest of the overall project goals.

TASK 3. Plan for long term site at NIST

One of the test sites shall be a manufactured home to be purchased and located at the NIST site for the duration of the work. An appropriate floor plan has been chosen and a unit shall be procured and installed on the site.

TASK 4. Review National Fire Incident Reporting System (NFIRS) data and develop scenarios

For the test scenarios to be realistic they need to be based on current, fatal residential fire scenarios in terms of such parameters as ignition source and first item ignited, room of origin, location of occupants and time of day. Dr. John Hall of the National Fire Protection Association (NFPA) shall conduct an analysis of the latest five years of NFIRS data to develop the test scenario descriptions. This work is being conducted by NFPA as an in-kind contribution to the project.

TASK 5. Perform modeling studies of sites.

Modern fire models can provide valuable insights into the development of fires in the test spaces. The NIST Fire Dynamics Simulator (FDS) shall be used to examine test arrangements and fire scenarios in advance of the experiments to provide information useful for instrument selection and location.

TASK 6. Develop instrumentation and test plans for sites

Instrumentation layout, sensor locations, and measurement types shall be selected based on the scenarios planned and the floor plan of the site. These shall be developed with the assistance of the modeling discussed in task 5 and the scenario list from task 4

TASK 7. Identify and acquire fuel items

The primary fuel items for the tests shall be furniture and other household goods and these need to be representative of current materials and constructions. Some inexpensive items may be purchased new, but furniture items shall be purchased used from

residential furniture rental outlets. For the scenarios and floor plans of sites the appropriate items shall be identified and procured. For field testing, items shall be procured locally to avoid shipping costs.

TASK 8. Construct long term test site

Some testing may be conducted in an arrangement of rooms within the NIST test facility and others may be conducted in a manufactured home at the NIST site. The former needs to be constructed and the latter modified to allow fire testing without risking the unit.

TASK 9. Conduct initial fire testing

The first round of testing for smoke alarms shall consist of two tests per day for five days with the last tests actively sprinklered or flashover tests. These tests require a crew of engineers and technicians to do preparation, conduct the tests, and clean-up/tear down the instrumentation for the next series.

TASK 10. Conduct initial nuisance alarm testing

Development of recommendations for nuisance alarm tests shall involve tests in the NIST test site in a representative geometry followed by the reproduction of exposure conditions within the FE/DE facility, with careful measurements in the former guiding the latter. The data obtained shall be used to develop reproducible and repeatable testing protocols that are suitable for incorporation into US and international testing standards.

TASK 11. Analyze data, model tests and prepare initial test report

Data taken in the experiments shall be reduced to engineering units and analyzed. Modeling shall be conducted and compared with experimental data to provide insight into detector performance. After the completion of experiments model runs can be used to extrapolate results to untested conditions. An initial report and presentation shall be prepared for the steering committee and other interested parties.

TASK 12. Conduct second round of testing

The second round of testing shall be identical to the first except in

a different site or setup.

TASK 13. Analyze data, model and prepare final test report

This task is identical to Task 11 except for the second round of testing

TASK 14. Format data and publish on the Web

Reduced data files from all testing shall be formatted into the Fire Data Management System (FDMS) and posted on the NIST web site (Fire on the Web).

TASK 15. Develop public educational materials from test results

Results and conclusions shall be formatted into public education materials for posting on the Web using the format developed for the manufactured housing fact sheets produced for USFA and HUD in 1999. Other opportunities for education include filming tests for the production of videos shall be explored with NFPA.

VI. NIST FURNISHED MATERIALS/EQUIPMENT

NIST agrees to furnish all necessary personnel, equipment, materials, services, and facilities to complete the objectives list in Section III.

VII. CPSC FURNISHED MATERIALS/EQUIPMENT

NONE

VIII. CONFIDENTIALITY REQUIREMENTS

A. All information reported to or otherwise obtained by CPSC or its agents under the Consumer Product Safety Act (CPSA) and provided to or shared with NIST, which contains or relates to a trade secret or other matter referred to in section 1905 of title 18, United States Code, or subject to section 552(b)(4) of the title 5, United States Code, shall be held in confidence by NIST personnel.

B. To the extent permitted by law, including the Freedom of Information Act, NIST agrees not to release the identity of any manufacturer of any product being tested or reviewed (example: smoke alarms, heat detectors, sprinklers heads) in conjunction with this IAG without the written consent of the CPSC

C. All documents and other materials developed pursuant to this IAG shall have appropriate statements to indicate the work was performed pursuant to the IAG by NIST; that the documents and other materials produced are the views of the staff or members (present or past) of NIST; and that although the documents and other materials may have been developed in conjunction with CPSC staff and sponsors, the documents and other materials do not necessarily represent the views of the Consumer Product Safety Commission and other sponsors.

D Any publications of or publicity pertaining to, the work performed under this Agreement shall include the following:

"This project was partially funded by CPSC, as well as by other sponsors. The content of this publication does not necessarily reflect the views of the Commission nor the other sponsors, nor does mention of trade names, commercial products, or organizations imply endorsement by the Commission or the other sponsors."

IX. PERIOD OF PERFORMANCE

The period of performance shall begin on the effective date of the IAG and shall not extend beyond twenty-four (24) months. This agreement may be modified by mutual consent of CPSC and NIST.

X. DELIVERY OR PERFORMANCE

All deliverables required under the terms and conditions of this IAG shall be provided to the CPSC, regardless of the various sources of funding. The following items shall be performed or delivered in accordance with the following schedule:

	DELIVERY ITEM	QUANTITY	PERFORMANCE
A.	Quarterly progress reports to include, but not be limited to: project status, costs incurred , for quarter just ended, costs incurred to date, schedule, and logistic status.	1 copy per sponsor	Within thirty (30) calendar days after the end of the quarter.
B.	Semi-annual briefings for sponsors and invitees.	4 ea. (Over 24 Month Period of Performance)	As agreed upon by CPSC and NIST Project Officers.
C.	Test site tours for sponsors.	As necessary	As agreed upon by CPSC

and NIST Project Officers.

D.	A draft technical report including, but not limited to, test setup, test data, data analysis, conclusions, and recommendations.	2 copies per sponsor	No Later Than (NLT) forty-five (45) calendar days prior to the end of the 24 month period of performance.
E.	A final technical report including, but not limited to, test setup, test data, data analysis, conclusions, and recommendations.	4 copies per sponsor	No Later Than (NLT) the end of the 24 month period of performance.
F.	Data access in electronic form in several formats as determined by the steering committee.	To be determined	No Later Than (NLT) the end of the 24 month period of performance.
G.	Representative photographs and videos of the tests.	To be determined	No Later Than (NLT) the end of the 24 month period of performance.

XI. DISAGREEMENTS

In the event that CPSC and NIST have a disagreement arising under this interagency agreement, the parties shall cooperatively seek to resolve the disagreement by themselves. If the disagreement cannot be resolved between them, the parties agree to seek the assistance of a third party in resolving the disagreement.

XII. SCHEDULE OF TASK COST AND PERFORMANCE

A. CPSC agrees to allow NIST to make adjustments as needed in the distribution of resources, as long as the total cost of the project is not increased and the project objectives are all met.

TASK	DESCRIPTION OF TASK	EST.COST PER TASK	EST. COMPLETION SCHEDULE
Task 1.	Acquisition of test detectors/alarms and detector characterization	$90,000	Months 1 - 3

Task 2.	Identify potential dwellings for test Sites	$25,000	Months 1 – 3
Task 3.	Plan for long term site at NIST	$50,000	Months 1 – 3
Task 4.	Review NFIRS data and develop scenarios (NFPA)	NFPA in kind (See Article V.B.Task 4)	Months 1 - 3
Task 5.	Perform modeling studies of sites	$90,000	Months 3 - 6
Task 6.	Develop instrumentation and test plans for sites	$50,000	Months 3 - 6
Task 7.	Identify and acquire fuel items	$50,000	Months 3 - 6
Task 8.	Construct long term test site	$75,000	Months 3-6
Task 9.	Conduct initial fire testing	$145,000	Months 6-12
Task 10.	Conduct initial nuisance alarm testing	$120,000	Months 6-12
Task 11.	Analyze data, model tests and prepare initial test report	$55,000	Months 12-15
Task 12.	Conduct second round of testing	$145,000	Months 15-21
Task 13.	Analyze data, model and prepare final test report	$50,000	Months 21-24
Task 14.	Format data and publish on the Web	$25,000	Months 23-24
Task 15.	Develop public educational materials from test results	$30,000	Months 23-24

XIII. LIAISON OFFICERS

A. NIST PROJECT OFFICER

Richard Bukowski
National Institute of Standards and Technology
100 Bureau Drive Stop 8642

224/A249
Gaithersburg, MD 20899-8642
Phone: (301) 975-6853

B. CPSC PROJECT OFFICER

Arthur Lee
U.S. Consumer Product Safety Commission
Engineering Sciences Directorate
4330 East West Highway, Suite 611
Bethesda, MD 20814
Phone: (301) 504-0508, ext. 1393

C. CPSC FINANCIAL OFFICER

Consumer Product Safety Commission
Directorate for Administration
Accounting Operations
Room 522
Washington, D.C. 20207

AGENCY PAYMENT OFFICER: Ms. Cecelia R. Smith
Telephone (301) 504-0018 ext. 1137

XIV. COST AND TRANSFER OF FUNDS

The total estimated cost for this research project is estimated at $1M over a 2 year period. Each sponsoring entity is providing a portion of the total funding required for this project.

SPONSOR ORGANIZATION	FY-2000 FUNDING	FY-2001 FUNDING
Department of Housing and Urban Development (funding to be provided to NIST under a separate IAG)	$100k	$100k
Consumer Product Safety Commission (funding to be provided to NIST under this IAG)	$100k*	$100k
US Fire Administration (funding to be provided to NIST under this IAG)	$100k*	$100k
Centers for Disease Control and Prevention (funding to be provided to NIST under this IAG)	$100k*	$100k

Underwriters Laboratories (funding to be provided to NIST under a separate agreement)	$100k	$100k

CPSC agrees to transfer a total of $300K for FY00 to NIST under this agreement. Funding for FY-2001 is anticipated to be $300K and will be dependent upon availability.

Payment to NIST will be based on actual costs incurred. Any funds provided by CPSC, but unexpended by NIST shall, at the request of CPSC, be returned prior to the end of the fiscal year.

**funding provided under this IAG*

XV. FUNDING AND ACCOUNTING DATA

The transfer of funds shall be through the On-Line Payment Collection (OPAC) system using the following accounting data:

Transfer From:

00 EXOB-PS 4400.00 0021725 25.3101 $300,000.

XVI. AUTHORITY

Economy Act of 1932, as amended, General Authority: 31 U.S.C. 1535

Section 27(g) of the Consumer Product Safety Act, (15 U.S.C. 2076(g)),

Section 29(d) of the Consumer Product Safety Act, (15 U.S.C. 2078(d))

XVII. FASA COMPLIANCE

As the servicing agency, NIST agrees to act in full compliance with section 1074 of the Federal Acquisition Streamlining Act (FASA) of 1994, entitled "Economy Act Purchases."

Approved and Accepted for
National Institute of Standards and Technology

BY: for Betty J. Lula

TITLE: WILLIAM A. SMOOT, JR.
FINANCIAL POLICY, DIVISION CHIEF

DATE: 9/13/00

Approved and Accepted for
Consumer Product Safety Commission.

BY:

TITLE: ROBERT J. FROST
CONTRACTING OFFICER

DATE: 9/14/00