

**Justification for Survey Instrument
In Partial Fulfillment of the Paperwork Reduction Act Requirements**

For Submission to the Office of Management and Budget (OMB)

August 2, 2007

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Submitted by:

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Supporting Statement

U.S. Department of Housing and Urban Development Office of Policy Development and Research

Humidity Monitoring Survey

Note: This submission is presented as an application for a new collection of information.

- 1. Explain the circumstances that make the collection of information necessary. Identify any legal or administrative requirements that necessitate the collection. Attach a copy of the appropriate section of each statute and of each regulation mandating or authorizing the collection of information.**

Research has shown that indoor relative humidity affects thermal and respiratory comfort. It impacts perception of indoor air quality (IAQ) and the energy consumed for conditioning. High relative humidity also favors growth of dust mites, molds and bugs. In the presence of moisture accumulation in the home, moisture induced damage may occur. However, little to no measured data is available on actual indoor humidity levels in U.S. households. There is a need to develop a more thorough understanding of the impact of the interior environment on the building's performance. Hourly data for a full year collected via this project is required for input to computer models that are increasingly used to make recommendations for building design in various climates.

The proposed field measurements and data monitoring could aid efforts underway by the ASHRAE Standard Committee 160P on "Design Criteria for Preventing Moisture Damage in Buildings" and others to develop moisture modeling tools and related technical standards. The results shall provide data and points of reference that will improve a home's durability by minimizing durability problems associated with high moisture levels. By effectively designing to control moisture in homes, the subsequent development of moisture related problems (including mold) should largely be addressed.

This is a new collection. This survey is authorized under Title 12 (Section 1701z-1.).

- 2. Indicate how, by whom, and for what purpose the information is to be used. Except for a new collection, indicate the actual use the agency has made of the information received from the current collection.**

This collection will be a one-time effort. The information will be collected to develop a final report and the effort is not expected to be repeated.

The respondents for this survey will be homeowners. The contractor will develop a list of candidate households using industry contacts including ASHRAE Committee members, state and local agency staff, utility staff, home builders and contractors.

HUD will provide this data to researchers and engineers. The researchers and engineers will use the information as points of reference to develop new and enhance existing residential moisture models and technical standards. These models and standards will help to improve the durability of homes by minimizing durability problems associated with high moisture levels.

Indoor temperature and humidity data will be collected using small, battery-powered data loggers. They will be installed by field technicians employed by Steven Winter Associates, Inc. House and household characteristic data will also be collected by the field technician during the logger installation visit to the home. More information on the data to be collected and procedures used is provided as an attachment.

- 3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological collection techniques or other forms of information technology. Also describe any consideration of using information technology to reduce burden.**

The home owner will not have to support the data logger effort.

Data loggers will be used to collect moisture and temperature data at 5 locations in each subject home. Other than battery-powered data loggers, the collection of information does not utilize technological data collection techniques that would permit the electronic submission of responses and reduce burden. Much of the data to be collected requires observations and testing by a trained technician with some customization for different site circumstances.

- 4. Describe efforts to identify duplication. Show specifically why similar information already available cannot be used or modified for use for the purposes described in Item 2 above.**

A comprehensive search of the literature and interviews with recognized experts were conducted. The results of this effort is described in the HUD PD&R publication "Building Moisture and Durability: Past, Present, and Future Work" (<http://www.huduser.org/publications/destech/MoistDurability.html>). The report prioritized as 'very high' the project entitled "Characterize the moisture performance of existing homes through a field testing protocol" that focuses exclusively on collecting field measurements and conducting data monitoring of moisture-related issues in a sample of newly-built homes and existing homes around the county.

There are limited current information sources available. However, these are limited to a single home in a single climatic location. The proposed effort will collect information from 20+ homes in three different climatic locations (a total of 70 homes).

- 5. If the collection of information impacts small businesses or other small entities (Item 5 of OMB Form 83-I), describe any methods used to minimize burden.**

Because this collection will be limited to households, the collection of information does not impact small businesses or other small entities.

- 6. Describe the consequences to Federal program or policy activities if the collection is not conducted or is conducted less frequently, as well as any technical or legal obstacles to reducing burden.**

If the collection effort is not conducted, information will not be available to researchers and engineers developing the next generation of moisture models and technical standards. The researchers and engineers may choose to develop these models and standards with less information than will be available as a result of this collection. In that case, researchers and engineers may develop unrealistic models and standards, which may result in a more costly or less effective solution.

The proposed survey strikes a balance between collecting minimal data on a larger sample of homes and extensive data on a much smaller sample of homes. A modest number of sites is needed to capture the diversity and important variations within the housing population. And sufficient characteristic data is needed to more fully understand and enhance the value of the humidity data collected.

One or two pretest sites are planned to finalize data collection procedures and confirm the comprehensiveness of the data to be collected.

- 7. Explain any special circumstances that would cause an information collection to be conducted in a specific manner.**

There are no conditions that would require applicants to conform to any specific method of information collection.

- 8. If applicable, provide a copy and identify the date and page number of publication in the Federal Register of the agency's notice, as required by 5 CFR 1320.8(3), soliciting comments on the information collection prior to submission to OMB. Summarize public comments received in response to that notice and actions by the agency.**

A copy of the Federal Register notice soliciting public comments is attached. The Federal Register notice (60 day) was published on April 4, 2007, reference number FR-5123-N-08. No comments were received. There was one inquiry, which was from the American Society for Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE), a professional engineering association, inquiring if their members were involved.

HUD responded to the ASHRAE inquiry with an affirmative statement that their members had been previously included on an advisory panel for this effort.

An advisory panel, predominately comprised of members of the ASHRAE Standard 160P Committee, has been created to review and comment on the proposed data to be collected and procedures for data collection. An acknowledged moisture expert, Anton Tenwolde with the Forest Products Laboratory, is acting as a consultant on the project as well.

9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

There will be no payment or gift to respondents. However, upon completion of the data collection period, survey participants will be given a brief energy audit report. Much of the characteristic information to be collected is relevant to the energy efficiency of the home.

10. Describe any assurance of confidentiality provided to respondents and the basis for the assurance in statute, regulations, or agency policy.

There will be no assurance of confidentiality to the respondents. If, during the interviews, the home owner feels some information is sensitive, the interviewer will work with the respondent to record it in a manner where it will not be considered confidential. If the interviewer is not able to reach agreement with the respondent, the confidential information will not be recorded.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private.

No questions of a sensitive nature will be asked.

12. Provide estimates of the hour burden of the collection of information.

70 individuals will be surveyed in person. Average time to complete the survey is 20 minutes. Respondents will be contacted three times, once every six months. Each respondent will spend an additional 5+ hours waiting as the

house is instrumented, instrumentation is checked, and instrumentation is removed. Total burden hours are 420.

The costs estimated below are based on an estimated labor rate of \$32.08 (GS-13 Step 1 equivalent). Based on the information described in item 12, the costs are:

70 respondents * 6.0 hours/respondent	=	420 labor hours
420 labor hours * \$32.08 per hour	=	\$13473.60

The total effort is estimated to be 420 labor hours (\$13473.60) for this one time requirement.

13. Provide an estimate of the total annual cost burden to respondents or recordkeepers resulting from the collection of information.

No start up or operations and maintenance costs are anticipated.

14. Provide estimates of annualized cost to the Federal government.

The information collection will be performed by a contractor. Assuming each of the 70 initial contacts requires six hours (420 hours total for 70 respondents) and the questionnaire requires 1 hours (70 hours total for 70 respondents), the total collection effort will be 490 hours. The cost to the Federal government shown below assumes a GS 13 Step 5 equivalent:

It will take approximately 7.0 labor hours to prepare for and collect the information.

70 respondents * 7 hour/respondent	=	420 labor hours
490 labor hours * 36.36 per hour	=	\$17,816

The total effort for the Federal government is estimated to be 490 labor hours (\$17,816).

15. Explain the reasons for any program changes or adjustments reported in Items 13 and 14 on the OMB Form 83-I.

Because this is a new collection request, there are no changes or adjustments.

16. For collections of information whose results will be published, outline plans for tabulation and publications.

The results of the information collection will be published in a compilation of requirements described by the respondents. The publication may also include a CDrom containing the raw data from the data loggers. This report will be published by HUD and will be available to the public. It is also anticipated that a

technical paper on this research will be presented at an American Society for Heating, Refrigerating, and Air-conditioning Engineers meeting.

- 17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.**

The Department is not seeking approval to not display the expiration date on the information collection documents.

- 18. Explain each exception to the certification statement identified in Item 19 of OMB Form 83-I, Certification for Paperwork Reduction Act Submission.**

There are no exceptions to the certification statement identified in Item 19 of OMB Form 83-I, Certification for Paperwork Reduction Act Submission.

Appendix A

First Federal Register Notice

[Federal Register: April 4, 2007 (Volume 72, Number 64)]

[Notices]

[Page 16381-16382]

From the Federal Register Online via GPO Access [wais.access.gpo.gov]

[DOCID:fr04ap07-83]

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

[Docket No. FR-5123-N-08]

Notice of Proposed Information Collection for Public Comment on
the Humidity Monitoring Survey

AGENCY: Office of the Policy Development and Research, HUD.

ACTION: Notice.

SUMMARY: The proposed information collection requirement described
below will be submitted to the Office of Management and Budget (OMB)
for review, as required by the Paperwork

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Reduction Act. The Department is soliciting public comments on the
subject proposal.

DATES: Comments Due Date: June 4, 2007.

ADDRESSES: Interested persons are invited to submit comments regarding
this proposal. Comments should refer to the proposal by name and/or OMB
Control Number and should be sent to: Reports Management Liaison
Officer, Office of Policy Development and Research, Department of
Housing and Urban Development, 451 7th Street, SW., Room 8234,
Washington, DC 20410-5000.

FOR FURTHER INFORMATION CONTACT: Mr. Michael Blanford, Research
Engineer, Office of Policy Development and Research, Department of
Housing and Urban Development, 451 7th Street, SW., Room 8134,
Washington, DC 20410-5000. Call (202) 402-5728 for copies of the
proposed forms and other available documents. (This is not a toll-free
number).

SUPPLEMENTARY INFORMATION: The Department will submit the proposed
information collection to OMB for review, as required by the Paperwork
Reduction Act of 1995 (44 U.S.C. Chapter 35, as amended). This Notice
is soliciting comments from members of the public and affected agencies

concerning the proposed collection of information to: (1) Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility; (2) Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information; (3) Enhance the quality, utility, and clarity of the information to be collected; and (4) Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated collection techniques or other forms of information technology (e.g., permitting electronic submission of responses).

This Notice also lists the following information:

Title of Proposal: Humidity Monitoring Survey.

Description of the need for the information and proposed use: This request is for the clearance of a survey instrument designed to measure the humidity levels in single family residences. The purpose of the survey is: (1) Collect moisture load data to support research to better understand the impact of moisture on the durability of homes; (2) Support the development of design criteria, such as ASHRAE Standard 160P, that will minimize durability problems associated with high moisture levels; (3) Investigate the influence of the interior and exterior conditions on the moisture level of typical single family detached homes.

OMB Approval Number: Pending OMB approval.

Agency form numbers: None.

Members of Affected Public: Individuals.

Estimation of the total number of hours needed to prepare the information collection including number of respondents, frequency of response, and hours of response: 70 individuals will be surveyed in person. Average time to complete the survey is 20 minutes. Respondents will be contacted three times, once every six months. Total burden hours are 70.

Status of the proposed information collection: New.

Authority: Section 3506 of the Paperwork Reduction Act of 1995, 44 U.S.C. Chapter 35, as amended.

Dated: March 29, 2007.

Darlene F. Williams,
Assistant Secretary for Policy Development and Research.
[FR Doc. E7-6226 Filed 4-3-07; 8:45 am]
BILLING CODE 4210-67-P

Appendix B

Survey Sample Selection and Data Collection Procedures

Sample Selection Procedures

The project intent is to collect data from a total of 70 homes; at least 20 in each of three different climatic regions - the cold/humid Pacific Northwest, the cold Midwest, and the hot/humid Southeast. Each house in the sample will be treated separately to provide data for appropriate moisture models. The purpose is to capture a variety of homes in these three regions in order to provide a more complete set of data. This sample is not intended to be a representative sample. The intent is to capture the diversity of single family homes in each region but not be representative of the United States or those regions.

The following is an outline of the selection process:

1. Develop lists of candidate households using industry contacts including ASHRAE Committee members, state and local agency staff, utility staff, home builders and contractors.
2. Conduct pre-screening telephone calls using the Recruitment Script document (Appendix C).
3. Obtain signed agreements from participants using the Monitoring Agreement attached.

A convenience sample, including a few quota samples to capture a range of conditions, will be utilized. It is important to have a range of household characteristics including high occupancy (6 occupants/1000 square feet) households. And, it is important to have a variety in types of single family housing (size, configuration, age, etc.).

Some effort will be made to consolidate the sites to a focused area within each climate region, but only if this can be accomplished without compromising the selection goals.

A convenience sample is appropriate for this type of engineering research as the purpose is to identify how the specific housing unit characteristics noted above can affect humidity levels in different climate regions. This research is not intended or appropriate for making descriptive statements about all housing units or to examine other variables not being measured such as variation in demographic characteristics or other human factors that would require representative samples.

Data Collection Procedures

Initial Visit

An initial field visit will be made to each participant site to complete the attached Field Data Collection Form (Appendix D) and install the data loggers for long-term monitoring of temperature and relative humidity. It is anticipated that this visit will require approximately two hours.

Completion of the Data Collection form will involve a brief in-person survey (1st page), observations of construction and mechanical equipment characteristics (1st and 2nd pages), and testing of the building envelope and duct system(s) (3rd page). Bath exhaust fan air flows will be measured with an Alnor LoFlo Balometer or Energy Conservatory Exhaust Fan Flow Meter. A blower door test will be used to quantify envelope tightness. A duct blaster or Delta-Q test will be performed to quantify duct leakage.

Subsequent to this short-term assessment, SWA field technicians will install five data loggers at each site for long-term monitoring of temperature and relative humidity. The following collection data is planned:

- o outdoor temperature and relative humidity
- o primary living space (family/great room) temperature and relative humidity
- o master bedroom temperature and relative humidity (If master bedroom is on the first floor of a two-story home, a second floor bedroom will be substituted.)
- o primary use bathroom temperature and relative humidity
- o basement or crawlspace temperature and relative humidity
- o for slab construction, attic temperature and relative humidity

We currently plan to use HOBO dataloggers by Onset Computer unless a more appropriate product becomes available. These loggers are low cost, nonintrusive, and relatively simple to use. These loggers will record the surrounding temperature and relative humidity every 15 minutes. These data will be averaged during post-processing to provide hourly data for model input.

We anticipate using the Pro v2 U23-002 for outdoor and attic measurements and the U12-011 for indoor measurements. Technicians will secure the loggers in locations that are appropriate for the desired measurement as well as acceptable to the homeowners. Homeowners will be instructed to not move or tamper with the loggers.

Contact information for the Contractor shall be placed on each data logger.

Interim Visit

Approximately six months after the initial visit, a second visit to each site will be made. The primary objective of this visit is to check on and download data from the loggers. The loggers have the capacity to hold more than 200 days of readings as 15-minute intervals. It is believed that this interim visit will help assure the integrity and reliability of the data.

Final Visit

Upon one year of data collection, the sites will be visited again to remove and download data from the loggers.

Appendix D

Recruitment Script

This survey is being conducted by Steven Winter Associates under contract with the U.S. Department of Housing and Urban Development (HUD). The questions included in the survey have been reviewed by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (OMB Control #_____, expiration date _____). The estimated time to complete this recruitment survey is 10 to 20 minutes. Participation in this Government-sponsored survey is voluntary. Please be aware that the information provided in this survey will be kept strictly confidential. The names or other identifying information for individuals that respond to this survey will not be used in any published reports or datasets nor will this identifying information be shared with HUD.

We are conducting a research study on humidity levels in homes and your home has been identified as a potential candidate for the study. The study involves a researcher coming to your home, conducting some tests to determine the tightness of your home and the performance of your HVAC systems, and installing several non-intrusive sensors that will remain for a year. Would you be willing to participate?

If response is yes, ask the following:

This is a year-long monitoring study. Based upon your current circumstances, do you plan to stay in your current home for at least a year?

How many people live in the home?

Do you anticipate any significant changes to the home's occupancy during the coming year (e.g., new family members, kids going off to college, etc.)?

Do you plan to do any remodeling or additions in the coming year?

How old is the home?

Is the home single- or two-story?

Does it have a basement? Finished?

Verify home's address.

Obtain information for contacting again to schedule visit.

Determine convenient time(s) for 5 hour visit. Certain days of week? Morning vs. afternoon?